

Release Notes for Cisco ASR 9000 Series Routers, IOS XR Release 24.2.1

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IOS XR 64-bit on Cisco ASR 9000 Series is the next generation operating system running in a virtualized environment with an underlying 64-bit Linux kernel. Cisco IOS XR operating system delivers greater agility, automation, and simplicity while reducing the cost of operating the networks.

References

For more information about Cisco ASR 9000 Series, see:

- Cisco ASR 9000 Data Sheet listing page
- Migration Guide for Cisco ASR 9000 Series Routers

What's New in Cisco IOS XR Release 24.2.1

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

New in Documentation

Feature	Description
Cisco IOS XR Feature Finder	We have launched this interactive tool that assists you in locating features introduced across Cisco IOS XR releases and platforms. This tool empowers you to explore, discover, and utilize the full potential of our platforms. As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note here.

Software Features Enhanced and Introduced

Feature	Description
System Setup and Software Installation	

Feature	Description
ZTP for Cisco ASR 9000 Series 4th and 5th Generation High-Density Multi-Rate Line Cards	Support for Classic ZTP is extended to the following 4th-generation line cards: • A9K-16X100GE-TR • A99-16X100GE-X-SE • A99-32X100GE-TR Support for Classic ZTP is extended to the following 5th-generation line cards: • A9K-4HG-FLEX-TR • A9K-4HG-FLEX-SE • A99-4HG-FLEX-TR • A99-4HG-FLEX-SE • A9K-8HG-FLEX-TR • A9K-8HG-FLEX-SE • A9K-20HG-FLEX-TR • A9K-20HG-FLEX-SE • A99-32X100GE-X-TR • A99-32X100GE-X-SE • A99-10X400GE-X-TR • A99-10X400GE-X-SE
Routing	
BGP Flowspec with SRv6 on Cisco ASR 9000 Series 5th Generation High-Density Multi-Rate Line Cards	A solution that uses BGP Flowspec along with SRv6 to provide enhanced Traffic Engineering capabilities and comprehensive network security, is now supported on the Cisco ASR 9000 Series 5th Generation High-Density Multi-Rate Line Cards.
Multi-area Loopback Interface for OSPF	You can save IP addresses and resources, prevent the use of multiple node SIDs for labels associated with loopback interfaces, and save time configuring multiple loopback interfaces for an Area Border Router (ABR) in a network. These improvements are possible as you can now configure a single loopback interface for multiple areas. With this feature, an ABR can use a single loopback interface for all areas it connects to, eliminating the need for separate loopback interfaces for each area. Previously, each loopback interface was linked to only one area. The feature introduces these changes: **CLI:** The **multi-area-interface** command is extended to support loopback interfaces.

Feature	Description
Protect IS-IS Processes in OOR Conditions	This feature enables prompt alerts for out-of-resource conditions in IS-IS processes that could otherwise cause network instability and disruption due to memory leaks and excessive link-state packets (LSPs). That, in addition, they can disable the overload bit status flag that's included in the router's LSP to prevent setting of the overload-bit, but it's not recommended without Cisco consultation This ability to protect IS-IS processes in OOR conditions is enabled by default and you can't disable it. Previously, during OOR conditions, IS-IS processes restarted themselves, but the OOR conditions could persist. The feature introduces these changes: **CLI:** • The feature introduces fields that indicate the memory state of the IS-IS protocol in the **show isis protocol** command. • **oor-set-overload-bit disable** command. **YANG Data Model** • New XPaths for `Cisco-IOS-XR-clns-isis-cfg` • `Cisco-IOS-XR-um-router-isis-cfg` (see GitHub, YANG Data Models Navigator)
Segment Routing	
Data Plane Validation for SR-MPLS IPv6-based Controller Instantiated LSPs	You can now verify the network configuration and paths and policies set up, without interrupting or potentially disrupting live network traffic, for SR-MPLS (Segment Routing over Multiprotocol Label Switching) IPv6-based Label Switched Paths (LSPs). With this feature, you can validate controller instantiated LSPs programmed directly into the forwarding hardware. Previously, SR data plane validation was possible over IPv4-based LSPs. The feature introduces these changes: **CLI:** The **dataplane-only** keyword is introduced in the **traceroute sr-mpls** and **ping sr-mpls** commands. **YANG Data Models:** • `Cisco-IOS-XR-mpls-traceroute-act.yang` • `Cisco-IOS-XR-mpls-ping-act.yang` See (GitHub, Yang Data Models Navigator)

Feature	Description
Display Neighbor Router Capabilities in OSPF Networks	You can now improve the user experience, understand the features and functionalities supported by neighboring routers, reduce operational work hours and human errors by gaining better visibility into the routing capabilities of directly connected neighboring routers in an OSPF network. These improvements are now possible when you enable Segment Routing on a neighboring connected router. Previously, there was no straightforward method to display the segment routing and other capabilities of neighboring routers in an OSPF network. The feature introduces these changes: **CLI:** • The **capabilities** keyword is introduced in the **show ospf neighbor** command. **YANG Data Models:** • `Cisco-IOS-XR-ipv4-ospf-oper.yang` See (GitHub, Yang Data Models Navigator)
Dual-Stack Support with SRv6 Unicast and IPv4 Multicast Core	This feature introduces dual-stack support with SRv6 for unicast traffic and IPv4 for multicast communication. The dual-stack simplifies the routing process by combining the advantages of both IPv4 and SRv6 protocols, and facilitates smoother interoperability between the two protocols. The dual-stack enables efficient unicast communication through SRv6 by allowing precise control over the path that a packet takes through a network and streamlines the network routing, while using the deployment support of IPv4 for multicast traffic.
MPLS OAM support for SR-TE Policies using MPLS IPv6-based LSPs	You can now verify the network configuration and paths and SR-TE policies set up, without interrupting or potentially disrupting live network traffic, for SR-MPLS (Segment Routing over Multiprotocol Label Switching) IPv6-based Label Switched Paths (LSPs). Previously, MPLS OAM support was only for IPv4-based LSPs. The feature introduces these changes: **CLI:** The **traceroute sr-mpls** and **ping sr-mpls** commands are extended to support IPv6 nexthop addresses. **YANG Data Models:** • `Cisco-IOS-XR-mpls-traceroute-act.yang` • `Cisco-IOS-XR-mpls-ping-act.yang` See (GitHub, Yang Data Models Navigator)

Feature	Description
Path MTU Discovery for SRv6 Packets on Ingress Provider Edge (PE) Routers, Egress (PE) Router and Provider Core Router Transit Nodes	You can measure and monitor the packet loss information when one SRv6-enabled router sends an oversized packet to another. This functionality enables a router to send an ICMP error message to the source in such cases, prompting the sender to resend a packet whose size is within the MTU value, thus ensuring the packet moves ahead. The feature is critical for SRv6-enabled routers as these routers do not support packet fragmentation. Previously, a router dropped oversized packets without notifying the source, resulting in packet loss. This feature is enabled by default.
User-Defined Generic Metric Support for IS-IS Flex Algo	This feature adds support for user-defined generic metric as a metric type for IS-IS Flexible Algorithm. You can now have more control over traffic flows using user-defined generic metrics. You can define a family of user-defined generic metrics that can advertise different types of administrative metrics such as jitter, reliability, and fiscal cost depending on the traffic class for Flexible Algorithms. You can selectively define and assign semantics of these metrics as per the network requirement. The feature introduces the following changes: **CLI**: • The feature introduces the **generic-metric flex-algo** and **metric-type generic** commands. **YANG Data Models:** • `Cisco-IOS-XR-um-router-isis-cfg.yang`
IP Addresses and Services	
TCP Dump File Converter	You can now convert an entire TCP dump of packet traces in binary files into readable formats such as text or cap, which makes it easier to analyze them for troubleshooting using third-party or open-source tools. This feature saves time and effort by preventing the need to examine each packet for failure. This feature introduces the **tcp dump-file convert** command.
L2VPN and Ethernet Services	
PBB-EVPN (Deprecated)	Starting from Cisco IOS XR Release 24.2.1, the Provider Backbone Bridge (PBB)-EVPN feature is deprecated and will not be supported in future releases. We recommend not to use this feature starting from Cisco IOS XR Release 24.2.1.
Modular QoS	
Set IP Marking for SRv6 Encapsulation	With this feature support for IP marking for SRv6 packets that are encapsulated, there are some important updates to the QoS behavior. This is an explicit packet marking feature that applies only to ingress QoS policies. **CLI:** This feature introduces the **set ip encapsulation** command.
General Administration	

Feature	Description
Higher Single-Tagged VLAN Subinterface Capacity with Layer 2 TCAM Profile on Cisco ASR 9000 Series 5th Generation High-Density Multi-Rate Line Cards	This feature allows you to configure the L2 TCAM profile that facilitates higher scale capacity for single-tagged VLAN subinterfaces on the Cisco ASR 9000 Series 5th generation high-density multi-rate line cards. With this configuration, the feature supports up to 40,000 Single-tagged Layer 2 VLAN subinterfaces. **CLI:** This feature introduces the **hw-module profile itcam lightspeed l2tcam** command.
Increasing Commit Limit	The maximum number of commits is increased in the router that allows you to configure complex topology changes without interruptions caused by the default blocking of commit changes during rebase or ASCII backup operations. You can prevent the commit operation from getting blocked by using the **cfs check** command, which increases the commit (pacount) count from 20 to 40, and the commit file diff size (configuration data) from 2 MB to 4 MB, and by using the **clear configuration ascii inconsistency** command, which performs an ASCII backup after 55 minutes. The feature modifies the following commands: • **cfs check** • **clear configuration ascii inconsistency**
System Security	
Lawful Intercept on MPLS Layer 3	You can now enable lawful intercept (LI) consistently across different underlying transport technologies. This is made possible by enabling the lawful intercept at the MPLS Layer 3 in the network. You can enable lawful intercept using the SNMPv3. Additionally, Lawful Intercept enablement at MPLS Layer 3 allows managing LI centrally, which makes it easier for service providers to comply with Law Enforcement Agencies (LEAs) requests and reduce administrative overhead.
CGv6	
Configurable TCP Maximum Segment Size for MAP-T	You can now configure a TCP Maximum Segment Size (MSS) for each MAP-T instance and adjust the MSS value of the forwarded Synchronize (SYN) packets to the configured value. This ensures that TCP segments are within the network capacity and prevents fragmentation. The feature introduces these changes: **CLI:** • **tcp mss (map-t)** **YANG Data Model**: Cisco-IOS-XR-um-service-cfg (see GitHub, YANG Data Models Navigator)

Feature	Description
Scaling Up of MAP-T Instances	You can now service an increased number of address-mapping requirements for the network traffic requiring a transition from IPv4 to IPv6 and IPv6 to IPv4 networks. Such scaling is possible because we've expanded our mapping of address and port translation (MAP-T) instance capacity increasing 255–2000, enabling more comprehensive address mapping for network traffic transitioning between IPv4 and IPv6. This increase improves scalability, load balancing, IPv4 address efficiency, and ensures seamless connectivity with enhanced performance and security across IPv4, IPv6 networks. These expansions are available only on Cisco ASR 9000 Series 5th Generation High-Density Multi-Rate Line Cards. The feature introduces these changes: **CLI:** • **hw-module profile itcam lightspeed**

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	
openconfig-local-routing.yang Version 2.0.1	The OpenConfig data model, which is part of the openconfig-network-instance.yang data model is revised from version 1.2.0 to 2.0.1. This revision enables you to configure the preference for the order selection when multiple sources, such as protocols and static routes, contribute to the same prefix entry. A lower number signifies a better preference. When the preference value is not specified, default preference value is considered which is one. This data model supports event-driven and Model-driven telemetry.

Feature	Description
Cisco-IOS-XR-infra-statsd-oper.yang	Previously, the native path for statsd included an additional 'mechanism' node, which supported 'Total', 'Cache', and 'Latest' options. This mechanism node has been removed. With the removal of the mechanism node, all queries will now be addressed using the cache only **Previous Path:** sensor-path Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/<**mechanism**>/<data-type> **Updated Path:** sensor-path Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/<data-type>" The supported paths are Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/**GenericCounters | DataRate | InterfacesMIBCounters | Protocols**
openconfig-sflow.yang Version 1.0.0	This OpenConfig data model is enhanced to support: • stream cadence-driven telemetry data for the total number of flow record packets sent to the collector using **packets-sent** leaf • stream cadence-driven telemetry data for the total number of packets sampled from the interface using **packets-sampled** leaf This data model supports model-driven telemetry and not event-driven telemetry.
Cisco-IOS-XR-service-cgn-mapt-cisco-oper.yang	This Cisco unified YANG data model enables you to configure MTUs for a specific service or a network and the next-hop service set for redirection to another router, which can handle the fragmentation for IPv4 or IPv6 MAP-T traffic.
Cisco-IOS-XR-infra-statsd-oper.yang	The native yang data model streams cached counters using a TARGET_DEFINED subscription. It enables you to fetch interface statistics, such as bytes-received, packets-received and other details, from a cache which is periodically updated from hardware using generic-counters container. The hardware-timestamp field indicates the timestamp of the most recent hardware counter readings. If hardware-timestamp field is 0, the last-data-time field indicates the timestamp of the most recent counter readings, which could be either from hardware or software. This data model supports event-driven telemetry.

Feature	Description
Cisco-IOS-XR-ipv4-ospf-oper.yang	This native data model is enhanced with new leaves *sr-capable, ri-capabilities-tlv, te-capable, gr-capable, grh-capable*, and *host-name* in the *OSPF-SH-NEIGHBOR-DETAIL* and *OSPF-SH-NEIGHBOR* groupings to display neighbor router capabilities in OSPF networks.
Cisco-IOS-XR-mpls-traceroute-act.yang	This unified data model is enhanced with a new container, *ipv6*, and leaves such as *next-hop*, *lsp-endpoint*, and *force-ipv6-explicit-null* in the *type-ipv6-next-hop* interface to extend support to Segment Routing OAM to verify network configuration for SR-MPLS IPv6-based LSPs.
Cisco-IOS-XR-mpls-ping-act.yang	This unified data model is enhanced with a new container, *ipv6*, and leaves such as *next-hop*, *lsp-endpoint*, and *force-ipv6-explicit-null* in the *type-ipv6-next-hop* interface to extend support to Segment Routing OAM to verify network configuration for SR-MPLS IPv6-based LSPs.
Cisco-IOS-XR-um-router-isis-cfg	This unified data model is enhanced with new containers *generic-metric*, and *generic-metric-level* to define a family of user-defined generic metrics that can advertise different types of administrative metrics such as jitter, reliability, and fiscal cost depending on the traffic class for Flexible Algorithms.

Hardware Introduced

Hardware	Description
Optics	**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. This release introduces the following optics: • Cisco 100GBASE Quad Small Form-Factor Pluggable (QSFP) CVR-QSFP28-SFP25G

Caveats

There are no caveats in this release.

Behavior Changes

- The **profile-dot1q** profile supports 40,000 single-tagged Layer 2 VLAN sub-interfaces and 16,000 double-tagged Layer 2 VLAN sub-interfaces.
- The **cef load-balancing algorithm adjust** command is supported on the following line cards:
  - A9K-16X100GE-TR

- A99-32X100GE-TR
- A9K-20HG-FLEX-SE
- A9K-20HG-FLEX-TR

- Cisco IOS XR enforces the existence of the leaves referenced by OpenConfig list key leafrefs. If the referenced leaves do not exist in the OpenConfig datastore, the following error is returned:

  Leaf `name` inside the `config` container must also be set to value `default` to satisfy the leafref constraint on the list key.

- To configure load-balancing parameters, use the **cef load-balancing** command in Global configuration mode.
- When multiple IS-IS instances are configured on a router, by default, **show isis** commands display information from all IS-IS instances. To display information from only one specific IS-IS instance, use the **set default-isis-instance** command in the EXEC mode.

Deprecated Features

- PBB-EVPN: Starting from Cisco IOS XR Release 24.2.1, the Provider Backbone Bridge (PBB)-EVPN feature is deprecated and will not be supported in future releases. We recommend not to use this feature starting from Cisco IOS XR Release 24.2.1.

Supported Packages and System Requirements

Feature Set (Software Images)

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

Cisco IOS XR 64 bit

This table lists the feature set matrix (ISO and RPM files) and associated filenames available for the Cisco IOS XR 64 bit 24.2.1 Release supported on the Cisco ASR 9000 Series Aggregation Services Router.

Table 1: Cisco IOS XR 64 bit Software Release 24.2.1 TAR Files

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software [for RSP and RP systems]	ASR9K-x64-iosxr-px-24.2.1.tar	• Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR MPLS -TE and RSVP Package • Cisco IOS XR Multicast Package • Cisco IOS XR Optics Package • Cisco IOS XR BNG Package • Cisco IOS XR Lawful Intercept Package • Cisco IOS XR Satellite Package • Cisco IOS XR EIGRP Package • Cisco IOS XR ISIS Package • Cisco IOS XR OSPF Package • Cisco IOS XR Service Package
Cisco IOS XR IP/MPLS Core Software 3DES [for RSP and RP systems]	ASR9K-x64-iosxr-px-k9-24.2.1.tar	• Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR MPLS -TE and RSVP Package • Cisco IOS XR Multicast Package • Cisco IOS XR Optics Package • Cisco IOS XR BNG Package • Cisco IOS XR Lawful Intercept Package • Cisco IOS XR Satellite Package • Cisco IOS XR Security Package • Cisco IOS XR EIGRP Package • Cisco IOS XR ISIS Package • Cisco IOS XR OSPF Package • Cisco IOS XR Service Package

Feature Set	Filename	Description
Cisco IOS XR IP Unicast Routing Core Bundle and Migration to IOS XR 64 bit tar image	asr9k-mini-x64-migrate_to_eXR.tar-24.2.1	Contains the required core packages, including OS, Admin, Base,Forwarding, Modular Services Card, Routing, FPD, SNMP Agent, and Alarm Correlation. Contains mini.iso file for XR 64 bit 24.2.1 and additional software for migration to 64 bit.

Table 2: Cisco IOS XR 64 bit Software Release 24.2.1 ISO and RPM Files

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR IP Unicast Routing Core Bundle	asr9k-mini-x64-24.2.1.iso	Contains the required core packages, including OS, Admin, Base,Forwarding, Modular Services Card, Routing, FPD, SNMP Agent, and Alarm Correlation. The mini iso file is used for upgrading to the new release.
Individually-Installable Optional Packages		
Feature Set	**Filename**	**Description**
Cisco IOS XR 64 bit EIGRP package	asr9k-eigrp-x64-1.0.0.0-r2421.x86_64.rpm	Includes EIGRP protocol support software
Cisco IOS XR BNG Package	asr9k-bng-x64-1.1.0.0-r2421.x86_64.rpm	Includes binaries to support BNG features.
Cisco IOS XR 64 bit ISIS package	asr9k-isis-x64-1.1.0.0-r2421.x86_64.rpm	Includes IS-IS Link state protocol support software
Cisco IOS XR 64 bit OSPF package	asr9k-ospf-x64-1.1.0.0-r2421.x86_64.rpm	Includes OSPF link state protocol support software
Cisco IOS XR Manageability Package	asr9k-mgbl-x64-3.0.0.0-r2421.x86_64.rpm	CORBA2 agent, XML3 Parser, and HTTP server packages. This RPM also contains some SNMP MIB infrastructure. Certain MIBs won't work if this RPM is not installed. IPSLA and environment MIBs are part of the mgbl rpm.
Cisco IOS XR 64 bit MPLS-TE and RSVP package	asr9k-mpls-te-rsvp-x64-1.2.0.0-r2421.x86_64.rpm	MPLS Traffic Engineering (MPLS-TE), Resource Reservation Protocol (RSVP).

Cisco IOS XR 64 bit MPLS Package	asr9k-mpls-x64-2.1.0.0-r2421.x86_64.rpm	Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI) and Layer-3 VPN.
Cisco IOS XR 64 bit Multicast Package	asr9k-mcast-x64-2.0.0.0-r2421.x86_64.rpm	Multicast Routing Protocols (PIM, Multicast Source Discovery Protocol [MSDP], Internet Group Management Protocol [IGMP], Auto-RP), Tools (SAP, MTrace), and Infrastructure [(Multicast Routing Information Base [MRIB], Multicast-Unicast RIB [MURIB], Multicast forwarding [MFWD]), and Bidirectional Protocol Independent Multicast (BIDIR-PIM).
Cisco IOS XR 64 bit Optics Package	asr9k-optic-x64-1.0.0.0-r2421.x86_64.rpm	Firmware for the optics feature for Cisco ASR 9000 Series Aggregation Services Router Chassis. It enables Transport / OTN feature under interfaces.
Cisco IOS XR 64 bit Lawful Intercept (LI) Package	asr9k-li-x64-1.1.0.0-r2421.x86_64.rpm	Includes LI software images.
Cisco IOS XR Security Package	asr9k-k9sec-x64-3.1.0.0-r2421.x86_64.rpm	Support for Encryption, Decryption,, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI).
Cisco IOS XR Satellite Package -ASR9000v	asr9k-9000v-nV-x64-1.0.0.0-r2421.x86_64.rpm	Includes RPM to support Cisco ASR9000v Series Router Software and to support Cisco ASR 9000v Series Router as a satellite for Cisco ASR 9000 Series Router
Cisco IOS XR 64 bit Services Package	asr9k-services-x64-1.0.0.0-r2421.x86_64.rpm	Includes RPM to support Cisco IOS XR 64-bit inline MAP-T function

Memory

Caution If you remove the media in which the software image or configuration is stored, the router may become unstable and fail.

The available memory for Cisco ASR 9000 Series Aggregation Services Router running Cisco IOS XR Software Release 24.2.1 consist of the following:

- 32 GB memory on the A99-RP-F
- 16 GB memory on the RP2 transport optimised (TR) variant and 32 GB memory on the RP2 service edge (SE) variant
- 24 GB memory on the RP3 transport optimised (TR) variant and 40 GB memory on the RP3 service edge (SE) variant

- 24 GB memory on the RP3-X transport optimised (TR) variant and 48 GB memory on the RP3-X service edge (SE) variant
- 24 GB memory on the RSP5 transport optimised (TR) variant and 40 GB memory on the RSP5 service edge (SE) variant
- 24 GB memory on the RSP5-X transport optimised (TR) variant and 48 GB memory on the RSP5-X service edge (SE) variant
- 2 GB compact flash on route switch processors (RSPs)
- 8 GB memory on the line cards (LCs) running Cisco IOS XR 64-bit image

Software Compatibility

Cisco IOS XR Software Release 24.2.1 is compatible with the following Cisco ASR 9000 Series Aggregation Services Router systems.

- Cisco ASR 9900 Series Chassis
  - Cisco ASR 9922 Chassis
  - Cisco ASR 9912 Chassis
  - Cisco ASR 9910 Chassis
  - Cisco ASR 9906 Chassis
  - Cisco ASR 9904 Chassis
  - Cisco ASR 9903 Chassis
  - Cisco ASR 9902 Chassis
  - Cisco ASR 9901 Chassis
- Cisco ASR 9000 Series Chassis
  - Cisco ASR 9010 Chassis
  - Cisco ASR 9006 Chassis

For Cisco license support, please contact your Cisco Sales Representative or Customer Service at 800- 553-NETS (6387) or 408-526-4000. For questions on the program other than ordering, please send e-mail to: cwm-license@cisco.com.

Determining Installed Packages

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

Cisco IOS XR 64 bit

```
Router# show install active summary
Label : 24.2.1
    Active Packages: 18
        asr9k-xr-24.2.1 version=24.2.1 [Boot image]
        asr9k-9000v-nV-x64-1.0.0.0-r2421
        asr9k-bng-ipoe-x64-1.0.0.0-r2421
        asr9k-bng-supp-x64-1.0.0.0-r2421
        asr9k-bng-x64-1.0.0.0-r2421
        asr9k-bng-pppoe-x64-1.0.0.0-r2421
        asr9k-eigrp-x64-1.0.0.0-r2421
```

```
asr9k-isis-x64-1.0.0.0-r2421
asr9k-k9sec-x64-1.0.0.0-r2421
asr9k-li-x64-1.0.0.0-r2421
asr9k-m2m-x64-1.0.0.0-r2421
asr9k-mcast-x64-1.0.0.0-r2421
asr9k-mgbl-x64-1.0.0.0-r2421
asr9k-mpls-x64-1.0.0.0-r2421
asr9k-mpls-te-rsvp-x64-1.0.0.0-r2421
asr9k-optic-x64-1.0.0.0-r2421
asr9k-ospf-x64-1.0.0.0-r2421
asr9k-services-x64-1.0.0.0-r2421
```

Firmware Support on Cisco IOS XR 64-bit

To check the firmware code running on the Cisco ASR 9000 Series Router, run the **show fpd package** command in admin mode:



Note

The show command output lists supported and EOL hardware PIDs. To know the PIDs that are supported in this release, see the Supported Hardware section in this Release Notes.

```
(sysadmin-vm)#show fpd package
================================ ==================================================
                                          Field Programmable Device Package
                                 ==================================================
                                           Req     SW        Min Req     Min Req
Card Type            FPD Description       Reload  Ver       SW Ver    Board Ver
================== ========================= ====== =======  ==========  =========
A99-10X400GE-X-CM    Aldrin-FPGA             YES     1.05       1.05      0.0
                     Beachcomber-0           YES     0.01       0.01      0.0
                     Beachcomber-1           YES     0.01       0.01      0.0
                     CBC                     NO     62.05      62.05      0.0
                     IPU-DDR4                YES     1.06       1.06      0.0
                     Primary-BIOS            YES    25.30      25.30      0.0
                     Sunstreaker             YES     0.19       0.19      0.0
                     TAMFW-Sunstreaker       YES     2.72       2.72      0.0
                     Trailbreaker-0          YES     0.24       0.24      0.0
                     Trailbreaker-1          YES     0.24       0.24      0.0
-------------------------------------------------------------------------------
A99-10X400GE-X-SE    Aldrin-FPGA             YES     1.05       1.05      0.0
                     Beachcomber-0           YES     0.01       0.01      0.0
                     Beachcomber-1           YES     0.01       0.01      0.0
                     CBC                     NO     62.05      62.05      0.0
                     IPU-DDR4                YES     1.06       1.06      0.0
                     Primary-BIOS            YES    25.30      25.30      0.0
                     Sunstreaker             YES     0.19       0.19      0.0
                     TAMFW-Sunstreaker       YES     2.72       2.72      0.0
                     Trailbreaker-0          YES     0.24       0.24      0.0
                     Trailbreaker-1          YES     0.24       0.24      0.0
-------------------------------------------------------------------------------
A99-10X400GE-X-TR    Aldrin-FPGA             YES     1.05       1.05      0.0
                     Beachcomber-0           YES     0.01       0.01      0.0
                     Beachcomber-1           YES     0.01       0.01      0.0
                     CBC                     NO     62.05      62.05      0.0
                     IPU-DDR4                YES     1.06       1.06      0.0
                     Primary-BIOS            YES    25.30      25.30      0.0
                     Sunstreaker             YES     0.19       0.19      0.0
                     TAMFW-Sunstreaker       YES     2.72       2.72      0.0
                     Trailbreaker-0          YES     0.24       0.24      0.0
                     Trailbreaker-1          YES     0.24       0.24      0.0
-------------------------------------------------------------------------------
A99-12X100GE         CBC                     NO     46.06      46.06      0.1
                     IPU-FPGA                YES     1.90       1.90      0.1
                     IPU-FSBL                YES     1.113      1.113     0.1
                     IPU-Linux               YES     1.113      1.113     0.1
                     Morra-0                 YES     1.05       1.05      0.1
                     Morra-1                 YES     1.05       1.05      0.1
                     Primary-BIOS            YES     9.33       9.33      0.1
                     Sideswipe-0             YES     1.02       1.02      0.1
                     Sideswipe-1             YES     1.02       1.02      0.1
-------------------------------------------------------------------------------
A99-12X100GE-CM      CBC                     NO     46.06      46.06      0.1
                     IPU-FPGA                YES     1.90       1.90      0.1
                     IPU-FSBL                YES     1.113      1.113     0.1
                     IPU-Linux               YES     1.113      1.113     0.1
                     Morra-0                 YES     1.05       1.05      0.1
                     Morra-1                 YES     1.05       1.05      0.1
                     Primary-BIOS            YES     9.33       9.33      0.1
                     Sideswipe-0             YES     1.02       1.02      0.1
                     Sideswipe-1             YES     1.02       1.02      0.1
-------------------------------------------------------------------------------
```

A99-16X100GE-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A99-16X100GE-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A99-16X100GE-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A99-16X100GE-X-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
A99-24HG-FLEX-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-24HG-FLEX-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0

A99-24HG-FLEX-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-24X10GE-1G-CM	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-24X10GE-1G-SE	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-24X10GE-1G-TR	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-32X100GE-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
A99-32X100GE-DENS	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.12	0.12	0.0
	Grapple-1	YES	0.12	0.12	0.0
	IPU-DDR4	YES	1.08	1.08	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.08	0.08	0.0
	Skylynx-1	YES	0.08	0.08	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-32X100GE-SE	Aldrin-FPGA	YES	1.05	1.05	0.0

	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
A99-32X100GE-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
A99-32X100GE-X-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-32X100GE-X-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-32X100GE-X-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	57.04	57.04	0.0
	Grapple-0	YES	0.15	0.15	0.0
	Grapple-1	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Mixmaster-1	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Skylynx-1	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-48X10GE-1G-CM	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1

	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Leadfoot-1	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-48X10GE-1G-SE	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Leadfoot-1	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-48X10GE-1G-TR	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Leadfoot-1	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A99-4HG-FLEX-FC	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	63.03	63.03	0.0
	IPU-DDR4	YES	1.05	1.05	0.0
	Moonracer	YES	0.14	0.14	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-4HG-FLEX-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	63.03	63.03	0.0
	IPU-DDR4	YES	1.05	1.05	0.0
	Moonracer	YES	0.14	0.14	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-4HG-FLEX-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	63.03	63.03	0.0
	IPU-DDR4	YES	1.05	1.05	0.0
	Moonracer	YES	0.14	0.14	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A99-4X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0

	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-4X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-CM	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0

	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-8X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99-RP-F	Aldrin-0-FPGA	YES	1.06	1.06	0.0
	CBC	NO	59.13	59.13	0.0
	Lionheart-FPGA	YES	0.30	0.30	0.0
	Longshot	YES	2.16	2.16	0.0
	Primary-BIOS	YES	33.30	33.30	0.0
	TamFW-Longshot	YES	2.65	2.65	0.0
	Wolfpack-FPGA	YES	0.19	0.19	0.0

A99-RP2-SE	Alpha-FPGA	YES	0.16	0.16	0.0
	CBC-0	NO	35.14	35.14	0.0
	CBC-1	NO	35.14	35.14	0.0
	Cha-FPGA	YES	0.09	0.09	0.0
	IPU-FPGA	YES	0.72	0.72	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	14.39	14.39	0.0
A99-RP2-TR	Alpha-FPGA	YES	0.16	0.16	0.0
	CBC-0	NO	35.14	35.14	0.0
	CBC-1	NO	35.14	35.14	0.0
	Cha-FPGA	YES	0.09	0.09	0.0
	IPU-FPGA	YES	0.72	0.72	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	14.39	14.39	0.0
A99-RP3-SE	Aldrin-0-FPGA	YES	1.03	1.03	0.0
	Aldrin-1-FPGA	YES	1.00	1.00	0.0
	Beta-FPGA	YES	0.07	0.07	0.0
	CBC-0	NO	51.12	51.12	0.0
	CBC-1	NO	51.12	51.12	0.0
	IPU-DDR4	YES	0.20	0.20	0.0
	Orion-FPGA	YES	0.23	0.23	0.0
	Primary-BIOS	YES	30.37	30.37	0.0
	Zenith-FPGA	YES	0.12	0.12	0.0
A99-RP3-TR	Aldrin-0-FPGA	YES	1.03	1.03	0.0
	Aldrin-1-FPGA	YES	1.00	1.00	0.0
	Beta-FPGA	YES	0.07	0.07	0.0
	CBC-0	NO	51.12	51.12	0.0
	CBC-1	NO	51.12	51.12	0.0
	IPU-DDR4	YES	0.20	0.20	0.0
	Orion-FPGA	YES	0.23	0.23	0.0
	Primary-BIOS	YES	30.37	30.37	0.0
	Zenith-FPGA	YES	0.12	0.12	0.0
A99-RP3-X-SE	Aldrin-0-FPGA	YES	1.00	1.00	0.0
	Aldrin-1-FPGA	YES	32.00	32.00	0.0
	Beta-FPGA	YES	2.02	2.02	0.0
	CBC-0	NO	12.04	12.04	0.0
	CBC-1	NO	51.12	51.12	0.0
	IPU-DDR4	YES	3.04	3.04	0.0
	Orion-FPGA	YES	2.03	2.03	0.0
	Primary-BIOS	YES	35.10	35.10	0.0
	Sigma	YES	3.34	3.34	0.0
	TamFW-Sigma	YES	2.07	2.07	0.0
	Zenith-FPGA	YES	2.08	2.08	0.0
A99-RP3-X-TR	Aldrin-0-FPGA	YES	1.00	1.00	0.0
	Aldrin-1-FPGA	YES	32.00	32.00	0.0
	Beta-FPGA	YES	2.02	2.02	0.0
	CBC-0	NO	12.04	12.04	0.0
	CBC-1	NO	51.12	51.12	0.0
	IPU-DDR4	YES	3.04	3.04	0.0
	Orion-FPGA	YES	2.03	2.03	0.0
	Primary-BIOS	YES	35.10	35.10	0.0
	Sigma	YES	3.34	3.34	0.0
	TamFW-Sigma	YES	2.07	2.07	0.0

	Zenith-FPGA	YES	2.08	2.08	0.0
A99-RSP-SE	Alpha-FPGA	YES	0.16	0.16	0.0
	CBC	NO	43.03	43.03	0.0
	Cha-FPGA	YES	0.09	0.09	0.0
	IPU-FPGA	YES	0.72	0.72	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	16.18	16.18	0.0
A99-RSP-TR	Alpha-FPGA	YES	0.16	0.16	0.0
	CBC	NO	43.03	43.03	0.0
	Cha-FPGA	YES	0.09	0.09	0.0
	IPU-FPGA	YES	0.72	0.72	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	16.18	16.18	0.0
A99-SFC-S	CBC	NO	44.02	44.02	0.0
	IPU-FPGA	YES	0.37	0.37	0.0
	IPU-FSBL	YES	1.100	1.100	0.0
	IPU-Linux	YES	1.100	1.100	0.0
A99-SFC-T	CBC	NO	44.02	44.02	0.0
	IPU-FPGA	YES	0.37	0.37	0.0
	IPU-FSBL	YES	1.100	1.100	0.0
	IPU-Linux	YES	1.100	1.100	0.0
A99-SFC2	CBC	NO	37.20	37.20	0.0
	IPU-FPGA	YES	0.37	0.37	0.0
	IPU-FSBL	YES	1.100	1.100	0.0
	IPU-Linux	YES	1.100	1.100	0.0
A99-SFC3	CBC	NO	49.03	49.03	0.0
	IPU-DDR4	YES	0.25	0.25	0.0
A99-SFC3-S	CBC	NO	44.02	44.02	0.0
	IPU-DDR4	YES	0.25	0.25	0.0
A99-SFC3-T	CBC	NO	44.02	44.02	0.0
	IPU-DDR4	YES	0.25	0.25	0.0
A99L-4X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99L-4X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0

A99L-4X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99L-8X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99L-8X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A99L-8X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-1600W-AC	PO-PriMCU	NO	17.137	17.137	0.0
A9K-1600W-DC	PO-PriMCU	NO	1.09	1.09	0.0
A9K-16X100GE-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A9K-16X100GE-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A9K-16X100GE-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0

	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A9K-16X100GE-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A9K-20HG-FLEX-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Trailbreaker-1	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
	Windcharger-1	YES	0.08	0.08	0.0
A9K-20HG-FLEX-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Trailbreaker-1	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
	Windcharger-1	YES	0.08	0.08	0.0
A9K-20HG-FLEX-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Trailbreaker-1	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
	Windcharger-1	YES	0.08	0.08	0.0
A9K-24X10GE-1G-CM	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A9K-24X10GE-1G-SE	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Leadfoot-0	YES	1.00	1.00	0.1
	Lewis	YES	1.11	1.11	0.1
	Primary-BIOS	YES	18.33	18.33	0.1
A9K-24X10GE-1G-TR	CBC	NO	47.03	47.03	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1

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                    IPU-Linux                YES     1.113       1.113      0.1
                    Leadfoot-0               YES     1.00        1.00       0.1
                    Lewis                    YES     1.11        1.11       0.1
                    Primary-BIOS             YES    18.33       18.33       0.1
-------------------------------------------------------------------------------
A9K-400G-DWDM-TR    CBC                      NO     42.04       42.04       0.0
                    Doran                    YES     1.05        1.05       0.0
                    Frenzy                   YES    49.00       49.00       0.0
                    IPU-FPGA                 YES     1.97        1.97       0.1
                    IPU-FSBL                 YES     1.103       1.103      0.1
                    IPU-Linux                YES     1.103       1.103      0.1
                    Martell                  YES     1.03        1.03       0.0
                    Meldun                   YES     1.07        1.07       0.1
                    Primary-BIOS             YES     8.51        8.51       0.1
-------------------------------------------------------------------------------
A9K-400GE-LSP       Aldrin-FPGA              YES     1.05        1.05       0.0
                    CBC                      NO     63.03       63.03       0.0
                    IPU-DDR4                 YES     1.05        1.05       0.0
                    Moonracer                YES     0.14        0.14       0.0
                    Primary-BIOS             YES    25.30       25.30       0.0
                    Sunstreaker              YES     0.19        0.19       0.0
                    TAMFW-Sunstreaker        YES     2.72        2.72       0.0
-------------------------------------------------------------------------------
A9K-48X10GE-1G-CM   CBC                      NO     47.03       47.03       0.1
                    IPU-FPGA                 YES     1.90        1.90       0.1
                    IPU-FSBL                 YES     1.113       1.113      0.1
                    IPU-Linux                YES     1.113       1.113      0.1
                    Leadfoot-0               YES     1.00        1.00       0.1
                    Leadfoot-1               YES     1.00        1.00       0.1
                    Lewis                    YES     1.11        1.11       0.1
                    Primary-BIOS             YES    18.33       18.33       0.1
-------------------------------------------------------------------------------
A9K-48X10GE-1G-SE   CBC                      NO     47.03       47.03       0.1
                    IPU-FPGA                 YES     1.90        1.90       0.1
                    IPU-FSBL                 YES     1.113       1.113      0.1
                    IPU-Linux                YES     1.113       1.113      0.1
                    Leadfoot-0               YES     1.00        1.00       0.1
                    Leadfoot-1               YES     1.00        1.00       0.1
                    Lewis                    YES     1.11        1.11       0.1
                    Primary-BIOS             YES    18.33       18.33       0.1
-------------------------------------------------------------------------------
A9K-48X10GE-1G-TR   CBC                      NO     47.03       47.03       0.1
                    IPU-FPGA                 YES     1.90        1.90       0.1
                    IPU-FSBL                 YES     1.113       1.113      0.1
                    IPU-Linux                YES     1.113       1.113      0.1
                    Leadfoot-0               YES     1.00        1.00       0.1
                    Leadfoot-1               YES     1.00        1.00       0.1
                    Lewis                    YES     1.11        1.11       0.1
                    Primary-BIOS             YES    18.33       18.33       0.1
-------------------------------------------------------------------------------
A9K-4HG-FLEX-FC     Aldrin-FPGA              YES     1.05        1.05       0.0
                    CBC                      NO     63.03       63.03       0.0
                    IPU-DDR4                 YES     1.05        1.05       0.0
                    Moonracer                YES     0.14        0.14       0.0
                    Primary-BIOS             YES    25.30       25.30       0.0
                    Sunstreaker              YES     0.19        0.19       0.0
                    TAMFW-Sunstreaker        YES     2.72        2.72       0.0
-------------------------------------------------------------------------------
A9K-4HG-FLEX-SE     Aldrin-FPGA              YES     1.05        1.05       0.0
                    CBC                      NO     63.03       63.03       0.0
                    IPU-DDR4                 YES     1.05        1.05       0.0
                    Moonracer                YES     0.14        0.14       0.0
                    Primary-BIOS             YES    25.30       25.30       0.0
                    Sunstreaker              YES     0.19        0.19       0.0
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	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A9K-4HG-FLEX-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	63.03	63.03	0.0
	IPU-DDR4	YES	1.05	1.05	0.0
	Moonracer	YES	0.14	0.14	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A9K-4X100GE	CBC	NO	46.06	46.06	0.1
	IPU-FPGA	YES	1.90	1.90	0.1
	IPU-FSBL	YES	1.113	1.113	0.1
	IPU-Linux	YES	1.113	1.113	0.1
	Morra-0	YES	1.05	1.05	0.1
	Primary-BIOS	YES	9.33	9.33	0.1
	Sideswipe-0	YES	1.02	1.02	0.1
A9K-4X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-TR	CBC	NO	38.23	38.23	0.0

	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-4X100GE-TR-V2	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	48.09	48.09	0.0
	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.09	1.09	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	21.43	21.43	0.0
	Scamper	YES	0.23	0.23	0.0
	Skylynx-0	YES	0.12	0.12	0.0
A9K-8HG-FLEX-CM	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
A9K-8HG-FLEX-SE	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
A9K-8HG-FLEX-TR	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
A9K-8X100GE-CM	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-L-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0

	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-L-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-L-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-SE	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-TR	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0

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                    IPU-FSBL                YES     1.113       1.113      0.0
                    IPU-Linux               YES     1.113       1.113      0.0
                    Meldun-0                YES     1.07        1.07       0.0
                    Meldun-1                YES     1.07        1.07       0.0
                    Primary-BIOS            YES     8.51        8.51       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X-CM    Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     48.09       48.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.09        1.09       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    21.43       21.43       0.0
                    Scamper                 YES     0.23        0.23       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X-SE    Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     48.09       48.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.09        1.09       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    21.43       21.43       0.0
                    Scamper                 YES     0.23        0.23       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X-TR    Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     48.09       48.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.09        1.09       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    21.43       21.43       0.0
                    Scamper                 YES     0.23        0.23       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X-TR    Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     48.09       48.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.09        1.09       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    21.43       21.43       0.0
                    Scamper                 YES     0.23        0.23       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X2-CM   Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     58.09       58.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.18        1.18       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    25.30       25.30       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
                    Sunstreaker             YES     0.19        0.19       0.0
                    TAMFW-Sunstreaker       YES     2.72        2.72       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X2-SE   Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     58.09       58.09       0.0
                    Grapple-0               YES     0.15        0.15       0.0
                    IPU-DDR4                YES     1.18        1.18       0.0
                    Mixmaster-0             YES     0.13        0.13       0.0
                    Primary-BIOS            YES    25.30       25.30       0.0
                    Skylynx-0               YES     0.12        0.12       0.0
                    Sunstreaker             YES     0.19        0.19       0.0
                    TAMFW-Sunstreaker       YES     2.72        2.72       0.0
--------------------------------------------------------------------------------
A9K-8X100GE-X2-TR   Aldrin-FPGA             YES     1.05        1.05       0.0
                    CBC                     NO     58.09       58.09       0.0
```

	Grapple-0	YES	0.15	0.15	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Mixmaster-0	YES	0.13	0.13	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Skylynx-0	YES	0.12	0.12	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
A9K-8X100GELSE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-8X100GELTR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9K-MOD200-CM	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1
	IPU-FSBL	YES	1.103	1.103	0.1
	IPU-Linux	YES	1.103	1.103	0.1
	Primary-BIOS	YES	8.51	8.51	0.1
A9K-MOD200-SE	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1
	IPU-FSBL	YES	1.103	1.103	0.1
	IPU-Linux	YES	1.103	1.103	0.1
	Primary-BIOS	YES	8.51	8.51	0.1
A9K-MOD200-TR	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1
	IPU-FSBL	YES	1.103	1.103	0.1
	IPU-Linux	YES	1.103	1.103	0.1
	Primary-BIOS	YES	8.51	8.51	0.1
A9K-MOD400-CM	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1
	IPU-FSBL	YES	1.103	1.103	0.1
	IPU-Linux	YES	1.103	1.103	0.1
	Primary-BIOS	YES	8.51	8.51	0.1
A9K-MOD400-SE	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1
	IPU-FSBL	YES	1.103	1.103	0.1
	IPU-Linux	YES	1.103	1.103	0.1
	Primary-BIOS	YES	8.51	8.51	0.1
A9K-MOD400-TR	Blaster	YES	1.27	1.27	0.1
	CBC	NO	39.09	39.09	0.1
	IPU-FPGA	YES	1.97	1.97	0.1

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                    IPU-FSBL                YES     1.103       1.103      0.1
                    IPU-Linux               YES     1.103       1.103      0.1
                    Primary-BIOS            YES     8.51        8.51       0.1
-------------------------------------------------------------------------------
A9K-RSP5-SE         Aldrin-0-FPGA           YES     1.06        1.06       0.0
                    Beta-FPGA               YES     0.07        0.07       0.0
                    CBC                     NO     53.10       53.10       0.0
                    IPU-DDR4                YES     0.20        0.20       0.0
                    Orion-FPGA              YES     0.23        0.23       0.0
                    Primary-BIOS            YES    31.37       31.37       0.0
                    Zenith-FPGA             YES     0.12        0.12       0.0
-------------------------------------------------------------------------------
A9K-RSP5-TR         Aldrin-0-FPGA           YES     1.06        1.06       0.0
                    Beta-FPGA               YES     0.07        0.07       0.0
                    CBC                     NO     53.10       53.10       0.0
                    IPU-DDR4                YES     0.20        0.20       0.0
                    Orion-FPGA              YES     0.23        0.23       0.0
                    Primary-BIOS            YES    31.37       31.37       0.0
                    Zenith-FPGA             YES     0.12        0.12       0.0
-------------------------------------------------------------------------------
A9K-RSP5-X-SE       Aldrin-0-FPGA           YES    51.00       51.00       0.0
                    Beta-FPGA               YES     2.02        2.02       0.0
                    CBC                     NO     14.04       14.04       0.0
                    IPU-DDR4                YES     3.04        3.04       0.0
                    Orion-FPGA              YES     2.03        2.03       0.0
                    Primary-BIOS            YES    35.10       35.10       0.0
                    Sigma                   YES     3.34        3.34       0.0
                    TamFW-Sigma             YES     2.07        2.07       0.0
                    Zenith-FPGA             YES     2.08        2.08       0.0
-------------------------------------------------------------------------------
A9K-RSP5-X-TR       Aldrin-0-FPGA           YES    51.00       51.00       0.0
                    Beta-FPGA               YES     2.02        2.02       0.0
                    CBC                     NO     14.04       14.04       0.0
                    IPU-DDR4                YES     3.04        3.04       0.0
                    Orion-FPGA              YES     2.03        2.03       0.0
                    Primary-BIOS            YES    35.10       35.10       0.0
                    Sigma                   YES     3.34        3.34       0.0
                    TamFW-Sigma             YES     2.07        2.07       0.0
                    Zenith-FPGA             YES     2.08        2.08       0.0
-------------------------------------------------------------------------------
A9K-RSP880-LT-SE    Aldrin-FPGA             YES     1.11        1.11       0.0
                    Alpha-FPGA              YES     0.05        0.05       0.0
                    CBC                     NO     50.03       50.03       0.0
                    IPU-FPGA                YES     0.20        0.20       0.0
                    IPU-FSBL                YES     1.113       1.113      0.0
                    IPU-Linux               YES     1.113       1.113      0.0
                    Omega-FPGA              YES     0.07        0.07       0.0
                    Optimus-FPGA            YES     0.05        0.05       0.0
                    Primary-BIOS            YES    17.40       17.40       0.0
-------------------------------------------------------------------------------
A9K-RSP880-LT-TR    Aldrin-FPGA             YES     1.11        1.11       0.0
                    Alpha-FPGA              YES     0.05        0.05       0.0
                    CBC                     NO     50.03       50.03       0.0
                    IPU-FPGA                YES     0.20        0.20       0.0
                    IPU-FSBL                YES     1.113       1.113      0.0
                    IPU-Linux               YES     1.113       1.113      0.0
                    Omega-FPGA              YES     0.07        0.07       0.0
                    Optimus-FPGA            YES     0.05        0.05       0.0
                    Primary-BIOS            YES    17.40       17.40       0.0
-------------------------------------------------------------------------------
A9K-RSP880-SE       Alpha-FPGA              YES     0.16        0.16       0.0
                    CBC                     NO     34.40       34.40       0.0
                    Cha-FPGA                YES     0.09        0.09       0.0
                    IPU-FPGA                YES     0.72        0.72       0.0
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	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	10.69	10.69	0.0
A9K-RSP880-TR	Alpha-FPGA	YES	0.16	0.16	0.0
	CBC	NO	34.40	34.40	0.0
	Cha-FPGA	YES	0.09	0.09	0.0
	IPU-FPGA	YES	0.72	0.72	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Omega-FPGA	YES	0.20	0.20	0.0
	Optimus-FPGA	YES	0.12	0.12	0.0
	Primary-BIOS	YES	10.69	10.69	0.0
A9K-TEST_LSQ_DX1	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	58.09	58.09	0.0
	IPU-DDR4	YES	1.18	1.18	0.0
	Primary-BIOS	YES	25.30	25.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Trailbreaker-0	YES	0.24	0.24	0.0
	Windcharger-0	YES	0.08	0.08	0.0
A9KL-4X100GE-SE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9KL-4X100GE-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
A9KL-4X100GE-TR-TAA	CBC	NO	38.23	38.23	0.0
	Dalla	YES	1.09	1.09	0.0
	IPU-FPGA	YES	1.99	1.99	0.0
	IPU-FSBL	YES	1.113	1.113	0.0
	IPU-Linux	YES	1.113	1.113	0.0
	Meldun-0	YES	1.07	1.07	0.0
	Meldun-1	YES	1.07	1.07	0.0
	Primary-BIOS	YES	8.51	8.51	0.0
ASR-9006-AC	CBC	NO	7.105	7.105	0.0
ASR-9006-AC-V2	CBC	NO	7.105	7.105	0.0
ASR-9006-FAN	CBC	NO	5.04	5.04	0.0
ASR-9006-FAN-V2	CBC	NO	5.05	5.05	0.0
ASR-9010-AC	CBC	NO	7.105	7.105	0.0
ASR-9010-AC-V2	CBC	NO	7.105	7.105	0.0

ASR-9010-FAN	CBC	NO	4.03	4.03	0.0
ASR-9010-FAN-V2	CBC	NO	29.12	29.12	0.0
ASR-9901-LC	CBC	NO	55.07	55.07	0.1
	Gamora-FPGA	YES	0.36	0.36	0.1
	IPU-FPGA	YES	1.10	1.10	0.1
	IPU-FSBL	YES	1.104	1.104	0.1
	IPU-Linux	YES	1.104	1.104	0.1
	Primary-BIOS	YES	23.22	23.22	0.1
ASR-9901-RP	CBC	NO	54.11	54.11	0.1
	Drax-FPGA	YES	0.38	0.38	0.1
	IPU-FPGA	YES	2.05	2.05	0.1
	IPU-FSBL	YES	1.104	1.104	0.1
	IPU-Linux	YES	1.104	1.104	0.1
	Primary-BIOS	YES	22.28	22.28	0.1
ASR-9902	FAN-CBC	NO	61.25	61.25	0.0
ASR-9902-LC	Aldrin-FPGA	YES	1.05	1.05	0.0
	CBC	NO	17.03	17.03	0.0
	Chromia	YES	0.14	0.14	0.0
	IPU-DDR4	YES	1.17	1.17	0.0
	Primary-BIOS	YES	34.30	34.30	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
ASR-9903	FAN-CBC	NO	61.25	61.25	0.0
ASR-9903-LC	Aldrin-0-FPGA	YES	1.05	1.05	0.0
	CBC	NO	60.12	60.12	0.0
	Harpoon-0	YES	0.11	0.11	0.0
	Harpoon-1	YES	0.11	0.11	0.0
	IPU-DDR4	YES	1.25	1.25	0.0
	Metalmaster-0	YES	0.02	0.02	0.0
	Metalmaster-1	YES	0.02	0.02	0.0
	Primary-BIOS	YES	34.30	34.30	0.0
	Scattershot	YES	0.14	0.14	0.0
	Sunstreaker	YES	0.19	0.19	0.0
	Supernaut	YES	0.14	0.14	0.0
	TAMFW-Sunstreaker	YES	2.72	2.72	0.0
	Warstar-0	YES	0.02	0.02	0.0
	Warstar-1	YES	0.02	0.02	0.0
ASR-9903-PXC800G-LC	Harpoon-0	YES	0.11	0.11	0.0
	Harpoon-1	YES	0.11	0.11	0.0
ASR-9904-AC	CBC	NO	7.105	7.105	0.0
ASR-9904-FAN	CBC	NO	31.06	31.06	0.0
ASR-9906	CBC	NO	7.105	7.105	0.0
ASR-9906-FAN	CBC	NO	56.01	56.01	0.0
	PSOC	NO	2.06	2.06	0.0
ASR-9910	CBC	NO	7.105	7.105	0.0
ASR-9910-FAN	CBC	NO	45.02	45.02	0.0
	PSOC	NO	2.06	2.06	0.0
ASR-9912-AC	CBC	NO	7.105	7.105	0.0

ASR-9912-FAN	CBC	NO	31.06	31.06	0.0
ASR-9912-SFC220	CBC	NO	37.20	37.20	0.0
	IPU-FPGA	YES	0.37	0.37	0.0
	IPU-FSBL	YES	1.100	1.100	0.0
	IPU-Linux	YES	1.100	1.100	0.0
ASR-9922-AC	CBC-0	NO	7.105	7.105	0.0
	CBC-1	NO	7.105	7.105	0.0
ASR-9922-FAN	CBC	NO	29.12	29.12	0.0
ASR-9922-FAN-V2	CBC	NO	40.07	40.07	0.0
	PSOC	NO	2.06	2.06	0.0
ASR-9922-FAN-V3	CBC	NO	40.07	40.07	0.0
	PSOC	NO	2.06	2.06	0.0
PWR-1.6KW-AC	PO-PriMCU	NO	17.20	17.20	0.0
	QCS-PriMCU	NO	3.02	3.02	0.1
	QCS-SecMCU	NO	4.04	4.04	0.1
PWR-1.6KW-DC	PO-PriMCU	NO	1.03	1.03	0.0
	QCS-PriMCU	NO	1.05	1.05	0.0
PWR-2KW-DC-V2	DT-PriMCU	NO	6.03	6.03	0.12
	DT-Sec54vMCU	NO	6.02	6.02	0.12
	DT-Sec5vMCU	NO	6.03	6.03	0.12
	EM-PriMCU	NO	3.13	3.13	0.12
	EM-Sec54vMCU	NO	3.21	3.21	0.12
	EM-Sec5vMCU	NO	3.20	3.20	0.12
PWR-3KW-AC-V2	DT-PriMCU	NO	6.02	6.02	1.0
	DT-Sec54vMCU	NO	6.02	6.02	1.0
	DT-Sec5vMCU	NO	6.04	6.04	1.0
	EM-Sec54vMCU	NO	3.12	3.12	0.21
	EM-Sec5vMCU	NO	3.18	3.18	0.21
PWR-3KW-HVDC	DT-PriMCU	NO	2.02	2.02	1.0
	DT-Sec54vMCU	NO	2.02	2.02	1.0
	DT-Sec5vMCU	NO	2.03	2.03	1.0
PWR-4.4KW-DC-V3	AB-Pri0MCU	NO	3.02	3.02	0.1
	AB-Pri1MCU	NO	3.02	3.02	0.1
	AB-Sec054vMCU	NO	3.04	3.04	0.1
	AB-Sec154vMCU	NO	3.04	3.04	0.1
	AB-Sec5vMCU	NO	3.06	3.06	0.1
	DT-Pri0MCU	NO	3.01	3.01	0.1
	DT-Pri1MCU	NO	3.01	3.01	0.1
	DT-Sec054vMCU	NO	3.02	3.02	0.1
	DT-Sec154vMCU	NO	3.02	3.02	0.1
	DT-Sec5vMCU	NO	9.03	9.03	0.1
	QCS-Pri0MCU	NO	1.04	1.04	0.1
	QCS-Pri1MCU	NO	1.04	1.04	0.1
	QCS-Sec054vMCU	NO	1.10	1.10	0.1
	QCS-Sec154vMCU	NO	1.10	1.10	0.1
	QCS-Sec5vMCU	NO	1.06	1.06	0.1
PWR-6KW-AC-V3	AB-Pri0MCU	NO	3.02	3.02	0.1
	AB-Pri1MCU	NO	3.02	3.02	0.1
	AB-Sec054vMCU	NO	3.02	3.02	0.1
	AB-Sec154vMCU	NO	3.02	3.02	0.1
	AB-Sec5vMCU	NO	3.05	3.05	0.1
	DT-Pri0MCU	NO	4.02	4.02	0.1

```
                        DT-Pri1MCU                NO       4.02         4.02       0.1
                        DT-Sec054vMCU             NO       4.03         4.03       0.1
                        DT-Sec154vMCU             NO       4.03         4.03       0.1
                        DT-Sec5vMCU               NO       4.04         4.04       0.1
-------------------------------------------------------------------------------
```

Supported Hardware

The following table lists the supported hardware components on the Cisco ASR 9000 Series Router and the minimum required software versions. For more information, see the *Firmware Support* section.

All hardware features are supported on Cisco IOS XR Software, subject to the memory requirements specified in the section.

For information on the end-of-sale and end-of-life dates for the Cisco ASR 9000 Series Router hardware, refer to the End-of-Life and End-of-Sale Notices page.

Table 3: Cisco ASR 9000 Series Aggregation Services Router Supported Hardware and Minimum Software Requirements

Cisco ASR 9000 Series Aggregation Services Router - Route Switch Processor Cards		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A9K-RSP5-X-SE	ASR 9000 Series Route Switch Processor 5 for Service Edge, Premium	Release 7.6.2
A9K-RSP5-X-TR	ASR 9000 Series Route Switch Processor 5 for Packet Transport, Premium	Release 7.6.2
A9K-RSP5-SE	ASR 9000 Route Switch Processor 5 for Service Edge	Release 6.5.15
A9K-RSP5-TR	ASR 9000 Route Switch Processor 5 for Packet Transport	Release 6.5.15
Cisco ASR 9000 Series Aggregation Services Router - Route Processor Cards		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A99-RP3-X-SE	ASR 9900 Route Processor 3 for Service Edge, Premium	Release 7.6.2
A99-RP3-X-TR	ASR 9900 Route Processor 3 for Packet Transport, Premium	Release 7.6.2
A99-RP3-SE	ASR 9900 Route Processor 3 for Service Edge	Release 6.5.15
A99-RP3-TR	ASR 9900 Route Processor 3 for Packet Transport	Release 6.5.15
Cisco ASR 9901 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9901	Cisco ASR 9000 Series Aggregation Services Router 2-RU Fixed Port	Release 6.4.1
ASR-9901-FAN	Cisco ASR 9000 Series Aggregation Services Router 2-RU Fixed Port Fan Tray	Release 6.4.1

A9K-1600W-AC	Cisco ASR 9000 Series Aggregation Services Router 2-RU 1600W AC Power Module	Release 6.4.1
A9K-1600W-DC	Cisco ASR 9000 Series Aggregation Services Router 2-RU 1600W DC Power Module	Release 6.4.1
Cisco ASR 9902 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9902	Cisco ASR 9902 2RU Chassis with fixed ports	Release 7.4.1
A99-RP-F	Cisco ASR 9900 Fixed Chassis Route Processor	Release 7.1.3
ASR-9902-4P-KIT	Cisco ASR 9902 4-Post Mounting Kit for 19-Inch and 23-Inch Rack	Release 7.4.1
ASR-9902-4P-KIT-L	ASR 9902 4-Post Mounting Kit for 19 & 23 inch Rack – Long	Release 7.4.1
ASR-9902-2P-KIT	Cisco ASR 9902 2-Post Mounting Kit for 19-Inch and 23-Inch Rack	Release 7.4.1
ASR-9902-CAB-MGMT	Cisco ASR 9902 Cable Management	Release 7.4.1
ASR-9902-FILTER	Cisco ASR 9902 Air Filter	Release 7.4.1
ASR-9902-FAN	Cisco ASR 9902 Fan Tray	Release 7.4.1
Cisco ASR 9903 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9903	Cisco ASR 9903 Compact High-Performance Router with fixed ports and PEC (Port Expansion Card) slot.	Release 7.1.3
A99-RP-F	Cisco ASR 9900 Fixed Chassis Route Processor	Release 7.1.3
ASR-9903-FAN	Cisco ASR 9903 Router Fan Tray	Release 7.1.3
ASR-9903-4P-KIT	ASR 9903 4-Post Mounting Kit for 19-inch Rack	Release 7.1.3
ASR-9903-CAB-MGMT	ASR 9903 Cable Management Brackets	Release 7.1.3
ASR-9903-FILTER	ASR 9903 Air Filter	Release 7.1.3
Cisco ASR 9904 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9904	Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot Chassis, 6 RU	Release 6.1.2
ASR-9904-AC	Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot AC Chassis w/ PEM V2	Release 6.1.2

ASR-9904-DC	Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot DC Chassis w/ PEM V2	Release 6.1.2
ASR-9904-FAN	Cisco ASR 9000 Series Aggregation Services Router 4-Slot Fan Tray	Release 6.1.2
ASR-9904-FILTER	Cisco ASR 9000 Series Aggregation Services Router 4-Slot Filter	Release 6.1.2
ASR-9904-BAFFLE	Cisco ASR 9000 Series Aggregation Services Router 4-Slot Baffle	Release 6.1.2
Cisco ASR 9912 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9912	Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot Chassis	Release 6.1.2
ASR-9912-AC	Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot AC Chassis w/ PEM V2	Release 6.1.2
ASR-9912-DC	Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot DC Chassis w/ PEM V2	Release 6.1.2
A99-SFC3	Cisco ASR 9900 Switch Fabric Card 3	Release 6.5.15
ASR-9912-FAN	Cisco ASR 9000 Series Aggregation Services Router 12-Slot Fan Tray	Release 6.1.2
Cisco ASR 9922 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9922	Cisco ASR 9922 20 Line Card Slot Chassis, 44 RU	Release 6.1.2
ASR-9922-AC	Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot AC Chassis w/ PEM V2	Release 6.1.2
ASR-9922-DC	Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot DC Chassis w/ PEM V2	Release 6.1.2
A99-SFC3	Cisco ASR 9900 Switch Fabric Card 3	Release 6.5.15
ASR-9922-FAN-V3	Cisco ASR 9000 Series Aggregation Services Router 22-Slot Fan Tray version 3	Release 6.5.15
ASR-9922-FLTR-CV2	Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Center	Release 6.1.2
ASR-9922-FLTR-LR	Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Left & Right	Release 6.1.2
ASR-9922-RP-FILR	Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor Filler	Release 6.1.2

ASR-9922-FAN-V2	Cisco ASR 9000 Series Aggregation Services Router 22-Slot Version 2 Fan Tray	Release 6.1.2
Cisco ASR 9006 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9006-SYS	Cisco ASR 9000 Series Aggregation Services Router 6-Slot System	Release 6.1.2
ASR-9006-AC-V2	Cisco ASR 9000 Series Aggregation Services Router 6-Slot AC Chassis Version 2	Release 6.1.2
ASR-9006-DC-V2	Cisco ASR 9000 Series Aggregation Services Router 6-Slot DC Chassis Version 2	Release 6.1.2
ASR-9006-FAN	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray	Release 6.1.2
ASR-9006-FAN-V2	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Version 2 Fan Tray	Release 6.1.2
ASR-9006-DOOR	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Door Kit	Release 6.1.2
ASR-9006-FILTER	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Air Filter	Release 6.1.2
Cisco ASR 9906 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9906	Cisco ASR 9000 Series Aggregation Services Router 6-Slot chassis	Release 6.3.1
ASR-9906-FAN	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray	Release 6.3.1
ASR-9906-FILTER	Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Filter	Release 6.3.1
A99-SFC3-T	ASR 9906 Switch Fabric Card	Release 6.5.15
Cisco ASR 9010 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9010-SYS	Cisco ASR 9000 Series Aggregation Services Router 10-Slot System	Release 6.1.2
ASR-9010-AC-V2	Cisco ASR 9000 Series Aggregation Services Router 10-Slot AC Chassis Version 2	Release 6.1.2
ASR-9010-DC-V2	Cisco ASR 9000 Series Aggregation Services Router 10-Slot DC Chassis Version 2	Release 6.1.2
ASR-9010-FAN	Cisco ASR 9000 Series Aggregation Services Router 10-Slot Fan Tray	Release 6.1.2
ASR-9010-FAN-V2	Cisco ASR 9000 Series Aggregation Services Router 10-Slot Version 2 Fan Tray	Release 6.1.2

ASR-9010-DOOR	Cisco ASR 9000 Series Aggregation Services Router 10-Slot Door Kit	Release 6.1.2
ASR-9010-2P-KIT	Cisco ASR 9000 Series Aggregation Services Router 2 Post Mounting Kit	Release 6.1.2
ASR-9010-4P-KIT	Cisco ASR 9000 Series Aggregration Services Router 4 Post Mounting Kit	Release 6.1.2
ASR-9010-FILTER	Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air Filter	Release 6.1.2
Cisco ASR 9910 Router		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
ASR-9910	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) System	Release 6.2.1
ASR-9910-FAN	Cisco ASR 9000 Series Aggregation Services Router 10-Slot(9910) Fan Tray	Release 6.2.1
ASR-9910-ACC-KIT	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Accessory Kit	Release 6.2.1
ASR-9910-4P-KIT	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) 4 Post Rack Mounting Kit	Release 6.2.1
ASR-9910-2P-KIT	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) 2 Post Rack Mounting Kit	Release 6.2.1
ASR-9910-AIRREF	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Air Reflector	Release 6.2.1
ASR-9910-FILTER	Cisco ASR 9000 Series Aggregation Services Router 10-Slot (9910) Air Filter	Release 6.2.1
A99-SFC3-S	ASR 9910 Switch Fabric Card 3	Release 6.5.15
Cisco ASR 9000 Series Aggregation Services Router - Power Modules		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
PWR-2KW-DC-V2	Cisco ASR 9000 Series Aggregation Services Router 2KW DC Power Module, version 2	Release 6.1.2
PWR-3KW-AC-V2	Cisco ASR 9000 Series Aggregation Services Router 3KW AC Power Module, version 2	Release 6.1.2
A9K-AC-PEM-V2	Cisco ASR 9000 Series Aggregation Services Router AC Power Entry Module Version 2	Release 6.1.2
A9K-DC-PEM-V2	Cisco ASR 9000 Series Aggregation Services Router DC Power Entry Module Version 2	Release 6.1.2

A9K-PEM-V2-FILR	Cisco ASR 9000 Series Aggregation Services Router Power Entry Module Version 2 Filler	Release 6.1.2
A9K-AC-PEM-V3	Cisco ASR 9000 Series Aggregation Services Router AC Power Enclosure Module Version 3	Release 6.1.2
A9K-DC-PEM-V3	Cisco ASR 9000 Series Aggregation Services Router DC Power Enclosure Module Version 3	Release 6.1.2
PWR-6KW-AC-V3	Cisco ASR 9000 Series Aggregation Services Router 6kW AC Power Module Version 3	Release 6.1.2
PWR-4.4KW-DC-V3	Cisco ASR 9000 Series Aggregation Services Router 4.4kW DC Power Module Version 3	Release 6.1.2
PWR-1.6KW-AC	ASR 9900 Fixed Chassis AC Power Supply	Release 7.1.25
PWR-1.6KW-DC	ASR 9900 Fixed Chassis DC Power Supply	Release 7.1.25
Cisco ASR 9000 Series Aggregation Services Router - Line Cards		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A9K-4HG-FLEX-SE	ASR 9000 400GE Combo Service Edge Line Card - 5th Generation	Release 7.4.1
A9K-4HG-FLEX-TR	ASR 9000 400GE Combo Packet Transport Line Card - 5th Generation	Release 7.4.1
A99-4HG-FLEX-SE	ASR 9900 400GE Combo Service Edge Line Card - 5th Generation	Release 7.4.1
A99-4HG-FLEX-TR	ASR 9900 400GE Combo Packet Transport Line Card - 5th Generation	Release 7.4.1
A9903-8HG-PEC	ASR 9903 800G Multi-rate Port Expansion Card	Release 7.4.1
A99-10X400GE-X-SE	ASR 9900 4T Service Edge Line Card - 5th Generation	Release 7.3.1
A99-10X400GE-X-TR	ASR 9900 4T Packet Transport Line Card - 5th Generation	Release 7.3.1
A9903-20HG-PEC	ASR 9903 2T Multi-rate Port Expansion Card	Release 7.1.3
A99-32X100GE-X-SE	ASR 9000 32-Port 100GE QSFP28/QSFP+ Service Edge optimized Line Card - 5th Generation	Release 7.1.15
A99-32X100GE-X-TR	ASR 9000 32-Port 100GE QSFP28/QSFP+ Packet Transport optimized Line Card - 5th Generation	Release 7.1.15
A9K-20HG-FLEX-SE A9K-20HG-FLEX-TR	ASR 9000 2T Combo Line Card - 5th Generation	Release 7.1.15
A9K-8HG-FLEX-SE A9K-8HG-FLEX-TR	ASR 9000 800G Combo Line Card - 5th Generation	Release 7.1.15
A9K-16X100GE-TR	ASR 9000 16-port 100GE QSFP TR line card	Release 6.5.15
A99-32X100GE-TR	ASR 9900 32-port 100GE QSFP TR line card	Release 6.5.15

A99-48X10GE-1G-SE	ASR 9000 48 port dual rate 10G/1G Service Edge line card	Release 6.5.2
A99-48X10GE-1G-TR	ASR 9000 48 port dual rate 10G/1G Transport Optimised line card	Release 6.5.2
A99-16X100GE-X-SE	ASR 9900 16-port 100GE QSFP SE	Release 6.5.3
A9K-48X10GE-1G-CM	ASR 9000 48-port dual-rate 10G/1G Consumption Model line card	Release 6.4.1
A9K-24X10GE-1G-CM	ASR 9000 24-port dual-rate 10G/1G Consumption Model line card	Release 6.4.1
A9K-48X10GE-1G-SE	ASR9000 48-port dual-rate 10G/1G service edge–optimized line card	Release 6.3.2
A9K-48X10GE-1G-TR	ASR9000 48-port dual-rate 10G/1G packet transport–optimized line card	Release 6.3.2
A9K-24X10GE-1G-SE	ASR9000 24-port dual-rate 10G/1G service edge–optimized line card	Release 6.3.2
A9K-24X10GE-1G-TR	ASR9000 24-port dual-rate 10G/1G packet transport–optimized line card	Release 6.3.2
Cisco ASR 9000 Series Aggregation Services Router - Modular Line Cards		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A9K-MOD400-CM	Cisco ASR 9000 Modular 400G Consumption Model Line Card	Release 6.2.1
A9K-MOD400-SE	Cisco ASR 9000 Series Aggregation Services Router 400 Gigabyte Modular Line Card, Service Edge Optimized	Release 6.2.1
A9K-MOD400-TR	Cisco ASR 9000 Series Aggregation Services Router 400 Gigabyte Modular Line Card, Packet Transport Optimized	Release 6.2.1
Cisco ASR 9000 Series Aggregation Services Router - Modular Port Adapters (MPAs)		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A9K-MPA-1X200GE	Cisco ASR 9000 1-port 200-Gigabit Ethernet MPA, requires CFP2-DCO optics	Release 6.6.2
A9K-MPA-32X1GE	Cisco ASR 9000 32-port 1-Gigabit Ethernet MPA with MACSec	Release 6.6.2
A9K-MPA20X10GE-CM	Cisco ASR 9000 20x10GE Consumption Model MPA	Release 6.5.1
A9K-MPA2X100GE-CM	Cisco ASR 9000 2x100GE Consumption Model MPA	Release 6.5.1
A9K-MPA-1X100GE	Cisco ASR 9000 Series Aggregation Services Router 1-port 100-Gigabit Modular Port Adapter	Release 6.3.1
A9K-MPA-2X100GE	Cisco ASR 9000 Series Aggregation Services Router 2-port 100-Gigabit Modular Port Adapter	Release 6.2.2
A9K-MPA-20x10GE	20-Port 10-Gigabit Ethernet Modular Port Adapter with SFP+	Release 6.2.1

A9K-MPA-8X10GE	Cisco ASR 9000 Series Aggregation Services Router 8-port 10GE Modular Port Adapter	Release 6.3.2
A9K-MPA-4X10GE	Cisco ASR 9000 Series Aggregation Services Router 4-port 10GE Modular Port Adapter	Release 6.2.1
A9K-MPA-20X1GE	Cisco ASR 9000 Series Aggregation Services Router 20-port 1GE Modular Port Adapter	Release 6.2.1
A9K-MPA-2X40GE	Cisco ASR 9000 Series Aggregation Services Router 2-port 40GE Modular Port Adapter	Release 6.3.1
Cisco ASR 9000v Satellite Shelf		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
A9KV-V2-DC-A=	Cisco ASR 9000v Satellite Shelf Version 2 DC power ANSI chassis	Release 6.2.1
A9KV-V2-DC-E=	Cisco ASR 9000v Satellite Shelf Version 2 DC power chassis	Release 6.2.1
A9KV-V2-AC=	Cisco ASR 9000v Satellite Shelf AC power chassis	Release 6.2.1
A9KV-V2-FAN=	Cisco ASR 9000v Satellite Shelf Version 2 Fan Tray	Release 6.2.1
Cisco NCS 5000 Satellite Shelf		
Part Number	**Description**	**Support Initially Provided in IOS XR 64 bit Release**
NCS-5001	Cisco NCS 5001 Series Router	Release 6.2.1
NCS-5002	Cisco NCS 5002 Series Router	Release 6.2.1
NCS-5001-ACSR	Cisco NCS 5001 Router Accessory Kit	Release 6.2.1
NCS-5002-ACSR	Cisco NCS 5002 Router Accessory Kit	Release 6.2.1
NCS-5001-FN-BK	Cisco NCS 5001 Router Fan Back to Front AirFlow	Release 6.2.1
NCS-5002-FN-BK	Cisco NCS 5002 Router Fan Back to Front AirFlow	Release 6.2.1
NCS-5001-FLT-BK	Cisco NCS 5001 Air Filter Back to Front Airflow	Release 6.2.1
NCS-5002-FLT-BK	Cisco NCS 5002 Air Filter Back to Front Airflow	Release 6.2.1
NCS-5001-FN-FR	Cisco NCS 5001 Fan Front to Back Airflow	Release 6.2.1
NCS-5002-FN-FR	Cisco NCS 5002 Fan Front to Back Airflow	Release 6.2.1
NCS-5001-FLT-FR	Cisco NCS 5001 Air Filter Front to Back Airflow	Release 6.2.1
NCS-5002-FLT-FR	Cisco NCS 5002 Air Filter Front to Back Airflow	Release 6.2.1

Compatibility Matrix for EPNM and Crosswork with Cisco IOS XR Software

The compatibility matrix lists the version of EPNM and Crosswork that are supported with Cisco IOS XR Release in this release.

Table 4: Compatibility Matrix

Cisco IOS XR	Crosswork	EPNM
Release 24.2.1	Crosswork Optimization Engine 6.0	Evolved Programmable Network Manager 7.1.1

Important Notes

- Repetitive Smart Licensing evaluation expired warning messages are displayed on the console every hour, but no functionality impact is observed on the device. To stop these repetitive messages, you should register the device again with a new registration token.
- From IOS XR Release 7.0, 1st and 2nd generation of Ethernet ASR 9000 line cards are not supported.
- Country-specific laws, regulations, and licenses—In certain countries, use of these products may be prohibited and subject to laws, regulations, or licenses, including requirements applicable to the use of the products under telecommunications and other laws and regulations; customers must comply with all such applicable laws in the countries in which they intend to use the products.
- Exceeding Cisco testing—If you intend to test beyond the combined maximum configuration tested and published by Cisco, contact your Cisco Account Team or Technical Support representative to discuss how to engineer a large-scale configuration for your purpose.
- Starting Cisco IOS XR Software Release 24.1.1, ISSU upgrades and ISSU SMU are not supported for ASR 9000 third-generation line cards.
- Installing a Line Card—For a fully populated Line Card with cable optics, maintenance time required for card replacement is higher. For more information about Line Card installation and removal, refer to the *Cisco ASR 9000 Aggregation Services Router Ethernet Line Card Installation Guide*.
- For ZTP, In Cisco IOS XR Release 7.3.1 and earlier, the system accepts the device sending **user-class = "exr-config"**; however starting Cisco IOS XR Release 7.3.2 and later, you must use only **user-class = "xr-config"**.

  In Cisco IOS XR Release 7.3.2 and later, use:

```
host cisco-rp0 {
   hardware ethernet e4:c7:22:be:10:ba;
   fixed-address 172.30.12.54;
   if exists user-class and option user-class = "iPXE" {
      filename = "http://172.30.0.22/boot.ipxe";
   } elsif exists user-class and option user-class = "xr-config" {
      filename = "http://172.30.0.22/scripts/cisco-rp0_ztp.sh";
   }
}
```

- The auto FPD upgrade may result in certain intentional exceptions, which may need manual upgrades or reloading for a few FPDs. We recommend you use the **show hw-module fpd** command to check the hardware module status immediately after the FPD auto upgrade is complete and take necessary action in both admin and XR VM mode. That is, if any FPD displays a **NEED**

UPGD status, then upgrade those FPDs individually by the manual upgrade and follow it with a reload in admin mode, and if any FPDs show a **RLOAD REQ** status, perform a hardware module reload from admin mode.

- The statistics collection may time out due to CPU overload during route churn. In such scenarios, statistics collection will resume when the CPU becomes available after the route churn is complete.

Licensing

Starting with Cisco IOS XR Release 24.1.1, Smart Licensing Using Policy (SLP) is the default Licensing model. When you upgrade to the Cisco IOS XR Release 24.1.1 release or later, the Smart Licensing Using Policy is enabled by default.

You can migrate your devices to Smart Licensing with Policy model, see *Migrating from Smart Licensing to Smart Licensing Using Policy*, Smart Licensing Using Policy on Cisco IOS XR Routers.

We recommend that you update to the latest version of SSM On-Prem or Cisco Smart Licensing Utility.



Note SSM On-Prem and CSSM both support SLP devices and SL devices. SLP devices and SL devices can coexist in a network. The Smart Licensing (SL) model is available in releases Cisco IOS XR Release 7.11.1 and earlier.

Supported Transceiver Modules

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

Supported Modular Port Adapters

For the compatibility details of Modular Port Adapters (MPAs) on the line cards, see the datasheet of that specific line card.

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.

Upgrading Cisco IOS XR Software

Cisco IOS XR Software is installed and activated from modular packages, allowing specific features or software patches to be installed, upgraded, or downgraded without affecting unrelated processes. Software packages can be upgraded or downgraded on all supported card types, or on a single card (node).

Software packages are installed from Route Processor Module (RPM) files that contain one or more software components.

The upgrade document is available along with the software images.



Note If you have mLACP/ICCP Redundancy Model setup, ensure that you upgrade the active and standby nodes to the same IOS XR version while upgrading to a newer version of the ASR 9000 router.

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 ASR 9000 router documentation is located at the following URL:

https://www.cisco.com/c/en/us/td/docs/iosxr/asr-9000-series-routers.html

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