

# Release Notes for Cisco ASR 9000 Series Aggregation Services Routers for Cisco IOS XR Software Release 5.1.2

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## Release Notes for Cisco ASR 9000 Series Routers 5.1.2

Cisco IOS XR Software is a distributed operating system designed for continuous system operation combined with service flexibility and higher performance.



### Note

For information on Cisco ASR 9000 Series Aggregation Services Routers running Cisco IOS XR Software Release 5.1.2, see the [Important Notes](#), on page 69.

This release notes describe the features provided on the Cisco ASR 9000 Series Aggregation Services Routers running Cisco IOS XR Software Release 5.1.2 and are updated as needed.

For a list of software caveats that apply to the Cisco ASR 9000 Series Aggregation Services Routers running Cisco IOS XR Software Release 5.1.2, see the [Caveats](#), on page 71 section. The caveats are updated for every release and are described at <http://www.cisco.com>.

Cisco IOS XR Software running on the Cisco ASR 9000 Series Router provides the following features and benefits:

- **IP and Routing**—This supports a wide range of IPv4 and IPv6 services and routing protocols such as Border Gateway Protocol (BGP), Routing Information Protocol (RIPv2), Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF), IP Multicast, Routing Policy Language (RPL), , Hot Standby Router Protocol (HSRP), and Virtual Router Redundancy Protocol (VRRP) features.
- **Ethernet Services**—The following Ethernet features are supported:
  - Ethernet Virtual Connections (EVCs)
  - Flexible VLAN classification
  - Flexible VLAN translation
  - IEEE bridging
  - IEEE 802.1s Multiple Spanning Tree (MST)
  - MST Access Gateway
  - L2VPN
  - Virtual Private LAN Services (VPLS), Hierarchical VPLS (H-VPLS), Virtual Private Wire Service (VPWS), Ethernet over MPLS (EoMPLS), pseudo wire redundancy, and multi segment pseudo wire stitching.

- **BGP Prefix Independent Convergence**—This provides the ability to converge BGP routes within sub seconds instead of multiple seconds. The Forwarding Information Base (FIB) is updated, independent of a prefix, to converge multiple 100K BGP routes with the occurrence of a single failure. This convergence is applicable to both core and edge failures and with or without MPLS. This fast convergence innovation is unique to Cisco IOS XR Software.

The per-vrf label allocation mode is not recommended with BGP PIC. Instead resilient per-ce is the recommended mode.

- **Multiprotocol Label Switching (MPLS)**—This supports MPLS protocols, including Traffic Engineering (TE) [including TE-FRR and TE Preferred Path], Resource Reservation Protocol (RSVP), Label Distribution Protocol (LDP), Targeted LDP (T-LDP), Differentiated Services (DiffServ)-aware traffic engineering, and Layer 3 Virtual Private Network (L3VPN).
- **Multicast**—This provides comprehensive IP Multicast software including Source Specific Multicast (SSM) and Protocol Independent Multicast (PIM) in Sparse Mode only. The Cisco ASR 9000 Series Aggregation Services Router also supports Auto-Rendezvous Point (AutoRP), Multiprotocol BGP (MBGP), Multicast Source Discovery Protocol (MSDP), Internet Group Management Protocol Versions 2 and 3 (IGMPv2 and v3), IGMPv2 and v3 snooping, Multicast Listener Discovery (MLD) versions 1 and 2, and MLD snooping versions 1 and 2.
- **Quality of Service (QoS)**—This supports QoS mechanisms including policing, marking, queuing, random and hard traffic dropping, and shaping. Additionally, Cisco IOS XR supports modular QoS command-line interface (MQC). MQC is used to configure various QoS features on various Cisco platforms, including the Cisco ASR 9000 Series Aggregation Services Router. Supports the following:
  - Class-Based Weighted Fair Queuing (CBWFQ)
  - Weighted Random Early Detection (WRED)
  - Priority Queuing with propagation
  - 2-rate 3-color (2R3C) Policing
  - Modular QoS CLI (MQC)
  - 4-level Hierarchical-QoS
  - Shared Policy Instances
- **Manageability**—This provides industry-standard management interfaces including modular command-line interface (CLI), Simple Network Management Protocol (SNMP), and native Extensible Markup Language (XML) interfaces. Includes a comprehensive set of Syslog messages.
- **Security**—This provides comprehensive network security features including Layer 2 and Layer 3 access control lists (ACLs); routing authentications; Authentication, Authorization, and Accounting (AAA)/Terminal Access Controller Access Control System (TACACS+), Secure Shell (SSH), Management Plane Protection (MPP) for management plane security, and Simple Network Management Protocol version3 (SNMPv3). Control plane protections integrated into line card Application-Specific Integrated Circuits (ASICs) include Generalized TTL Security Mechanism (GTSM), RFC 3682, and Dynamic Control Plane Protection (DCPP).
- **Availability**—This supports rich availability features such as fault containment, fault tolerance, fast switchover, link aggregation, nonstop routing for ISIS, LDP, OSPF, and nonstop forwarding (NSF).
- **Enhanced core competencies:**

- IP fast convergence with Fast Reroute (FRR) support for Intermediate System-to-Intermediate System (IS-IS)
- IP fast convergence with Fast Reroute (FRR) support for Open Shortest Path First (OSPF)
- Path Computation Element (PCE) capability for traffic engineering

## System Requirements

This section describes the system requirements for Cisco ASR 9000 Series Aggregation Services Router Software Release 5.1.2 .

To determine the software versions or levels of your current system, see the *Determining Your Software Version* section.

## Feature Set Table

The Cisco ASR 9000 Series Aggregation Services Router Software is packaged in *feature sets* (also called *software images*). Each feature set contains a specific set of Cisco ASR 9000 Series Aggregation Services Router Software Release 5.1.2.

This table lists the Cisco ASR 9000 Series Aggregation Services Router Software feature set matrix (PX PIE files) and associated filenames available for the Release 5.1.2 supported on the Cisco ASR 9000 Series Aggregation Services Router.

**Table 1: Cisco IOS XR Software Release 5.1.2 PX PIE Files**

Feature Set	Filename	Description
<b>Composite Package</b>		
Cisco IOS XR IP Unicast Routing Core Bundle	asr9k-mini-px.pie-5.1.2	Contains the required core packages, including OS, Admin, Base, Forwarding, Modular Services Card, Routing, SNMP Agent, and Alarm Correlation.
Cisco IOS XR IP Unicast Routing Core Bundle	asr9k-mini-px.vm-5.1.2	Contains the required core packages including OS, Admin, Base, Forwarding, Forwarding Processor Card 40G, Routing, SNMP Agent, Diagnostic Utilities, and Alarm Correlation.
<b>Optional Individual Packages</b> (Packages are installed individually)		

Cisco IOS XR Manageability Package	asr9k-mgbl-px.pie-5.1.2	CORBA2 agent, XML3 Parser, and HTTP server packages. This PIE also contains some SNMP MIB infrastructure. Certain MIBs won't work if this PIE is not installed.
Cisco IOS XR CGv6 VSM Package	asr9k-services-infra.pie-5.1.2	Contains iso images and version details of System Admin Virtual Machine (VM) and Kernel-based Virtual Machine (KVM).
Cisco IOS XR MPLS Package	asr9k-mpls-px.pie-5.1.2	MPLS Traffic Engineering (MPLS-TE), Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI), Resource Reservation Protocol (RSVP), and Layer-3 VPN.
Cisco IOS XR Multicast Package	asr9k-mcast-px.pie-5.1.2	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 Advanced Video Package	asr9k-video-px.pie-5.1.2	Firmware for the advanced video feature for Cisco ASR 9000 Series Router chassis.
Cisco IOS XR Optics Package	asr9k-optic-px.pie-5.1.2	Firmware for the optics feature for Cisco ASR 9000 Series Aggregation Services Router Chassis. It enables Transport / OTN feature under interfaces.
Cisco IOS XR FPD Package	asr9k-fpd-px.pie-5.1.2	Firmware pie for all LC and RSP FPGAs and ASICs.

Cisco IOS XR Documentation Package	asr9k-doc-px.pie-5.1.2	.man pages for Cisco IOS XR Software on the Cisco ASR 9000 Series Aggregation Services Router Chassis.
Cisco IOS XR Services Package	asr9k-services-px.pie-5.1.2	Includes binaries to support CGv6 on VSM and ISM.
Cisco IOS XR Satellite Package - ASR9000v	asr9000v-nV-px.pie-5.1.2	Includes binaries 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 BNG Package	asr9k-bng-px.pie-5.1.2	Includes binaries to support BNG features.
Cisco IOS XR Lawful Intercept (LI) Package	asr9k-li-px.pie-5.1.2	Includes LI software images.
Cisco IOS XR Satellite Package - ASR903	asr9k-asr903-nV-px.pie-5.1.2	Includes binaries to support Cisco ASR 903 Series Router software and to support Cisco ASR 903 Series Router as a satellite for Cisco ASR 9000 Series Router.
Cisco IOS XR Satellite Package - ASR901	asr9k-asr901-nV-px.pie-5.1.2	Includes binaries to support Cisco ASR 901 Series Router software and to support Cisco ASR 901 Series Router as a satellite for Cisco ASR 9000 Series Router.
Cisco IOS XR Security Package	asr9k-k9sec-px.pie-5.1.2	Support for Encryption, Decryption, IP Security (IPSec), Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI) (IPSec is supported only for OSPFv3).

**Note**

- PX PIE image files are the only option on all ASR9000 platforms including RSP-2 and ASR9001 starting from Cisco IOS XR Software Release 4.3.0.
- Starting Cisco IOS XR Software Release 4.3.0 of the Cisco ASR 9000 Aggregation Services Router platform, P images are no longer required. The P images are now converged with PX. Through the normal upgrade process the migration will happen to PX.

This table lists the Cisco ASR 9000 Series Aggregation Services Router TAR files.

**Table 2: Cisco IOS XR Software Release 5.1.2 TAR Files**

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software [for RSP440 systems]	ASR9K-iosxr-px-5.1.2.tar	<ul style="list-style-type: none"> <li>• Cisco IOS XR IP Unicast Routing Core Bundle</li> <li>• Cisco IOS XR Manageability Package</li> <li>• Cisco IOS XR MPLS Package</li> <li>• Cisco IOS XR Multicast Package</li> <li>• Cisco IOS XR FPD Package</li> <li>• Cisco IOS XR Diagnostic Package</li> <li>• Cisco IOS XR Advanced Video Package</li> <li>• Cisco IOS XR Optics Package</li> <li>• Cisco IOS XR Upgrade Package</li> <li>• Cisco IOS XR BNG Package</li> <li>• Cisco IOS XR Lawful Intercept Package</li> <li>• Cisco IOS XR Services Package</li> <li>• Cisco IOS XR Documentation Package</li> </ul>

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software 3DES [for RSP440 systems]	ASR9K-iosxr-px-k9-5.1.2.tar	<ul style="list-style-type: none"> <li>• Cisco IOS XR IP Unicast Routing Core Bundle</li> <li>• Cisco IOS XR Manageability Package</li> <li>• Cisco IOS XR MPLS Package</li> <li>• Cisco IOS XR Multicast Package</li> <li>• Cisco IOS XR Security Package</li> <li>• Cisco IOS XR FPD Package</li> <li>• Cisco IOS XR Diagnostic Package</li> <li>• Cisco IOS XR Advanced Video Package</li> <li>• Cisco IOS XR Optics Package</li> <li>• Cisco IOS XR Upgrade Package</li> <li>• Cisco IOS XR BNG Package</li> <li>• Cisco IOS XR Lawful Intercept Package</li> <li>• Cisco IOS XR Services Package</li> <li>• Cisco IOS XR Documentation Package</li> </ul>

## Memory Requirements



### Caution

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

The minimum memory requirements for Cisco ASR 9000 Series Aggregation Services Router running Cisco IOS XR Software Release 5.1.2 consist of the following:

- minimum 6 GB memory on the RSP-440, ASR 9912 and ASR9922 RP
- minimum 2 GB compact flash on route switch processors (RSPs)

- minimum 4 GB memory on the line cards (LCs)

These minimum memory requirements are met with the base board design.

The supported ASR9K low memory and high memory RSP card PIDs are:

**Table 3: ASR 9000 Low and High Memory RSPs with PIDs and Minimum Software Requirement**

Description	PID	Release
ASR 9922 Route Processor 6 GB for Packet Transport	ASR-9922-RP-TR	Release 4.2.2
ASR 9922 Route Processor 12 GB for Service Edge	ASR-9922-RP-SE	Release 4.2.2
ASR9001 Route Switch Processor 8 GB	ASR9001-RP	Release 4.2.1
ASR9K Route Switch Processor with 440G/slot Fabric and 6 GB	A9K-RSP440-TR	Release 4.2.0
ASR9K Route Switch Processor with 440G/slot Fabric and 12 GB	A9K-RSP440-SE	Release 4.2.0
ASR9K Fabric, Controller 4 GB memory	A9K-RSP-4G	Release 3.7.2
Route Switch Processor 8 GB Memory	A9K-RSP-8G	Release 3.7.2
ASR 9900 Route Processor 12 GB for Service Edge	ASR-9900-RP-SE	Release 4.3.2
ASR 9900 Route Processor 6 GB for Packet Transport	ASR-9900-RP-TR	Release 4.3.2
ASR Route Processor 32 GB for Service Edge	A99-RP2-SE	Release 5.3.0

## Supported Hardware

The following table lists the supported hardware components on the Cisco ASR 9000 Series Router and the minimum required software release. 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 *Memory Requirements* section.



**Table 4: Cisco ASR 9000 Series Aggregation Services Router Supported Hardware and Minimum Software Requirements**

Component	Part Number	Support from Release
<b>Cisco ASR 9000 Series Aggregation Services Router 4-Slot</b>		
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot AC Chassis w/ PEM V2	ASR-9904-AC	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot AC Chassis w/ PEM V2 Spare	ASR-9904-AC=	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot DC Chassis w/ PEM V2	ASR-9904-DC	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot 2 Line Card Slot DC Chassis w/ PEM V2 Spare	ASR-9904-DC=	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Fan Tray	ASR-9904-FAN	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Fan Tray Spare	ASR-9904-FAN=	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Filter	ASR-9904-FILTER	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Filter Spare	ASR-9904-FILTER=	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Baffle	ASR-9904-BAFFLE	5.1.0
Cisco ASR 9000 Series Aggregation Services Router 4-Slot Baffle Spare	ASR-9904-BAFFLE=	5.1.0
<b>Cisco ASR 9000 Series Aggregation Services Router 12-Slot</b>		
Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot AC Chassis w/ PEM V2	ASR-9912-AC	4.3.2
Cisco ASR 9000 Series Aggregation Services Router 12-Slot 10 Line Card Slot DC Chassis w/ PEM V2	ASR-9912-DC	4.3.2
Cisco ASR 9000 Series Aggregation Services Router 12-Slot Fan Tray	ASR-9912-FAN	4.3.2
<b>Cisco ASR 9000 Series Aggregation Services Router 22-Slot</b>		

Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot AC Chassis w/ PEM V2	ASR-9922-AC	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot 20 Line Card Slot DC Chassis w/ PEM V2	ASR-9922-DC	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory Kit with grounding locks, guide rails etc	ASR-9922-ACC-KIT	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory - Cover for Power Shelves and Modules	ASR-9922-PWR-COV	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Reflector	ASR-9922-AIRREF	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Accessory - Door (with lock) and Fan Tray Covers	ASR-9922-DOOR	NA
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Fan Tray	ASR-9922-FAN	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Center	ASR-9922-FLTR-CEN	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Air Filter with Media, Left & Right	ASR-9922-FLTR-LR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor Filler	ASR-9922-RP-FILR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor 12GB for Service Edge	ASR-9922-RP-SE	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Route Processor 6GB for Packet Transport	ASR-9922-RP-TR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Switch Fabric Card Slot Filler	ASR-9922-SFC-FILR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 22-Slot Switch Fabric Card/110G	ASR-9922-SFC110	4.2.2
<b>Cisco ASR 9000 Series Aggregation Services Router 2-RU</b>		
Cisco ASR 9000 Series Aggregation Services Router 2-Slot Route Processor	—	4.2.1
Cisco ASR 9000 Series Aggregation Services Router 2-Slot Fan Tray Version 2	ASR-9001-FAN-V2	

Cisco ASR 9000 Series Aggregation Services Router 2-Slot Fan Tray	ASR-9001-FAN	4.2.1
Cisco ASR 9000 Series Aggregation Services Router 2-Slot Line Card	ASR-9001-LC	4.2.1
Cisco ASR 9000 Series Aggregation Services Router	ASR-9001-TRAY	4.2.1
<b>Cisco ASR 9000 Series Aggregation Services Router 6-Slot</b>		
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray Version 2	ASR-9006-FAN-V2	
Cisco ASR 9000 Series Aggregation Services Router 6-Slot System	ASR-9006	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Fan Tray	ASR-9006-FAN	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Door Kit	ASR-9006-DOOR	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot AC Chassis	ASR-9006-AC	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 6-Slot DC Chassis	ASR-9006-DC	3.7.2
<b>Cisco ASR 9000 Series Aggregation Services Router 6-Slot Air</b>		
Cisco ASR 9000 Series Aggregation Services Router 6-Slot Air Filter	ASR-9006-FILTER	3.7.2
<b>Cisco ASR 9000 Series Aggregation Services Router 10-Slot</b>		
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Fan Tray Version 2	ASR-9010-FAN-V2	
Cisco ASR 9000 Series Aggregation Services Router 10-Slot System	ASR-9010	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Fan Tray	ASR-9010-FAN	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Door Kit	ASR-9010-DOOR	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot AC Chassis	ASR-9010-AC	3.7.2

Cisco ASR 9000 Series Aggregation Services Router 10-Slot DC Chassis	ASR-9010-DC	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 2 Post Mounting Kit	ASR-9010-2P-KIT	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 4 Post Mounting Kit	ASR-9010-2P-KIT	3.7.2
<b>Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air</b>		
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air Filter	ASR-9010-FILTER	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 10-Slot External Exhaust Air Shaper	ASR-9010-AIRSHPR	NA
Cisco ASR 9000 Series Aggregation Services Router 10-Slot Air Inlet Grill	ASR-9010-GRL	NA
<b>Cisco ASR 9000 Series Aggregation Services Router Power</b>		
Cisco ASR 9000 Series Aggregation Services Router 2KW DC Power Module, version 2	PWR-2KW-DC-V2	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 3KW AC Power Module, version 2	PWR-3KW-AC-V2	4.2.0
Cisco ASR 9000 Series Aggregation Services Router AC Power Entry Module Version 2	A9K-AC-PEM-V2	4.2.0
Cisco ASR 9000 Series Aggregation Services Router DC Power Entry Module Version 2	A9K-DC-PEM-V2	4.2.0
Cisco ASR 9000 Series Aggregation Services Router Power Entry Module Version 2 Filler	A9K-PEM-V2-FILR	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 1.5kW DC Power Module	A9K-1.5KW-DC	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 2kW DC Power Module	A9K-2KW-DC	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 3kW AC Power Module	A9K-3KW-AC	3.7.2
<b>Cisco ASR 9000 Series Aggregation Services Router Line Cards</b>		

Cisco ASR 9000 Series Aggregation Services Router Virtualized Services Module (VSM) line card	A9K-VSM-500	5.1.2
Cisco ASR 9000 Series Aggregation Services Router 1-port 100GE, Service Edge Optimized	A9K-1X100GE-SE	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 1-port 100GE, Packet Transport Optimized	A9K-1X100GE-TR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 36-port 10GE, Service Edge Optimized	A9K-36X10GE-SE	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 36-port 10GE, Packet Transport Optimized LC	A9K-36X10GE-TR	4.2.2
Cisco ASR 9000 Series Aggregation Services Router 2-Port Ten Gigabit Ethernet + Cisco ASR 9000 Series Aggregation Services Router 20-Port Gigabit Ethernet, Medium Queue	A9K-2T20GE-B	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 2-Port Ten Gigabit Ethernet + Cisco ASR 9000 Series Aggregation Services Router 20-Port Gigabit Ethernet, High Queue	A9K-2T20GE-E	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 2-Port Ten Gigabit Ethernet + Cisco ASR 9000 Series Aggregation Services Router 20-Port Gigabit Ethernet, Low Queue	A9K-2T20GE-L	3.9.1
Cisco ASR 9000 Series Aggregation Services Router 4-Port Ten Gigabit Ethernet, Medium Queue	A9K-4T-B	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 4-Port Ten Gigabit Ethernet Extended Line Card, High Queue	A9K-4T-E	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 4-Port Ten Gigabit Ethernet, Low Queue	A9K-4T-L	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten Gigabit Ethernet, 80G Line Rate Extended Line Card, Medium Queue	A9K-8T-B	4.0.1
Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten Gigabit Ethernet, 80G Line Rate Extended Line Card, High Queue	A9K-8T-E	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten Gigabit Ethernet, 80G Line Rate Extended Line Card, Low Queue	A9K-8T-L	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten Gigabit Ethernet, Medium Queue	A9K-8T/4-B	3.7.2

Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten GE DX Extended Line Card, High Queue	A9K-8T/4-E	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 8-Port Ten Gigabit Ethernet, Low Queue	A9K-8T/4-L	3.9.0
Cisco ASR 9000 Series Aggregation Services Router 16-Port Ten Gigabit Ethernet, Medium Queue	A9K-4T-B	4.0.1
Cisco ASR 9000 Series Aggregation Services Router 40-Port Ten Gigabit Ethernet, Medium Queue	A9K-40GE-B	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 40-Port Ten Gigabit Ethernet, High Queue	A9K-40GE-E	3.7.2
Cisco ASR 9000 Series Aggregation Services Router 40-Port Ten Gigabit Ethernet, Low Queue	A9K-40GE-L	3.9.0
Cisco ASR 9000 Series Aggregation Services Router Line Card Filler	A9K-LC-FILR	3.7.2
ISM (Integrated Service Module) Line Card	A9K-ISM-100	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 2-Port Hundred Gigabit Ethernet, Service Edge Optimized	A9K-2X100GE-SE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 2-Port Hundred Gigabit Ethernet, Packet Transport Optimized	A9K-2X100GE-TR	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 24-Port Ten Gigabit Ethernet, Service Edge Optimized	A9K-24X10GE-SE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 24-Port Ten Gigabit Ethernet, Packet Transport Optimized	A9K-24X10GE-TR	4.2.0
<b>Cisco ASR 9000 Series Aggregation Services Router Modular Line Cards</b>		
Cisco ASR 9000 Series Aggregation Services Router 80 Gig Modular Line Card, Service Edge Optimized	A9K-MOD80-SE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 80 Gig Modular Line Card, Packet Transport Optimized	A9K-MOD80-TR	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 160 Gig Modular Line Card, Service Edge Optimized	A9K-MOD160-SE	4.2.1
Cisco ASR 9000 Series Aggregation Services Router 160 Gig Modular Line Card, Packet Transport Optimized	A9K-MOD160-TR	4.2.1
<b>Cisco ASR 9000 Series Aggregation Services Router Modular Port Adapters (MPAs)</b>		

Cisco ASR 9000 Series Aggregation Services Router 8-port 10GE Modular Port Adapter	A9K-MPA-8x10GE	4.3.1
Cisco ASR 9000 Series Aggregation Services Router 1-port 40GE Modular Port Adapter	A9K-MPA-1x40GE	4.2.3
Cisco ASR 9000 Series Aggregation Services Router 4-port 10GE Modular Port Adapter	A9K-MPA-4x10GE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 20-port 1GE Modular Port Adapter	A9K-MPA-20x1GE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router 2-port 10GE Modular Port Adapter	A9K-MPA-2x10GE	4.2.1
Cisco ASR 9000 Series Aggregation Services Router 2-port 40GE Modular Port Adapter	A9K-MPA-2x40GE	4.2.1
<b>Cisco ASR 9000 Series Aggregation Services Router Route Switch Processor Cards</b>		
Cisco ASR 9000 Series Aggregation Services Router Route Switch Processor, 4G Memory	A9K-RSP-4G	3.7.2
Cisco ASR 9000 Series Aggregation Services Router Route Switch Processor, 8G Memory	A9K-RSP-8G	4.0.1
Cisco ASR 9000 Series Aggregation Services Router Route Switch Processor Filler	ASR-9000-RSP-FILR	3.7.2
Cisco ASR 9000 Series Aggregation Services Router Next Generation Route Switch Processor, Service Edge Optimized	A9K-RSP-440-SE	4.2.0
Cisco ASR 9000 Series Aggregation Services Router Next Generation Route Switch Processor, Packet Transport Optimized	A9K-RSP-440-TR	4.2.0
<b>Cisco ASR 9000 Series Aggregation Services Router SIP and SPA Cards</b>		
Cisco ASR 9000 SIP-700 SPA interface processor	A9K-SIP-700	3.9.0
2-Port Channelized OC-12/DS0 SPA	SPA-2XCHOC12/DS0	3.9.0
1-Port Channelized OC48/STM16 DS3 SPA	SPA-1XCHOC48/DS3	4.0.1
2-Port OC-48/STM16 SPA	SPA-2XOC48POS/RPR	4.0.1
8-Port OC12/STM4 SPA	SPA-8XOC12-POS	4.0.1
1-Port OC-192/STM-64 POS/RPR SPA	SPA-OC192POS-XFP	4.0.1

4-Port Clear Channel T3/E3 SPA	SPA-4XT3E3	4.0.1
2-Port Clear Channel T3/E3 SPA	SPA-2XT3E3	4.0.1
1-Port Channelized OC-3/STM-1 SPA	SPA-1XCHSTM1/OC3	4.0.1
4-Port OC-3/STM-1 POS SPA	SPA-4XOC3	4.0.1
8-Port OC-3/STM-1 POS SPA	SPA-8XOC3	4.0.1
4-Port Channelized T3 to DS0 SPA	SPA-4XCT3/DS0	4.1.0
8-Port Channelized T1/E1 SPA	SPA-8XCHT1/E1	4.1.0
1-Port and 3-Port Clear Channel OC-3 ATM SPA	SPA-1/3XOC3ATM	4.2.0
1-Port Clear Channel OC-12 ATM SPA	SPA-1XOC12ATM	4.2.0
1-Port Channelized OC-3 ATM CEoP SPA	SPA-1XOC3-CE-ATM	4.2.0
1000BASE-BX40-D for Single-Fiber Bidirectional Applications	GLC-BX40-DA-I GLC-BX40-D-I	5.1.2
1000BASE-BX40-U for Single-Fiber Bidirectional Applications	GLC-BX40-U-I	5.1.2
1000BASE-BX80-D for Single-Fiber Bidirectional Applications	GLC-BX80-D-I	5.1.2
1000BASE-BX80-U for Single-Fiber Bidirectional Applications	GLC-BX80-U-I	5.1.2

## Software Compatibility

Cisco IOS XR Software Release 5.1.2 is compatible with the following Cisco ASR 9000 Series Aggregation Services Router systems.

- Cisco ASR 9000 Series Aggregation Services Router 4-Slot Line Card Chassis
- Cisco ASR 9000 Series Aggregation Services Router 6-Slot Line Card Chassis
- Cisco ASR 9000 Series Aggregation Services Router 10-Slot Line Card Chassis
- Cisco ASR 9000 Series Aggregation Services Router 12-Slot Line Card Chassis
- Cisco ASR 9000 Series Aggregation Services Router 22-Slot Line Card Chassis
- Cisco ASR 9000 Series Aggregation Services Router ASR-9001 Chassis

**Table 5: Cisco ASR 9000 Series Aggregation Services Router Supported Software Licenses**

Software License	Part Number
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Cisco ASR 9000 Series Aggregation Services Router iVRF License	A9K-IVRF-LIC
Cisco ASR 9000 Series Aggregation Services Router Per Chassis Advanced Video License	A9K-ADV-VIDEO-LIC
Cisco ASR 9000 Series Aggregation Services Router Per Line Card Advanced Optical License	A9K-ADV-OPTIC-LIC
Cisco ASR 9000 Series Aggregation Services Router L3VPN License, Medium Queue and Low Queue Line Cards	A9K-AIP-LIC-B
Cisco ASR 9000 Series Aggregation Services Router L3VPN License, High Queue Line Cards	A9K-AIP-LIC-E

Note that error messages may display if features run without the appropriate licenses installed. For example, when creating or configuring VRF, if the A9K-IVRF-LIC license is not installed before creating a VRF, the following message displays:

```
RP/0/RSP0/CPU0:router#LC/0/0/CPU0:Dec 15 17:57:53.653 : rsi_agent[247]:
%LICENSE-ASR9K_LICENSE-2-INFRA_VRF_NEEDED : 5 VRF(s) are configured without license
A9K-IVRF-LIC in violation of the Software Right To Use Agreement. This feature may be
disabled by the system without the appropriate license. Contact Cisco to purchase the
license immediately to avoid potential service interruption.
```

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](mailto:cwm-license@cisco.com).

## Cisco ASR 9000 Series Aggregation Services Router Right-To-Use (RTU) Licensing

Here are on-line locations of the Cisco ASR 9000 Series Aggregation Services Router Right-To-Use (RTU) licensing documents:

<http://www.cisco.com/en/US/docs/routers/asr9000/hardware/Prodlicense/A9k-AIP-LIC-B.html>

<http://www.cisco.com/en/US/docs/routers/asr9000/hardware/Prodlicense/A9k-AIP-LIC-E.html>



### Note

Layer 3 VPNs are only to be used after you have purchased a license. Cisco will enforce the RTU of L3VPNs in follow on releases. You should contact Cisco, or check the release notes for the follow on release before upgrading for directions on how to install the license as part of the upgrade - otherwise the L3VPN feature may be affected.

The activation of VRF capability still requires the use of the appropriate per line card license (A9K-IVRF-LIC / A9K-AIP-LIC-B / A9K-AIP-LIC-E). Please contact your sales representative for more details.

## Firmware Support

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

If upgrading from Release 3.7.3 or earlier releases, you may be expected to do a one-time FPD upgrade for any firmware images that may have changed since the last release. Refer to the documents at [http://www.cisco.com/web/Cisco\\_IOS\\_XR\\_Software/index.html](http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html) for upgrade instructions.

RP/0/RSP0/CPU0:router (admin) #show fpd package

```

=====
                        Field Programmable Device Package
=====
Card Type                FPD Description                Type Subtype    SW      Min Req  Min Req
=====                =====                =====
ASR-9904-BPID2           Can Bus Ctrl (CBC) BP2         bp cbc          7.104    0.00    0.1
-----
ASR-9912-BPID2           Can Bus Ctrl (CBC) BP2         bp cbc          7.104    0.00    0.1
                          Can Bus Ctrl (CBC) BP2         lc cbc          7.104    0.00    0.1
-----
ASR-9922-BPID2           Can Bus Ctrl (CBC) BP2         bp cbc          7.104    0.00    0.1
                          Can Bus Ctrl (CBC) BP2         lc cbc          7.104    0.00    0.1
-----
A9K-BPID2-10-SLOT        Can Bus Ctrl (CBC) BP2         bp cbc          7.104    0.00    0.1
                          Can Bus Ctrl (CBC) BP2         lc cbc          7.104    0.00    0.1
-----
A9K-BPID2-6-SLOT         Can Bus Ctrl (CBC) BP2         bp cbc          7.104    0.00    0.1
                          Can Bus Ctrl (CBC) BP2         lc cbc          7.104    0.00    0.1
-----
ASR-9922-SFC110          Can Bus Ctrl (CBC) MTFC        fc cbc          28.06    0.00    0.1
                          Fabric Ctrl0 MTFC              fc fpga7        1.02     0.00    0.1
                          Can Bus Ctrl (CBC) MTFC        lc cbc          28.06    0.00    0.1
-----
ASR-9912-SFC110          Can Bus Ctrl (CBC) SSFC        fc cbc          32.05    0.00    0.1
                          Fabric Ctrl0 MTFC              fc fpga7        1.02     0.00    0.1
-----
ASR-9010-FAN             Can Bus Ctrl (CBC) FAN         ft cbc          4.02     0.00    0.1
                          Can Bus Ctrl (CBC) FAN         lc cbc          4.02     0.00    0.1
-----
ASR-9006-FAN             Can Bus Ctrl (CBC) FAN         ft cbc          5.02     0.00    0.1
                          Can Bus Ctrl (CBC) FAN         lc cbc          5.02     0.00    0.1
-----
ASR-9922-FAN             Can Bus Ctrl (CBC) MFAN        ft cbc          29.11    0.00    0.1
                          Can Bus Ctrl (CBC) MFAN        lc cbc          29.11    0.00    0.1
-----
ASR-9912-FAN             Can Bus Ctrl (CBC) SFAN        ft cbc          31.04    0.00    0.1
-----
ASR-9010-FAN-V2          Can Bus Ctrl (CBC) FAN         ft cbc          29.11    0.00    0.1
                          Can Bus Ctrl (CBC) FAN         lc cbc          29.11    0.00    0.1
-----
ASR-9904-FAN             Can Bus Ctrl (CBC) SFAN        ft cbc          31.04    0.00    0.1

```

ASR-9001-FAN	Can Bus Ctrl (CBC) FAN	ft	cbc	24.115	0.00	0.1
	Can Bus Ctrl (CBC) FAN	lc	cbc	24.115	0.00	0.1
ASR-9001-FAN-V2	Can Bus Ctrl (CBC) FAN	ft	cbc	24.115	0.00	0.1
A9K-VSM-500	CPUCtrl Forge	lc	bios	3.04	0.00	0.1
	CPUCtrl Forge	lc	cbc	33.03	0.00	0.1
	CPUCtrl Forge	lc	fpga1	1.26	0.00	0.1
	CPUCtrl Forge	lc	ibmc	5.08	0.00	0.1
A9K-40GE-B	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.06	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
A9K-4T-B	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	PHY LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
A9K-8T/4-B	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	PHY LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
A9K-2T20GE-B	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.11	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.10	0.00	0.1

	PortCtrl LC2	lc	fpga2	0.16	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-40GE-E	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.06	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-4T-E	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	PHY LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-8T/4-E	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	PHY LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-2T20GE-E	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cp1d1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cp1d2	0.11	0.00	0.1
	LCclkCtrl LC2	lc	cp1d3	0.10	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.16	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-8T-B	Can Bus Ctrl (CBC) LC3	lc	cbc	6.11	0.00	0.1
	CPUCtrl LC3	lc	cp1d1	1.02	0.00	0.1

	PHYCtrl LC3	lc	cpld2	0.08	0.00	0.1
	LCClkCtrl LC3	lc	cpld3	0.03	0.00	0.1
	DB CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.11	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-16T/8-B	Can Bus Ctrl (CBC) LC3	lc	cbc	6.12	0.00	0.1
	CPUCtrl LC3	lc	cpld1	1.02	0.00	0.1
	PHYCtrl LC3	lc	cpld2	0.04	0.00	0.1
	LCClkCtrl LC3	lc	cpld3	0.01	0.00	0.1
	DB CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.01	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-8T-E	Can Bus Ctrl (CBC) LC3	lc	cbc	6.11	0.00	0.1
	CPUCtrl LC3	lc	cpld1	1.02	0.00	0.1
	PHYCtrl LC3	lc	cpld2	0.08	0.00	0.1
	LCClkCtrl LC3	lc	cpld3	0.03	0.00	0.1
	CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.11	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-16T/8-E	Can Bus Ctrl (CBC) LC3	lc	cbc	6.12	0.00	0.1
	CPUCtrl LC3	lc	cpld1	1.02	0.00	0.1
	PHYCtrl LC3	lc	cpld2	0.04	0.00	0.1
	LCClkCtrl LC3	lc	cpld3	0.01	0.00	0.1
	DB CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.01	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-40GE-L	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cpld1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cpld2	0.06	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1

	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-4T-L	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cpld1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cpld2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cpld3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	Serdes Upgrade LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-8T/4-L	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cpld1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cpld2	0.08	0.00	0.1
	LCclkCtrl LC2	lc	cpld3	0.03	0.00	0.1
	PortCtrl LC2	lc	fpga2	0.10	0.00	0.1
	Serdes Upgrade LC2	lc	fpga3	14.44	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-2T20GE-L	Can Bus Ctrl (CBC) LC2	lc	cbc	2.03	0.00	0.1
	CPUCtrl LC2	lc	cpld1	1.00	0.00	0.1
	PHYCtrl LC2	lc	cpld2	0.11	0.00	0.1
	LCclkCtrl LC2	lc	cpld3	0.10	0.00	0.1
	Tomcat LC2	lc	fpga2	0.16	0.00	0.1
	Bridge LC2	lc	fpga1	0.44	0.00	0.1
	ROMMONB LC2	lc	rommon	1.05	0.00	0.1
-----						
A9K-8T-L	Can Bus Ctrl (CBC) LC3	lc	cbc	6.11	0.00	0.1
	CPUCtrl LC3	lc	cpld1	1.02	0.00	0.1
	PHYCtrl LC3	lc	cpld2	0.08	0.00	0.1
	LCclkCtrl LC3	lc	cpld3	0.03	0.00	0.1
	CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.11	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-16T/8-L	Can Bus Ctrl (CBC) LC3	lc	cbc	6.12	0.00	0.1
	CPUCtrl LC3	lc	cpld1	1.02	0.00	0.1

	PHYCtrl LC3	lc	cpld2	0.04	0.00	0.1
	LCclkCtrl LC3	lc	cpld3	0.01	0.00	0.1
	DB CPUCtrl LC3	lc	cpld4	1.03	0.00	0.1
	PortCtrl LC3	lc	fpga2	0.01	0.00	0.1
	Raven LC3	lc	fpga1	1.03	0.00	0.1
	ROMMONB LC3	lc	rommon	1.03	0.00	0.1
-----						
A9K-SIP-700	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.23	0.00	0.1
	ROMMONB LC5	lc	rommon	1.04	0.00	0.1
-----						
A9K-SIP-500	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.23	0.00	0.1
	ROMMONB LC5	lc	rommon	1.04	0.00	0.1
-----						
A9K-SIP-700-8G	Can Bus Ctrl (CBC) LC5	lc	cbc	3.06	0.00	0.1
	CPUCtrl LC5	lc	cpld1	0.15	0.00	0.1
	QFPCPUBridge LC5	lc	fpga2	5.14	0.00	0.1
	NPUXBarBridge LC5	lc	fpga1	0.23	0.00	0.1
	ROMMONB LC5	lc	rommon	1.35	0.00	0.1
-----						
A9K-RSP-2G	Can Bus Ctrl (CBC) RSP2	lc	cbc	1.03	0.00	0.1
	CPUCtrl RSP2	lc	cpld2	1.18	0.00	0.1
	IntCtrl RSP2	lc	fpga2	1.15	0.00	0.1
	ClkCtrl RSP2	lc	fpga3	1.23	0.00	0.1
	UTI RSP2	lc	fpga4	3.08	0.00	0.1
	PUNT RSP2	lc	fpga1	1.05	0.00	0.1
	ROMMONB RSP2	lc	rommon	1.06	0.00	0.1
-----						
A9K-RSP-4G	Can Bus Ctrl (CBC) RSP2	lc	cbc	1.03	0.00	0.1
	CPUCtrl RSP2	lc	cpld2	1.18	0.00	0.1
	IntCtrl RSP2	lc	fpga2	1.15	0.00	0.1
	ClkCtrl RSP2	lc	fpga3	1.23	0.00	0.1
	UTI RSP2	lc	fpga4	3.08	0.00	0.1
	PUNT RSP2	lc	fpga1	1.05	0.00	0.1

	ROMMONB RSP2	lc	rommon	1.06	0.00	0.1
-----						
A9K-RSP-8G	Can Bus Ctrl (CBC) RSP2	lc	cbc	1.03	0.00	0.1
	CPUCtrl RSP2	lc	cpld2	1.18	0.00	0.1
	IntCtrl RSP2	lc	fpga2	1.15	0.00	0.1
	ClkCtrl RSP2	lc	fpga3	1.23	0.00	0.1
	UTI RSP2	lc	fpga4	3.08	0.00	0.1
	PUNT RSP2	lc	fpga1	1.05	0.00	0.1
	ROMMONB RSP2	lc	rommon	1.06	0.00	0.1
-----						
A9K-RSP440-TR	Can Bus Ctrl (CBC) RSP3	lc	cbc	16.115	0.00	0.1
	ClockCtrl0 RSP3	lc	fpga2	1.06	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.10	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.71	0.00	0.1
-----						
A9K-RSP440-SE	Can Bus Ctrl (CBC) RSP3	lc	cbc	16.115	0.00	0.1
	ClockCtrl0 RSP3	lc	fpga2	1.06	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.10	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.71	0.00	0.1
-----						
ASR-9922-RP-TR	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.02	0.00	0.1
	Fabric Ctrl13 MTFC	lc	fpga10	1.02	0.00	0.1
	Fabric Ctrl14 MTFC	lc	fpga11	1.02	0.00	0.1
	Fabric Ctrl15 MTFC	lc	fpga12	1.02	0.00	0.1
	Fabric Ctrl16 MTFC	lc	fpga13	1.02	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.03	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl10 MTFC	lc	fpga7	1.02	0.00	0.1
	Fabric Ctrl11 MTFC	lc	fpga8	1.02	0.00	0.1
	Fabric Ctrl12 MTFC	lc	fpga9	1.02	0.00	0.1
	CPUCtrl0	lc	fpga1	1.04	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.11	0.00	0.1
-----						
ASR-9922-RP-SE	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.02	0.00	0.1



	Fabric Ctrl3 MTFC	lc	fpga10	1.02	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.02	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.02	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.02	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.03	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl10 MTFC	lc	fpga7	1.02	0.00	0.1
	Fabric Ctrl11 MTFC	lc	fpga8	1.02	0.00	0.1
	Fabric Ctrl12 MTFC	lc	fpga9	1.02	0.00	0.1
	CPUCtrl0	lc	fpga1	1.04	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.11	0.00	0.1
-----						
ASR-9900-RP-TR	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.02	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.02	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.02	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.02	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.02	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1
	ClkCtrl	lc	fpga3	1.03	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl10 MTFC	lc	fpga7	1.02	0.00	0.1
	Fabric Ctrl11 MTFC	lc	fpga8	1.02	0.00	0.1
	Fabric Ctrl12 MTFC	lc	fpga9	1.02	0.00	0.1
	CPUCtrl0	lc	fpga1	1.04	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.11	0.00	0.1
-----						
ASR-9900-RP-SE	Can Bus Ctrl (CBC) MTRP	lc	cbc	25.02	0.00	0.1
	Fabric Ctrl3 MTFC	lc	fpga10	1.02	0.00	0.1
	Fabric Ctrl4 MTFC	lc	fpga11	1.02	0.00	0.1
	Fabric Ctrl5 MTFC	lc	fpga12	1.02	0.00	0.1
	Fabric Ctrl6 MTFC	lc	fpga13	1.02	0.00	0.1
	CPUCtrl1	lc	fpga2	1.03	0.00	0.1

	ClkCtrl	lc	fpga3	1.03	0.00	0.1
	IntCtrl	lc	fpga4	1.04	0.00	0.1
	UTI	lc	fpga5	4.09	0.00	0.1
	Timex	lc	fpga6	0.02	0.00	0.1
	Fabric Ctrl10 MTFC	lc	fpga7	1.02	0.00	0.1
	Fabric Ctrl11 MTFC	lc	fpga8	1.02	0.00	0.1
	Fabric Ctrl12 MTFC	lc	fpga9	1.02	0.00	0.1
	CPUCtrl0	lc	fpga1	1.04	0.00	0.1
	ROMMONB MTRP	lc	rommon	5.11	0.00	0.1
ASR9001-RP	Can Bus Ctrl (CBC) IMRP	lc	cbc	22.114	0.00	0.1
	MB CPUCtrl	lc	fpga2	1.14	0.00	0.0
	ROMMONB IM RP	lc	rommon	2.03	0.00	0.1
A9K-24x10GE-SE	Can Bus Ctrl (CBC) LC6	lc	cbc	19.112	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.03	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.01	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.07	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0
A9K-2x100GE-SE	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cpld1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0
	PortCtrl	lc	fpga3	1.05	0.00	0.0
	Imux	lc	fpga4	1.01	0.00	0.0
	Emux	lc	fpga5	1.03	0.00	0.0
	100GIGMAC	lc	fpga6	39.00	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.0
A9K-MOD80-SE	Can Bus Ctrl (CBC) LC4	lc	cbc	20.118	0.00	0.1
	DB Ctrl	lc	fpga2	1.04	0.00	0.0
	MB CPUCtrl	lc	fpga4	1.05	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.1
A9K-MOD160-SE	Can Bus Ctrl (CBC) LC4	lc	cbc	20.118	0.00	0.1
	DB Ctrl	lc	fpga2	1.04	0.00	0.0
	MB CPUCtrl	lc	fpga4	1.05	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.1
A9K-24x10GE-TR	Can Bus Ctrl (CBC) LC6	lc	cbc	19.112	0.00	0.0

	DBCtrl LC6	lc	fpga2	1.03	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.01	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.07	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0
-----						
A9K-2x100GE-TR	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cpld1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0
	PortCtrl	lc	fpga3	1.05	0.00	0.0
	Imux	lc	fpga4	1.01	0.00	0.0
	Emux	lc	fpga5	1.03	0.00	0.0
	100GIGMAC	lc	fpga6	39.00	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.0
-----						
A9K-MOD80-TR	Can Bus Ctrl (CBC) LC4	lc	cbc	20.118	0.00	0.1
	DB Ctrl	lc	fpga2	1.04	0.00	0.0
	MB CPUCtrl	lc	fpga4	1.05	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.1
-----						
A9K-MOD160-TR	Can Bus Ctrl (CBC) LC4	lc	cbc	20.118	0.00	0.1
	DB Ctrl	lc	fpga2	1.04	0.00	0.0
	MB CPUCtrl	lc	fpga4	1.05	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.1
-----						
A9K-8T-TEST	Can Bus Ctrl (CBC) LC17	lc	cbc	17.214	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	0.03	0.00	0.0
	ROMMONB LC6	lc	rommon	1.04	0.00	0.0
-----						
A9K-36x10GE-SE	Can Bus Ctrl (CBC) LC6	lc	cbc	15.104	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.01	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.00	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.03	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0
-----						
A9K-36x10GE_SC7-SE	Can Bus Ctrl (CBC) LC6	lc	cbc	15.104	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.01	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.00	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.03	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0

A9K-36x10GE-TR	Can Bus Ctrl (CBC) LC6	lc	cbc	15.104	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.01	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.00	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.03	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0
A9K-36x10GE_SC7-TR	Can Bus Ctrl (CBC) LC6	lc	cbc	15.104	0.00	0.0
	DBCtrl LC6	lc	fpga2	1.01	0.00	0.0
	LinkCtrl LC6	lc	fpga3	1.00	0.00	0.0
	LCCPUCtrl LC6	lc	fpga4	1.03	0.00	0.0
	ROMMONB LC6	lc	rommon	2.00	0.00	0.0
A9K-1x100GE-SE	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cp1d1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0
	PortCtrl	lc	fpga3	1.05	0.00	0.0
	Imux	lc	fpga4	1.01	0.00	0.0
	Emux	lc	fpga5	1.03	0.00	0.0
	100GIGMAC	lc	fpga6	39.00	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.0
A9K-1x100GE-TR	Can Bus Ctrl (CBC) LC4	lc	cbc	21.111	0.00	0.1
	DB IO FPGA1	lc	cp1d1	1.03	0.00	0.0
	MB CPUCtrl	lc	fpga2	1.08	0.00	0.0
	PortCtrl	lc	fpga3	1.05	0.00	0.0
	Imux	lc	fpga4	1.01	0.00	0.0
	Emux	lc	fpga5	1.03	0.00	0.0
	100GIGMAC	lc	fpga6	39.00	0.00	0.0
	ROMMONB LC4	lc	rommon	2.00	0.00	0.0
ASR9001-LC	Can Bus Ctrl (CBC) IMLC	lc	cbc	23.114	0.00	0.1
	DB CPUCtrl	lc	fpga2	1.18	0.00	0.0
	EP Gambit	lc	fpga3	0.08	0.00	0.0
	MB CPUCtrl	lc	fpga4	2.10	0.00	0.0
	EP Rogue	lc	fpga6	1.06	0.00	0.0
	EP Sage	lc	fpga7	1.02	0.00	0.0
	ROMMONB IM LC	lc	rommon	2.03	0.00	0.1
ASR9001-LC-S	Can Bus Ctrl (CBC) IMLC	lc	cbc	23.114	0.00	0.1

	DB CPUCtrl	lc	fpga2	1.18	0.00	0.0
	EP Gambit	lc	fpga3	0.08	0.00	0.0
	MB CPUCtrl	lc	fpga4	2.10	0.00	0.0
	EP Rogue	lc	fpga6	1.06	0.00	0.0
	EP Sage	lc	fpga7	1.02	0.00	0.0
	ROMMONB IM LC	lc	rommon	2.03	0.00	0.1
-----						
A9K-ISM-100	Can Bus Ctrl (CBC) LC6	lc	cbc	18.08	0.00	0.1
	CPUCtrl LC6	lc	cpld1	0.01	0.00	0.1
	Maintenance LC6	lc	fpga2	2.13	0.00	0.1
	Amistad LC6	lc	fpga1	0.33	0.00	0.20
	ROMMONB LC6	lc	rommon	1.02	0.00	0.1
-----						
A9K-RSP-3G	ClockCtrl0 RSP3	lc	fpga2	1.06	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.10	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.71	0.00	0.1
-----						
A9K-RSP-24G	ClockCtrl0 RSP3	lc	fpga2	1.06	0.00	0.1
	UTI RSP3	lc	fpga3	4.09	0.00	0.1
	CPUCtrl RSP3	lc	fpga1	0.10	0.00	0.1
	ROMMONB RSP3	lc	rommon	0.71	0.00	0.1
-----						
SPA-4XT3/E3	SPA E3 Subrate FPGA	spa	fpga2	1.04	0.00	0.0
	SPA T3 Subrate FPGA	spa	fpga3	1.04	0.00	0.0
	SPA I/O FPGA	spa	fpga1	1.01	0.00	0.0
	SPA ROMMON	spa	rommon	2.12	0.00	0.0
-----						
SPA-4XCT3/DS0	SPA T3 Subrate FPGA	spa	fpga2	0.11	0.00	0.100
	SPA T3 Subrate FPGA	spa	fpga2	1.04	0.00	0.200
	SPA I/O FPGA	spa	fpga1	2.08	0.00	0.100
	SPA ROMMON	spa	rommon	2.12	0.00	0.100
-----						
SPA-OC192POS-XFP	SPA FPGA swv1.101 hww3	spa	fpga2	1.101	0.00	3.0
	SPA FPGA swv1.2 hww2	spa	fpga1	1.02	0.00	2.0
-----						
SPA-1XCHSTM1/OC3	SPA T3 Subrate FPGA	spa	fpga2	1.04	0.00	0.0
	SPA I/O FPGA	spa	fpga1	1.08	0.00	0.0
	SPA ROMMON	spa	rommon	2.12	0.00	0.0
-----						
SPA-1XOC48POS/RPR	SPA FPGA swv1.101 hww3	spa	fpga2	1.101	0.00	3.0

SPA-24CHT1-CE-ATM	SPA T3 Subrate FPGA	spa fpga2	1.10	0.00	1.0
	SPA I/O FPGA	spa fpga1	2.32	0.00	1.0
	SPA ROMMON	spa rommon	1.03	0.00	1.0
SPA-2CHT3-CE-ATM	SPA T3 Subrate FPGA	spa fpga2	1.11	0.00	1.0
	SPA I/O FPGA	spa fpga1	2.22	0.00	1.0
	SPA ROMMON	spa rommon	1.04	0.00	1.0
SPA-1CHOC3-CE-ATM	SPA OC3 Subrate FPGA	spa fpga2	2.23	0.00	0.0
	SPA I/O FPGA	spa fpga1	2.23	0.00	2.0
	SPA ROMMON	spa rommon	1.04	0.00	0.0
SPA-1XCHOC48/DS3	SPA I/O FPGA	spa fpga2	1.00	0.00	0.49
	SPA I/O FPGA	spa fpga3	1.00	0.00	0.52
	SPA I/O FPGA	spa fpga1	1.36	0.00	0.49
	SPA ROMMON	spa rommon	2.02	0.00	0.49
SPA-2XCHOC12/DS0	SPA FPGA2 swv1.00	spa fpga2	1.00	0.00	0.0
	SPA FPGA swv1.36	spa fpga1	1.36	0.00	0.49
	SPA ROMMON swv2.2	spa rommon	2.02	0.00	0.49
A9K-MPA-20X1GE	EP I/O FPGA	spa fpga3	0.08	0.00	0.0
A9K-MPA-2X10GE	EP I/O FPGA	spa fpga6	1.06	0.00	0.0
A9K-MPA-4X10GE	EP I/O FPGA	spa fpga6	1.06	0.00	0.0
A9K-MPA-2X40GE	EP Sage	spa fpga7	1.03	0.00	0.0
A9K-MPA-1X40GE	EP Sage	spa fpga7	1.03	0.00	0.0
A9K-MPA-8X10GE	EP I/O FPGA	spa fpga8	1.00	0.00	0.0
SPA-8XOC12-POS	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.5
SPA-8XCHT1/E1	SPA I/O FPGA	spa fpga1	2.08	0.00	0.0
	SPA ROMMON	spa rommon	2.12	0.00	0.140
SPA-2XOC48POS/RPR	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.0
SPA-4XOC48POS/RPR	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.0
SPA-8XOC3-POS	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.5

SPA-2XOC12-POS	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.5
SPA-4XOC12-POS	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.5
SPA-10X1GE-V2	SPA FPGA swv1.10	spa fpga1	1.10	0.00	0.0
SPA-5X1GE-V2	SPA FPGA swv1.10	spa fpga1	1.10	0.00	0.0
SPA-1X10GE-L-V2	SPA FPGA swv1.9	spa fpga1	1.09	0.00	0.0
SPA-4XOC3-POS-V2	SPA FPGA swv1.0	spa fpga1	1.00	0.00	0.5
SPA-1X10GE-WL-V2	SPA FPGA swv1.9	spa fpga1	1.09	0.00	0.0
SPA-1XOC3-ATM-V2	SPA FPGA swv1.2	spa fpga1	2.02	0.00	0.0
SPA-2XOC3-ATM-V2	SPA FPGA swv1.2	spa fpga1	2.02	0.00	0.0
SPA-3XOC3-ATM-V2	SPA FPGA swv1.2	spa fpga1	2.02	0.00	0.0
SPA-1XOC12-ATM-V2	SPA FPGA swv1.2	spa fpga1	2.02	0.00	0.0
SPA-8XCHT1/E1-V2	SPA I/O FPGA	spa fpga1	1.02	0.00	1.0
	SPA ROMMON	spa rommon	1.00	0.00	1.0

## Determining Your Software Version

To determine the version of Cisco IOS XR Software running on your router, log in to the router and enter the **show version** command:

### SUMMARY STEPS

1. Establish a Telnet session with the router.
2. Enter **show version** command from EXEC mode.

### DETAILED STEPS

**Step 1** Establish a Telnet session with the router.

**Step 2** Enter **show version** command from EXEC mode.

```
RP/0/RSP0/CPU0:router show version
```

```
Cisco IOS XR Software, Version 5.1.2[Default]
Copyright (c) 2014 by Cisco Systems, Inc.
```

```
ROM: System Bootstrap, Version 5.11(c) 1994-2012 by Cisco Systems, Inc.
```

```

PE1 uptime is 7 hours, 52 minutes
System image file is "disk0:asr9k-os-mpi-5.1.2/0x100305/mbiasr9k-rsp3.vm"

cisco ASR9K Series (Intel 686 F6M14S4) processor with 6291456K bytes of memory.
Intel 686 F6M14S4 processor at 2130MHz, Revision 2.174
ASR 9922 20 Line Card Slot AC Chassis w/ PEM V2

8 Management Ethernet
10 GigabitEthernet/IEEE 802.3 interface(s)
2 HundredGigE
54 DWDM controller(s)
52 TenGigE
52 WANPHY controller(s)
20 GigabitEthernet
503k bytes of non-volatile configuration memory.
6143M bytes of hard disk.
11817968k bytes of disk0: (Sector size 512 bytes).
11817968k bytes of disk1: (Sector size 512 bytes).

Configuration register on node 0/RP0/CPU0 is 0x102
Boot device on node 0/RP0/CPU0 is disk0:
Package active on node 0/RP0/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supp-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supp-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supp-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
  Built on Wed Apr 30 08:56:19 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```



iosxr-mls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2

Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mgbl, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mgbl-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-suppl-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-px-5.1.2  
Built on Wed Apr 30 07:40:08 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-suppl-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-security, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-security-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-suppl-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-px-5.1.2  
Built on Wed Apr 30 08:55:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```
asr9k-fpd, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-5.1.2
  Built on Wed Apr 30 08:55:49 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-px-5.1.2
  Built on Wed Apr 30 08:56:10 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9K-doc-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9K-doc-supp-5.1.2
  Built on Wed Apr 30 08:55:43 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-doc-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-doc-px-5.1.2
  Built on Wed Apr 30 08:55:48 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-supp-5.1.2
  Built on Wed Apr 30 08:58:13 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-nV-px-5.1.2
  Built on Wed Apr 30 08:58:59 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-supp-5.1.2
  Built on Wed Apr 30 08:58:03 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-nV-px-5.1.2
  Built on Wed Apr 30 08:58:11 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-supp-5.1.2
  Built on Wed Apr 30 08:57:55 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-px-5.1.2
  Built on Wed Apr 30 08:58:01 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Configuration register on node 0/RP1/CPU0 is 0x102
```

```
Boot device on node 0/RP1/CPU0 is disk0:
Package active on node 0/RP1/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supply-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supply-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supply-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
  Built on Wed Apr 30 08:56:19 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2
  Built on Wed Apr 30 07:39:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2
  Built on Wed Apr 30 07:39:38 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2
  Built on Wed Apr 30 07:34:27 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2
  Built on Wed Apr 30 07:34:27 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2
  Built on Wed Apr 30 07:34:29 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mgbl, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mgbl-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-supp-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-px-5.1.2  
Built on Wed Apr 30 07:40:08 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-security, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-security-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-supp-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-px-5.1.2  
Built on Wed Apr 30 08:55:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-5.1.2  
Built on Wed Apr 30 08:55:49 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-px-5.1.2  
Built on Wed Apr 30 08:56:10 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9K-doc-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9K-doc-supp-5.1.2  
Built on Wed Apr 30 08:55:43 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-doc-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-doc-px-5.1.2  
Built on Wed Apr 30 08:55:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2  
Built on Wed Apr 30 08:55:31 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```
asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-suppl-5.1.2
  Built on Wed Apr 30 08:58:13 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-nV-px-5.1.2
  Built on Wed Apr 30 08:58:59 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-suppl-5.1.2
  Built on Wed Apr 30 08:58:03 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-nV-px-5.1.2
  Built on Wed Apr 30 08:58:11 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-suppl-5.1.2
  Built on Wed Apr 30 08:57:55 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-px-5.1.2
  Built on Wed Apr 30 08:58:01 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 0/0/CPU0 is mem:
Package active on node 0/0/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-suppl-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-suppl-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2  
Built on Wed Apr 30 08:56:17 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supp-5.1.2  
Built on Wed Apr 30 08:56:18 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2  
Built on Wed Apr 30 08:56:19 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014



By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2  
Built on Wed Apr 30 08:55:31 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2  
Built on Wed Apr 30 08:55:31 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2  
Built on Wed Apr 30 08:55:42 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```
Boot device on node 0/13/CPU0 is mem:
Package active on node 0/13/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supply-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supply-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supply-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
  Built on Wed Apr 30 08:56:19 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2
  Built on Wed Apr 30 07:39:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2
  Built on Wed Apr 30 07:39:38 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2
  Built on Wed Apr 30 07:34:27 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2
  Built on Wed Apr 30 07:34:27 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2
  Built on Wed Apr 30 07:34:29 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014

```

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2
Built on Wed Apr 30 10:06:14 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2
Built on Wed Apr 30 10:06:16 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
Built on Wed Apr 30 08:55:31 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
Built on Wed Apr 30 08:55:31 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
Built on Wed Apr 30 08:55:42 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 0/15/CPU0 is mem:
Package active on node 0/15/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
Built on Wed Apr 30 08:56:20 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supply-5.1.2
Built on Wed Apr 30 08:56:20 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
Built on Wed Apr 30 08:56:25 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
Built on Wed Apr 30 08:56:14 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supply-5.1.2
Built on Wed Apr 30 08:56:14 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
Built on Wed Apr 30 08:56:17 PST 2014
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asr9k-optics-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supply-5.1.2
Built on Wed Apr 30 08:56:18 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
Built on Wed Apr 30 08:56:19 PST 2014

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By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mppls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mppls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mppls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mppls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```
asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2
  Built on Wed Apr 30 07:34:46 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2
  Built on Wed Apr 30 07:39:11 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2
  Built on Wed Apr 30 07:39:39 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2
  Built on Wed Apr 30 07:39:39 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2
  Built on Wed Apr 30 07:39:54 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2
  Built on Wed Apr 30 10:06:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2
  Built on Wed Apr 30 10:06:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2
  Built on Wed Apr 30 10:06:16 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 0/18/CPU0 is mem:
Package active on node 0/18/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supp-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2  
Built on Wed Apr 30 08:56:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-suppl-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2  
Built on Wed Apr 30 08:56:17 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-suppl-5.1.2  
Built on Wed Apr 30 08:56:18 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2  
Built on Wed Apr 30 08:56:19 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mps, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mps-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mps-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mps-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-diags-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-suppl-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-mcast-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-suppl-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie



```
iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Configuration register on node 1/RP0/CPU0 is 0x102
Boot device on node 1/RP0/CPU0 is disk0:
Package active on node 1/RP0/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supply-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supply-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supply-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
  Built on Wed Apr 30 08:56:19 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mps, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mps-5.1.2
  Built on Wed Apr 30 07:39:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mps-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mps-px-5.1.2
  Built on Wed Apr 30 07:39:38 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-suppl, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-suppl-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mgbl, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mgbl-5.1.2

Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-supp-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-px-5.1.2  
Built on Wed Apr 30 07:40:08 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-security, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-security-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-supp-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-px-5.1.2  
Built on Wed Apr 30 08:55:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-5.1.2  
Built on Wed Apr 30 08:55:49 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-px-5.1.2  
Built on Wed Apr 30 08:56:10 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```

asr9K-doc-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9K-doc-supp-5.1.2
  Built on Wed Apr 30 08:55:43 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-doc-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-doc-px-5.1.2
  Built on Wed Apr 30 08:55:48 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-supp-5.1.2
  Built on Wed Apr 30 08:58:13 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-nV-px-5.1.2
  Built on Wed Apr 30 08:58:59 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-supp-5.1.2
  Built on Wed Apr 30 08:58:03 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-nV-px-5.1.2
  Built on Wed Apr 30 08:58:11 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-supp-5.1.2
  Built on Wed Apr 30 08:57:55 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-px-5.1.2
  Built on Wed Apr 30 08:58:01 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Configuration register on node 1/RP1/CPU0 is 0x102
Boot device on node 1/RP1/CPU0 is disk0:
Package active on node 1/RP1/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supp-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014

```

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2  
Built on Wed Apr 30 08:56:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supp-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2  
Built on Wed Apr 30 08:56:17 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supp-5.1.2  
Built on Wed Apr 30 08:56:18 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2  
Built on Wed Apr 30 08:56:19 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mgbl, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mgbl-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-supp-5.1.2  
Built on Wed Apr 30 07:39:56 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mgbl-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mgbl-px-5.1.2  
Built on Wed Apr 30 07:40:08 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-security, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-security-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-supp-5.1.2  
Built on Wed Apr 30 08:55:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-k9sec-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-k9sec-px-5.1.2  
Built on Wed Apr 30 08:55:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-5.1.2  
Built on Wed Apr 30 08:55:49 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fpd-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fpd-px-5.1.2  
Built on Wed Apr 30 08:56:10 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9K-doc-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9K-doc-supp-5.1.2  
Built on Wed Apr 30 08:55:43 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-doc-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-doc-px-5.1.2  
Built on Wed Apr 30 08:55:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2  
Built on Wed Apr 30 08:55:31 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2  
Built on Wed Apr 30 08:55:31 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2  
Built on Wed Apr 30 08:55:42 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

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asr9k-asr903-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-supp-5.1.2
  Built on Wed Apr 30 08:58:13 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr903-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr903-nV-px-5.1.2
  Built on Wed Apr 30 08:58:59 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-supp-5.1.2
  Built on Wed Apr 30 08:58:03 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-asr901-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-asr901-nV-px-5.1.2
  Built on Wed Apr 30 08:58:11 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-supp-5.1.2
  Built on Wed Apr 30 08:57:55 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-9000v-nV-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-9000v-nV-px-5.1.2
  Built on Wed Apr 30 08:58:01 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 1/2/CPU0 is mem:
Package active on node 1/2/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supp-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supp-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supp-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```



asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2  
Built on Wed Apr 30 08:56:19 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014

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By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2
Built on Wed Apr 30 07:34:46 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2
Built on Wed Apr 30 07:39:11 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2
Built on Wed Apr 30 07:39:39 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2
Built on Wed Apr 30 07:39:39 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2
Built on Wed Apr 30 07:39:54 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2
Built on Wed Apr 30 10:06:14 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2
Built on Wed Apr 30 10:06:14 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2
Built on Wed Apr 30 10:06:16 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
Built on Wed Apr 30 08:55:31 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
Built on Wed Apr 30 08:55:31 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
Built on Wed Apr 30 08:55:42 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 1/15/CPU0 is mem:
Package active on node 1/15/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
Built on Wed Apr 30 08:56:20 PST 2014
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supp-5.1.2
Built on Wed Apr 30 08:56:20 PST 2014

```

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2  
Built on Wed Apr 30 08:56:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supp-5.1.2  
Built on Wed Apr 30 08:56:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2  
Built on Wed Apr 30 08:56:17 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supp-5.1.2  
Built on Wed Apr 30 08:56:18 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2  
Built on Wed Apr 30 08:56:19 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2  
Built on Wed Apr 30 07:39:25 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2  
Built on Wed Apr 30 07:39:38 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2  
Built on Wed Apr 30 07:39:39 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2  
Built on Wed Apr 30 07:39:54 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2  
Built on Wed Apr 30 10:06:14 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2  
Built on Wed Apr 30 10:06:16 PST 2014

```
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

Boot device on node 1/19/CPU0 is mem:
Package active on node 1/19/CPU0:
iosxr-service, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-service-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-service-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-service-supply-5.1.2
  Built on Wed Apr 30 08:56:20 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-services-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-services-px-5.1.2
  Built on Wed Apr 30 08:56:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-adv-video, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-adv-video-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-adv-video-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-adv-video-supply-5.1.2
  Built on Wed Apr 30 08:56:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-video-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-video-px-5.1.2
  Built on Wed Apr 30 08:56:17 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optics-supply, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optics-supply-5.1.2
  Built on Wed Apr 30 08:56:18 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-optic-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-optic-px-5.1.2
  Built on Wed Apr 30 08:56:19 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-mpls, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mpls-5.1.2
  Built on Wed Apr 30 07:39:25 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mpls-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mpls-px-5.1.2
  Built on Wed Apr 30 07:39:38 PST 2014
```

By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-infra, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-infra-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-fwding, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-fwding-5.1.2  
Built on Wed Apr 30 07:34:27 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-routing, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-routing-5.1.2  
Built on Wed Apr 30 07:34:29 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-diags, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-diags-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
iosxr-ce, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-ce-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-os-mpi, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-os-mpi-5.1.2  
Built on Wed Apr 30 07:36:22 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-base, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-base-5.1.2  
Built on Wed Apr 30 07:34:33 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-fwding, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-fwding-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-diags-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-diags-supp-5.1.2  
Built on Wed Apr 30 07:34:48 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-scfclient, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-scfclient-5.1.2  
Built on Wed Apr 30 07:34:50 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-cpp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-cpp-5.1.2  
Built on Wed Apr 30 07:34:30 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-ce, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-ce-5.1.2  
Built on Wed Apr 30 07:34:46 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie  
asr9k-mini-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mini-px-5.1.2  
Built on Wed Apr 30 07:39:11 PST 2014  
By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

```
iosxr-mcast, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-mcast-5.1.2
  Built on Wed Apr 30 07:39:39 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-supp, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-supp-5.1.2
  Built on Wed Apr 30 07:39:39 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-mcast-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-mcast-px-5.1.2
  Built on Wed Apr 30 07:39:54 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-li, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-li-5.1.2
  Built on Wed Apr 30 10:06:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-5.1.2
  Built on Wed Apr 30 10:06:14 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-li-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-li-px-5.1.2
  Built on Wed Apr 30 10:06:16 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

iosxr-bng, V 5.1.2[Default], Cisco Systems, at disk0:iosxr-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-5.1.2
  Built on Wed Apr 30 08:55:31 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie

asr9k-bng-px, V 5.1.2[Default], Cisco Systems, at disk0:asr9k-bng-px-5.1.2
  Built on Wed Apr 30 08:55:42 PST 2014
  By iox-lnx-004 in /auto/srcarchive7/production/5.1.2/all/workspace for pie
```

---

## Software Features Introduced in Cisco IOS XR Software Release 5.1.2 for Cisco ASR 9000 Series Aggregation Service Router

### An overview of OFA

OpenFlow is a specification from the Open Networking Foundation (ONF) that defines a flowbased forwarding infrastructure (L2-L4 Ethernet switch model) and a standardized application programmatic interface (protocol definition) to learn capabilities, add and remove flow control entries and request statistics. OpenFlow allows a controller to direct the forwarding functions of a switch through a secure channel. Local device configuration is out of scope of the OpenFlow protocol. OpenFlow essentially provides a forwarding instruction set, allowing applications to directly program any-to-any routing and switching, with header field rewrite. New matches

and actions can be applied to packets in arbitrary unconstrained fashion, allowing routing and switching on the new criteria. Routers and switches embed the fast packet forwarding and the high level routing decisions together into their software on the same device. With only a few exceptions based on user configuration, all routing and switching decisions are made by the built-in protocols and control plane logic that reside on the switch.

## BFD Hardware Offload

The Bidirectional Forwarding Detection (BFD) hardware offload feature allows the offload of asynchronous BFD transmission (Tx) and reception (Rx) to the network processing unit on the ASR 9000 Enhanced Ethernet Line Card. BFD hardware offload improves scale and reduces the overall network convergence time by sending rapid failure detection packets (messages) to the routing protocols for recalculating the routing table.

For more information on BFD Hardware Offload, see the *Implementing BFD* chapter in the *Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide*. For more information on BFD Hardware Offload commands, see the *BFD Commands* chapter in the *Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference*.

## Dynamic Single Segment Pseudowire

A single segment pseudowire (SS-PW) is a point-to-point pseudowire (PW) where the PW segment is present between two PE routers.

For more information on SS-PW feature, see the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

## Ethernet Connectivity Fault Management down MEP

Ethernet Connectivity Fault Management (CFM) down Maintenance End Points (MEPs) are supported on VRF interfaces.

For more information, see *Configuring CFM MEPs* in *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide*

## Information About onePK

One Platform Kit (onePK) is a cross platform API and software development kit that enables the user to develop applications that interact directly with Cisco networking devices, and provides the user with the ability to access networking services using a set of controlled APIs that share the same programming model and style.

You can deploy onePK applications on a server in the network, such as a multi-CPU or multi-core server running Linux or Windows, or even a mobile device running Android or iOS. This is referred to as end-node hosting. The other hosting models are also discussed, in the later sections.

The base service set comprises all those services that an application needs to interact with Cisco devices. There are optional service sets that the application can use if it needs a specific service. The goal of onePK is to keep a consistent set of APIs across platforms so that customers can freely use any platform to develop their applications.

OnePK supports the following programming languages:

- C language API support



- Java language API support (Data Path service set is not supported in Java)
- Python API support

## Inter-area Traffic Engineering with Dynamic ABR Discovery

The inter-area traffic engineering with dynamic ABR discovery feature adds support for inter-area point-to-point (P2P) and point-to-multi-point (P2MP) traffic engineering with dynamic ABR discovery. With this feature, there is no need to specify transit ABR addresses in the explicit paths to allow for dynamic/best path computation for inter-area tunnels.

For more information on Inter-area Traffic Engineering with Dynamic ABR Discovery, see the *Implementing MPLS Traffic Engineering* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide*.

## Network Convergence after Pseudowire failure

This is an enhancement that enables faster network convergence after pseudowire failure. For more information, see the *Implementing Point to Point Layer 2 Services* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Layer 3 VPN Configuration Guide*.

## MMRP for PBB VPLS Flood Optimization

In a PBB network, traffic (unknown unicast, multicast, or broadcast) is flooded to all the PE devices in the network even if the devices do not host the service instance to which the traffic is destined.

The MMRP for PBB VPLS Flood Optimization feature optimizes the impact of the flooded traffic on PE devices by sending the traffic only to the PE devices interested in a particular service instance.

For more information on MMRP for PBB VPLS flood optimization feature, see the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*. For information on the commands used for configuring MMRP for PBB VPLS flood optimization, see the *Cisco ASR 9000 Series Aggregation Services Router VPN and Ethernet Services Command Reference*.

## MLDP inband signaling

MLDP Inband signaling allows the core to create (S,G) or (\*,G) state without using out-of-band signaling such as BGP or PIM. It is supported in VRF (and in the global context). Both IPv4 and IPv6 multicast groups are supported.

In MLDP Inband signaling, one can configure an ACL range of multicast (S,G). This (S,G) can be transported in MLDP LSP. Each multicast channel (S,G), is 1 to 1 mapped to each tree in the inband tree. The (S,G) join, through IGMP/MLD/PIM, will be registered in MRIB, which is the client of MLDP.

MLDP In-band signalling supports transiting PIM (S,G) or (\*,G) trees across a MPLS core without the need for an out-of-band protocol. In-band signaling is only supported for shared-tree-only forwarding (also known as sparse-mode threshold infinity). PIM Sparse-mode behavior is not supported (switching from (\*,G) to (S,G)).

The details of the MLDP profiles are discussed in the *Cisco ASR 9000 Series Aggregation Services Router Multicast Configuration Guide*

## Mixed Speed Bundles

Cisco ASR 9000 Series Router supports mixed speed bundles. Mixed speed bundles allow member links of different bandwidth to be configured as active members in a single bundle. The ratio of the bandwidth for bundle members must not exceed 10. For example, 100Gbps link and 10Gbps links can be active members in a bundle. Mixed speed bundles also allow:

- Load-balancing on member links based on bandwidth weightage.
- Support of proportional load-balancing for all unicast flows.
- Support of load-balancing based on bandwidth weightage for all VPLS flooding and Layer 2 multicast flows.

The Weight of each bundle member is the ratio of its bandwidth to the lowest bandwidth member. Total weight of the bundle is the sum of weights or relative bandwidth of each bundle member. Total weight of a bundle cannot exceed 64. Since the weight for a bundle member is greater than or equal to 1 and less than or equal to 10, the total member links in a bundle is less than 64 in the case of mixed bundles.

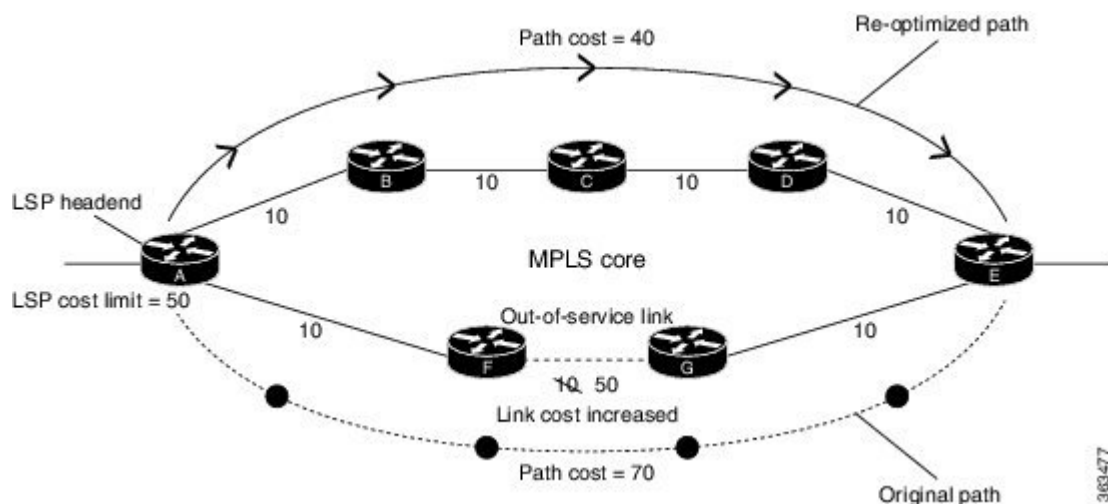
## MPLS TE Path Cost Limit

The MPLS TE path cost limit feature enables graceful migration of TE label switched paths (LSPs) away from a link without affecting the traffic. This is useful when a link is scheduled to be decommissioned or brought down for maintenance.

In order to take a link out of service and gracefully migrate the LSPs away from it, the cost assigned to the link is to be set higher than the path cost limit (path aggregate admin-weight) assigned at the LSP headend. The cost of the tunnel is equal to the aggregate cost of the links through which the tunnel passes. The headend routers recalculate the total path costs at the time of periodic path verification. At this stage, the headend routers automatically check if the path limit is crossed and reroute the LSPs away from the out-of-service link.

This sample illustration explains the TE path cost limit application:

**Figure 1: MPLS TE path cost limit application**



Here, the path cost limit for the LSP is set at 50. To move the LSP away from the link between F and G, the link cost is increased to 50.

For more information on MPLS TE Path Cost Limit, see the *Implementing MPLS Traffic Engineering* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide*. For more information on MPLS TE Path Cost Limit commands, see the *MPLS Traffic Engineering Commands* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference*.

## Port Shaper Policy Support on L2 Fabric ICL Interface

In L2 fabric mode, a port shaper policy can be applied on the inter-chassis link (ICL) sub-interface. The port shaper policy applied on the ICL sub-interface helps to control the traffic going out on all satellite access ports, and efficiently handles the oversubscribed backhaul ethernet virtual circuits (EVC). This port shaper policy applies to all the satellite interfaces hosted under the ICL sub-interface.

### Restrictions

- Support to add or remove the port shaper policy is implemented only when the nV satellite configuration is present on the ICL sub-interface.
- Only the port shaper policy can be configured under the L2 Fabric ICL in egress direction.
- Ability to shape all satellite ports under a single satellite in a simple ring mode is not supported.
- When operating in L2 fabric and simple ring mode, only upto 2 levels of QoS policies are supported on the satellite access ports. The user-defined class configuration is not supported at parent level.
- Pseudowire Headend (PW-HE) and Broadband Network Gateway (BNG) configurations are not supported under the satellite interfaces in L2 fabric or simple ring mode.

## Soft-preemption over FRR Backup Tunnels

The soft-preemption over FRR backup tunnels feature enables to move LSP traffic over the backup tunnels when the LSP is soft- preempted. MPLS TE tunnel soft-preemption allows removal of extra TE traffic in a graceful manner, by giving the preempted LSP a grace period to move away from the link. Though this mechanism saves the traffic of the preempted LSP from being dropped, this might cause traffic drops due to congestion as more bandwidth is reserved on the link than what is available. When the soft-preemption over FRR backup tunnel is enabled, the traffic of the preempted LSP is moved onto the FRR backup, if it is available and ready. This way, the capacity of the backup tunnel is used to remove the potential congestion that might be caused by soft-preemption.

For more information on Soft-Preemption over FRR Backup, see the *Implementing MPLS Traffic Engineering* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide*. For more information on Soft-Preemption over FRR Backup commands, see the *MPLS Traffic Engineering Commands* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference*.

## MPLS TE Auto-tunnel Mesh One-hop

The MPLS TE Auto-tunnel primary one-hop feature allows automatic creation of tunnels over TE enabled interfaces to next hop neighbors. The Auto-tunnel primary one-hop is configurable under the MPLS TE Auto-tunnel mesh group mode and for each mesh group. The Auto-tunnel primary one-hop configuration

automatically creates one-hop tunnels to next hop neighbors. A router that becomes a next hop neighbor will have a set of one-hop tunnels created automatically.

For more information on MPLS TE Auto-tunnel Primary One-hop, see the *Implementing MPLS Traffic Engineering* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide*. For more information on MPLS TE Auto-tunnel Primary One-hop commands, see the *MPLS Traffic Engineering Commands* chapter in the *Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference*.

## QoS Offload on 901 Satellite

The QoS Offload feature offloads the QoS policies from the Cisco ASR 9000 Series Router to the 901 satellite switch so that traffic can be managed in the 901 satellite itself. The QoS Offload feature supports the offloading of QoS policies applied not only to the 901 Satellite access interfaces, but also to the 901 Satellite switch's upstream interfaces, that face the Cisco ASR 9000 Series Router. The offloading of QoS policies helps to drop excess traffic at the ingress direction (or access ports) and prioritize the protocol control traffic at the egress direction (or SFL). The QoS Offload feature is supported on Hub & Spoke, Dual Home, L2 Fabric and Simple Ring topologies. H-QoS is supported on the 901 satellite.

## VRF support for MLD

MLD receives MLD joins, membership queries and membership reports under VRF. The MLD process will have LPTS entries per VRF and traffic is redirected based on the matching VRF entry to the correct interface configured under the given VRF. Support for Source-Specific Multicast(SSM) is also provided under VRF .

## Implementing CGv6 over Virtualized Services Module (VSM)

Cisco VSM is the next generation service card on the Cisco ASR9000 Series Aggregation Services Router. The software infrastructure on this card provides a virtual environment and the services run as virtual machines (VM) in this environment. CGv6 is the application VM running on VSM.

For more information on many-to-one address mapping, see the *Implementing CGv6 over VSM* module in the *Cisco ASR 9000 Series Aggregation Services Router CGv6 Configuration Guide*. For more information on *Implementing CGv6 over VSM* commands, see the *Cisco ASR 9000 Series Aggregation Services Router CGv6 Command Reference*.

## LSP Ping over VPWS and VPLS

Cisco IOS XR software supports LSP ping for point-to-point single-segment pseudowires (signalled using LDP FEC129 AII-type 2 applicable to VPWS technology). For information about Virtual Circuit Connection Verification (VCCV) support and the **ping mpls pseudowire** command, see the *Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference*.

## Software Feature Enhancements

These software feature enhancements are introduced in Cisco IOS XR Software Release 5.1.2.

- CFM MIB enhancement to allow MIB based indexing for faster retrieval.
- The **show l2vpn xconnect** and **show l2vpn bridge-domain** commands are enhanced to enable filtering the command output with just the pseudowire ID.

- The **show ipv6 interface brief** command has been enhanced to support **global** and **link-local** keywords. Use the **global** keyword to view the global IPv6 address assigned to the interfaces or VRF. Use the **link-local** keyword to view the link local IPv6 address assigned to the interfaces or VRF.
- Support for ipNetToMediaTable is included.

## Hardware Features Introduced in Cisco IOS XR Software Release 5.1.2 for the Cisco ASR 9000 Series Router

Cisco IOS XR Software Release 5.1.2 introduces support for the following:

- Virtualized Services Module (VSM) line card (A9K-VSM-500) on Cisco Aggregation Services Router (ASR) 9000 Series. This occupies single line-card slot on the router and facilitates the transition of network infrastructure services to virtual workloads. The A9K-VSM-500 line card provides the capability to host Cisco, third-party, and custom applications in a virtualized environment akin to a server blade on a router, offering the below key benefits:
  - X86-based Compute Infrastructure offering multi-core processing on the router.
  - Virtualization infrastructure offering elasticity, scalability and flexibility in deployment of services.
  - Variety of Services, developed by Cisco or third-party, that can be deployed to offer revenue generating or operational optimization opportunities to customers.
- 1000BASE-BX40-D and 1000BASE-BX40-U for Single-Fiber Bidirectional Applications—Cisco GLC-BX40-D-I, GLC-BX40-DA-I and GLC-BX40-U-I SFPs.
- 1000BASE-BX80-D and 1000BASE-BX80-U for Single-Fiber Bidirectional Applications—Cisco GLC-BX80-D-I and GLC-BX80-U-I SFPs.

## Important Notes

- 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.
- **Card fan controller, and RSP removal**—For all card removal and replacement (including fabric cards, line cards, fan controller, and RSP) follow the instructions provided by Cisco to avoid impact to traffic. See the *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide* for procedures.
- Exceeding Cisco testing—If you intend to test beyond the combined maximum configuration tested and published by Cisco, contact your Cisco Technical Support representative to discuss how to engineer a large-scale configuration for your purpose.
- Installing a Line Card—For a fully populated 40-port high density 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*.

- Serial Interfaces Out of Order in show ipv4 interface brief or show ipv6 interface brief command—The show ip interface brief command might display interfaces out of order if different types of serialization are used on the SPA cards.

The serial interfaces are displayed in the show ip interface brief command output in the order shown in the example below:

The ordering is based on:

- 1 Slot
- 2 SPA
- 3 Type
- 4 T3
- 5 T3/T1
- 6 vt15-T1
- 7 multilink

This may be confusing (the interfaces appear out of order) for the user who is accustomed to IOS.

Example output:

With multiple cards:

```
Serial0/2/0/1/1/1:0 (t3/t1)
Serial0/2/0/1/2/1:0
Serial0/2/0/1/3/1:0
Serial0/2/0/1/4/1:0
Serial0/2/0/1/5/1:0
Serial0/2/0/1/6/1:0
Serial0/2/0/1/7/1:0
Serial0/2/0/1/8/1:0
Serial0/2/0/1/9/1:0
Serial0/2/0/1/10/1:0
Serial0/2/0/1/11/1:0
Serial0/2/0/1/12/1:0
Serial0/2/0/0/1/1/1:0 (vt15)
Serial0/2/0/0/2/1/1:0
Serial0/2/0/0/3/1/1:0
Serial0/2/0/0/4/1/1:0
Serial0/2/0/0/5/1/1:0
Serial0/2/0/0/6/1/1:0
Serial0/2/0/0/7/1/1:0
Serial0/2/0/0/8/1/1:0
Serial0/2/0/0/9/1/1:0
Serial0/2/0/0/10/1/1:0
Serial0/2/0/0/11/1/1:0
Serial0/2/0/0/12/1/1:0
Multilink 0/2/0/0/1
Serial0/2/1/0/1 (t3)
Serial0/2/1/1/1/1:0 (t3/t1)
Serial0/2/1/1/2/1:0
Serial0/2/1/1/3/1:0
Serial0/2/1/1/4/1:0
Serial0/2/1/1/5/1:0
Serial0/2/1/1/6/1:0
```

```
Serial0/2/1/1/7/1:0
Serial0/2/1/1/8/1:0
Serial0/2/1/1/9/1:0
Serial0/2/1/1/10/1:0
Serial0/2/1/1/11/1:0
Serial0/2/1/1/12/1:0
Serial0/6/0/1/1/1:0
Serial0/6/0/1/2/1:0
Serial0/6/0/1/3/1:0
Serial0/6/0/1/4/1:0
Serial0/6/0/1/5/1:0
Serial0/6/0/1/6/1:0
Serial0/6/0/1/7/1:0
Serial0/6/0/1/8/1:0
Serial0/6/0/1/9/1:0
Serial0/6/0/1/10/1:0
Serial0/6/0/1/11/1:0
Serial0/6/0/1/12/1:0
Serial0/6/0/0/1/1:0
Serial0/6/0/0/2/1:0
Serial0/6/0/0/3/1:0
Serial0/6/0/0/4/1:0
Serial0/6/0/0/5/1:0
Serial0/6/0/0/6/1:0
Serial0/6/0/0/7/1:0
Serial0/6/0/0/8/1:0
Serial0/6/0/0/9/1:0
Serial0/6/0/0/10/1:0
Serial0/6/0/0/11/1:0
Serial0/6/0/0/12/1:0
Multilink 0/6/0/0/1
Serial0/6/1/0/1
Serial0/6/1/1/1:0
Serial0/6/1/1/2/1:0
Serial0/6/1/1/3/1:0
Serial0/6/1/1/4/1:0
Serial0/6/1/1/5/1:0
Serial0/6/1/1/6/1:0
Serial0/6/1/1/7/1:0
Serial0/6/1/1/8/1:0
Serial0/6/1/1/9/1:0
Serial0/6/1/1/10/1:0
Serial0/6/1/1/11/1:0
Serial0/6/1/1/12/1:0
```

## Caveats

Caveats describe unexpected behavior in Cisco IOS XR Software releases. Severity-1 caveats are the most critical caveats; severity-2 caveats are less critical.

This section contains the caveats for Cisco ASR 9000 Series Aggregation Services Router Software Release 5.1.2 and the Cisco ASR 9000 Series Aggregation Services Router platform.

## Cisco IOS XR Caveats

The following open caveats apply to Cisco IOS XR Software Release and are not platform specific:

### Caveats Specific to the Cisco ASR 9000 Series Aggregation Services Router

The following caveats are specific to the Cisco ASR 9000 Series Aggregation Services Router platform:

- **CSCuo55749**

**Basic Description:**

Bundle ICL fails to get added after RP failover, SAT stuck in Discovery.

**Symptom**

Bundle ICL fails to get added after RP failover, SAT stuck in Discovery.

**Conditions:**

RP failover.

**Workaround:**

Process restart icpe\_satfabmgr.

### Caveats Specific to the ASR 9001 Router

- **CSCum57183**

**Basic Description:**

In-Place modification leads some 901 SAT-intf to INACTIVE.

**Symptom**

With 300+ FP entries, In-Place modification leads some 901 SAT-intf to INACTIVE.

**Conditions:**

This behavior is seen when scale reaches more than 300 FP entries.

**Workaround:**

Keep the scale limit to 300 FP.

- **CSCun48934**

**Basic Description:**

BPE error messages during cluster node reload

**Symptom**

BPE server and L2VPN process terminates continuously on Cisco ASR 9001 Router cluster testbed.

**Conditions:**

Issue is seen on Cisco ASR 9001 Router cluster. It can be observed with:

- multiple cluster switchover (rack reloads) or
- image upgrade



Once issue is hit, it appears only on Rack 1.

**Workaround:**

Reload Rack 1 to recover from the issue.

## 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 package installation envelope (PIE) files that contain one or more software components.

The following URL contains links to information about how to upgrade Cisco IOS XR Software:

[http://www.cisco.com/web/Cisco\\_IOS\\_XR\\_Software/index.html](http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html)

## Troubleshooting

For information on troubleshooting Cisco IOS XR Software, see the *Cisco ASR 9000 Series Aggregation Services Routers Getting Started Guide* and the *Cisco ASR 9000 Series Router Troubleshooting Feature Module*

## Resolving Upgrade File Issues



**Note**

In some very rare cases inconsistencies in the content of the internal configuration files can appear. In such situations, to avoid configuration loss during upgrade, the following steps can be optionally done before activating packages:

- 1 Clear the NVGEN cache:

```
RP/0/RSP0/CPU0:router# run nvgen -F 1
```

- 2 Create a dummy config commit:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# hostname <hostname>
RP/0/RSP0/CPU0:router(config)# commit
RP/0/RSP0/CPU0:router(config)# end
```

- 3 Force a commit update by using the **reload** command. Press **n** when the confirmation prompt appears:

```
RP/0/RSP0/CPU0:router# reload
```

```
Updating Commit Database. Please wait...[OK]
```

```
Proceed with reload? [confirm]
```

#### 4 Press n

In some cases other activity may preclude a reload. The following message may display:

```
RP/0/RSP0/CPU0:router# reload
```

```
Preparing system for backup. This may take a few minutes .....System  
configuration backup in progress [Retry later]
```

If you receive this message wait and then retry the command after some time.

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see [What's New in Cisco Product Documentation](#).

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the [What's New in Cisco Product Documentation RSS feed](#). RSS feeds are a free service.

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