Cisco IOS XR Software Release 3.9.0 for Cisco ASR 9000 Series Aggregation Services Routers

PB573453

Product Overview

The Cisco® ASR 9000 Series Aggregation Services Router delivers unprecedented scale, service flexibility, and high availability into Carrier Ethernet services transport networks. It is powered by Cisco IOS® XR Software – an innovative, self-healing, distributed operating system designed for always-on operation while scaling system capacity up to 6.4 Tbps. Cisco IOS® XR Software Release 3.9.0 supports the Cisco ASR 9000 Series router, which is designed to provide a Carrier Ethernet foundation for visual networking. The Cisco ASR 9000 Series further enhances the IP Next-Generation Network (NGN) Carrier Ethernet design for converged, resilient, intelligent, and scalable transport of consumer, business, wholesale, and mobile services. Applications supported include residential broadband services such as IPTV and video on demand (VoD), Layer 2 and Layer 3 VPN business services, and next-generation mobile backhaul transport.

Cisco IOS XR Software Release 3.9.0 introduces support for the 8-port 10 Gigabit Ethernet and 2-port 10 Gigabit Ethernet/20-port Gigabit Ethernet line cards, as well as “low-queue” versions of the existing 40-port Gigabit Ethernet, 4-port 10 Gigabit Ethernet, and 8-port 10 Gigabit Ethernet line cards. The new Cisco ASR 9000 SPA Interface Processor-700 is also introduced in Cisco IOS XR Software Release 3.9.0.

New Hardware Features

Table 1 lists the hardware modules that Cisco IOS XR Software Release 3.9.0 supports.

Table 1. New Hardware Supported on Cisco ASR 9000 in Cisco IOS XR Software Release 3.9.0

Part Number	Description
A9K-2T20GE-B	2-port 10GE, 20-port GE medium-queue combo line card, requires XFPs for 10GE, SFPs for GE
A9K-2T20GE-E	2-port 10GE, 20-port GE high-queue combo line card, requires XFPs for 10GE, SFPs for GE
A9K-8T-L	8-port 10GE low-queue line card, requires XFPs
A9K-8T-E	8-port 10GE high-queue line card, requires XFPs
A9K-40GE-L	40-port GE low-queue line card, requires SFPs
A9K-4T-L	4-port 10GE low-queue line card, requires XFPs
A9K-8T/4-L	8-port 10GE low-queue DX line card, Requires XFPs
A9K-SIP-700	Cisco ASR 9000 SPA Interface Processor-700
A9K-ADV-OPTIC-LIC	Advanced Optical (G.709/IPoDWDM) Line Card License
A9K-ADV-VIDEO-LIC	Advanced Video Monitoring System License per system

New Software Features

New software features are supported for the Cisco ASR 9000 Series, including enhancements for Layer 2 Ethernet (Y.1731 Performance Monitoring, Traffic Mirroring, H-QoS over Link Aggregation Groups); Layer 3 (BGP NSR, HSRP/VRRP, BGP PIC Core and Edge, IP FRR, IS-IS over IPv6, Traffic Engineering Path Protection); video (IGMP Snooping Enhancements, PF-MoFRR, Video Monitoring); and mobile (Synchronous Ethernet).

Table 2 lists new software features in Cisco IOS XR Software Release 3.9.0 supported on the Cisco ASR 9000 Series Aggregation Services Routers.

Table 2. New Software Features Supported on Cisco ASR 9000 in Cisco IOS XR Software Release 3.9.0

Feature	Description
Y.1731 Performance Monitoring	• The advent of Ethernet as a metropolitan and WAN technology imposes a new set of operations, administration, and maintenance (OAM) requirements on Ethernet's traditionally enterprise-oriented functions. The expansion of this technology into the larger and more complex user base makes operational management of link uptime crucial. Isolating and responding to failures quickly directly affects the competitiveness of the service provider. • This feature provides performance-monitoring capabilities for Layer 2 Ethernet networks using ITU-T Y.1731 packet types. In Cisco IOS XR Software 3.9, the Cisco ASR 9000 Series offers the first phase of Y.1731 implementation and supports the collection of round-trip delay and jitter results using IEEE 802.1ag loopback packets and ITU Y.1731 Delay Measurements.
Traffic Mirroring	• Traffic Mirroring provides the ability to mirror traffic so that it can be analyzed at a network probe or other monitoring device without impacting the original user traffic. • Traffic Mirroring copies traffic from one or more Layer 2 interfaces or sub-interfaces, including Layer 2 link bundle interfaces/sub-interfaces, and sends the copied traffic to one or more destinations for analysis by a network analyzer such as a Cisco SwitchProbe device or other monitoring device. Traffic Mirroring does not affect the switching of traffic on the source interfaces or sub-interfaces and allows the mirrored traffic to be sent to a destination interface or sub-interface.
Hierarchical quality of service (H-QoS) over Link Aggregation Groups	• H-QoS support over Link Aggregation Groups (LAG): Four-level H-QoS support is provided for Ethernet virtual connections (EVCs) with the following hierarchy levels: port, group of Ethernet flow points (EFPs), EFP, and Class of Service. This level of support allows for per-service and per-end-user QoS granularity. This feature is now supported over link aggregation groups in Cisco IOS XR Software 3.9.
Border Gateway Protocol Nonstop Routing (BGP NSR)	• BGP NSR makes routing failures invisible to external BGP peers, with no disruption of forwarding and no impact to Layer 3 convergence. In cases such as an RP failover or process restart, the BGP sessions will not be terminated and external peers will not be aware of the failure.
BGP Fast Convergence	• The Cisco ASR 9000 Series supports many advanced BGP fast-convergence features in Cisco IOS XR Software, including BGP next-hop tracking, BGP local convergence upon provider edge-customer edge link failure, and BGP Prefix-Independent Convergence (PIC) for the core and edge. • The BGP PIC feature provides fast convergence in a scalable way. The Internet BGP routing table has hundreds of thousands of routes, and many BGP routes share the same provider-edge next hop. The Cisco ASR 9000 Series implements the forwarding table hierarchically so that during network reconvergence it does not need to update the entire BGP prefix in the forwarding table. Only the forwarding entry for the common BGP next hop is updated, resulting in a faster convergence time that is independent of the number of BGP prefixes. This feature is just one of the many Cisco IOS XR Software routing features that can help to maximize network availability.
IP Fast Reroute (IP FRR)	• The IP FRR loop-free alternate (LFA) computation provides protection against link failure. This Cisco IOS XR Software innovation provides subsecond IP fast convergence for both IS-IS and OSPF routing protocols in a properly designed network topology. By taking advantage of these protocols, the Cisco ASR 9000 can extend superior routing performance and fast convergence into Carrier Ethernet transport networks to increase network resiliency.
Bidirectional Forwarding Detection (BFD) support for Hot Standby Router Protocol/Virtual Router Redundancy Protocol (HSRP/VRRP)	• This support allows HSRP/VRRP state to be tracked in a many-to-one model using BFD. This provides faster convergence with lower CPU and memory overhead for improved system scale.
Intermediate System-to-Intermediate System (IS-IS) over IPv6	• Support for IPv6 addresses in the Integrated IS-IS routing protocol
MPLS-TE Path Protection	• The MPLS Traffic Engineering (TE): Path Protection feature provides an end-to-end failure recovery mechanism (that is, full path protection) for Multiprotocol Label Switching (MPLS) traffic engineering (TE) tunnels.
Video Monitoring	• Cisco IOS XR Software 3.9 introduces video monitoring on the Cisco ASR 9000 Series, which provides the ability to gather network statistics on video traffic as an effective troubleshooting and planning tool. • Video monitoring offers the following benefits: ◦ Video quality problem detected and reported to video management system ◦ Compute video quality at each system between receiver and source ◦ Troubleshoot location where quality first degrades ◦ Correct the problem and restore video quality ◦ Integrated into NMS for automatic detection, isolation, and switchover
Per Flow MoFRR (PF-MoFRR)	• Multicast-only FRR (MoFRR) is a Cisco IOS XR innovation to improve multicast network convergence times. The basic idea of MoFRR is to send a secondary join to a different upstream interface. The network then receives two copies of the multicast video stream over two separate and redundant paths through the network. When a primary path fails, it can switch over to the backup path instantly without issuing a new PIM join. This Cisco IOS XR Software solution is an extremely simple way for the Cisco ASR 9000 to take advantage of the native IP network in order to improve network convergence for multicast traffic.

IGMP Snooping Enhancements	• Enhancements added to IGMP Snooping to provide optimized network utilization: ◦ IGMP Snooping receives subscriber requests for a given channel ◦ Applies access-group filter to help ensure that subscriber is allowed to receive that channel ◦ Applies weighted group limit to help ensure that connection is not over-subscribed
Synchronous Ethernet	• Cisco IOS XR Software 3.9 introduces standards-based Synchronous Ethernet (SyncE) support on the Cisco ASR 9000 Series routers – a key feature for the next generation of packet-based mobile networks. • SyncE provides a PHY-level frequency distribution mechanism through the GE/10GE ports of a Cisco ASR 9000 Series Ethernet line card. With native support for SyncE, the Cisco ASR 9000 Series routers provide a cost effective, accurate and a stable frequency distribution solution for NGNs using external timing references (primary reference clock [PRC] or primary reference source [PRS] using Cesium oscillators and/or global positioning system [GPS] as the clock source) similar to what operators obtained on SONET/SDH and T1/E1-based networks. With G.8261, G.8262, G.8264, and ESMC/SSM support, the native SyncE support on Cisco ASR 9000 Series routers eases the migration to the next-generation IP/MPLS networks.

Ordering Information

Table 3 lists ordering information for Cisco IOS XR Software Release 3.9.0 for Cisco ASR 9000 Series Aggregation Services Routers. Only these part numbers are orderable. When future releases of Cisco IOS Software Release 3.9.0 are available, if you order these part numbers we will automatically ship the latest release.

Table 3. Ordering Information for Cisco IOS XR Software Release 3.9.0 for Cisco ASR 9000 Series Aggregation Services Routers

Product Name	Part Number
A9K-03.09	Cisco IOS-XR IP/MPLS Core Software
A9K-K9-03.09	Cisco IOS-XR IP/MPLS Core Software 3DES

Release 3.9 Lifecycle

The Cisco IOS XR Software release strategy is time-based, with a fixed release date and lifecycle, as opposed to being a feature-based release strategy with a variable release date. Table 4 lists the major milestones of Cisco IOS XR Software Release 3.9.0 and later.

Table 4. Major Milestones for Cisco IOS XR Software Release 3.9.0 and Later

Milestone	Definition	Date
Availability date	The date that the Cisco IOS XR Software Release 3.9.0 information is published on Cisco.com and becomes available to the general public.	December 18, 2009
End-of-life announcement date	The official end-of-life document that announces the end of sale and end of life of Cisco IOS XR Software 3.9 is distributed to the general public.	September 18, 2010
End-of-sale date and end-of-maintenance date	The last date to order Cisco IOS XR Software 3.9 through Cisco point-of-sale mechanisms. The product is no longer for sale after this date. This also marks end of engineering, maintenance rebuilds, and software fixes through rebuilds of Cisco IOS XR Software 3.9.x. After this date, maintenance rebuilds and software-fix support will be provided only through rebuilds of Cisco IOS XR Software 3.9.x or later.	June 18, 2011
End of software maintenance releases through migration: **OS software**	The last date that Cisco Engineering may release any final software maintenance releases or bug fixes via SMU. From June 18, 2011 until June 18, 2012, maintenance rebuilds and software fix via SMU support for Cisco IOS XR Software 3.9.x will be provided only through migration to rebuilds of Cisco IOS XR Software 4.0.x. After June 18, 2012, Cisco Engineering will no longer develop, repair, maintain, or test Cisco IOS XR Software 3.9.x.	June 18, 2012
Last date of support	The last date to receive service and support for the product. After this date, all support services for the product are unavailable and the product becomes obsolete.	June 18, 2016

For official end-of-life and end-of-sale announcements for Cisco IOS XR Software, please visit

http://www.cisco.com/en/US/products/ps5845/prod_eol_notices_list.html or contact your local Cisco account representative.

For More Information

For more information about the Cisco ASR 9000 Series or Cisco IOS XR Software, visit http://www.cisco.com/ or contact your local Cisco account representative.

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