Cisco IOS XR Software Release 4.0.1 for Cisco ASR 9000 Series Routers

Product Overview

The Cisco® ASR 9000 Series Aggregation Services Router delivers exceptional scale, service flexibility, and high availability into Carrier Ethernet and business-VPN 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 4.0.1 provides new software and hardware feature support for the Cisco ASR 9000 Series Router. This release further enhances the place of the Cisco ASR 9000 Series in the IP Next-Generation Network (NGN). The Cisco IP NGN delivers a Carrier Ethernet design for converged, resilient, intelligent, and scalable transport of consumer, business, wholesale, and mobile services. Applications supported within this framework include residential broadband services such as IPTV and video on demand (VoD), Layer 2 and Layer 3 business-VPN services, and next-generation mobile backhaul transport.

New Hardware Features

Cisco IOS XR Software Release 4.0.1 introduces support for several new shared port adapters (SPAs) on the Cisco ASR 9000 Series SPA Interface Processor 700 (SIP-700) as well as tunable optics.

Table 1 lists the new hardware support added in Cisco IOS XR Software Release 4.0.1.

Table 1. New Hardware Supported on Cisco ASR 9000 in Cisco IOS XR Software Release 4.0.1

Part Number	Description
SPA-4xOC3-POS =	4-port OC-3/STM-1 POS SPA
SPA-8XOC3-POS=	8-port OC-3/STM-1 POS SPA
SPA-1XCHSTM1/OC3=	1-port CHOC-3/CHSTM-1 SPA
SPA-2XT3/E3=	2-port T3/E3 SPA
SPA-4XT3/E3=	4-port T3/E3 SPA
DWDM-XFP-C=	10G MultiRate C Band Tunable DWDM XFP

New Software Features

Cisco IOS XR Software Release 4.0.1 also adds new software features for the Cisco ASR 9000 Series, including Integrated Routing and Bridging (IRB), IPv6 Multicast, Access-List Based Forwarding (ABF), generic routing encapsulation (GRE), 32-way Interior Gateway Protocol (IGP) and Label Distribution Protocol Equal Cost Multipath (LDP ECMP), Bidirectional Forwarding Detection (BFD) per member link, transparent Multiprotocol Label Switching (MPLS), Ethernet flow point (EFP) security with Dynamic ARP Inspection (DAI) and IP Source Guard (IPSG), Layer 2 Port Security and MAC Security, Dynamic Link Aggregation (LAG) with up to 64 members per bundle, connectivity fault management (CFM) on Multichassis LAG (MC-LAG), performance monitoring on Layer 2 sub-interfaces, quality-of-service (QoS) enhancement, Video Monitoring (VidMon) Trap and Clone, etc.

Table 2 lists new software features in Cisco IOS XR Software Release 4.0.1 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 4.0.1

Feature	Description
IRB	IRB allows you to combine a routed interface with a bridging domain. You can use the routed interface, termed a bridge-group virtual interface (BVI), in conjunction with typical IP routing protocols. Additionally, the ability to assign a BVI to a bridge domain allows for interbridge group routing. The baseline function of the Cisco ASR 9000 IRB is equivalent to the switch-virtual-interface (SVI) feature on Cisco 7600 Series Routers, although there are some platform-specific differences. The following important IRB features are introduced in Cisco IOS XR Software Release 4.0.1: • IPv4 Unicast and Multicast Forwarding • IPv4 Virtual Route Forwarding (VRF) • Internet Group Management Protocol (IGMP) Snooping • Hot Standby Router Protocol (HSRP) and Virtual Router Redundancy Protocol (VRRP) • Stateful Switchover (SSO)
IPv6 Multicast	The following important IPv6 Multicast features are introduced in Cisco IOS XR Software Release 4.0.1: • Multicast Listener Discovery Version 1 (MLDv1) and MLD v2 • Protocol Independent Multicast sparse mode (PIM SM) and PIM source-specific mode (PIM SSM) • Static rendezvous point and embedded rendezvous point
ABF	ABF provides an alternative to regular routing by providing the ability to forward to a next hop, based on packet content that extends beyond the destination IP address. The following ABF features are introduced in Cisco IOS XR Software Release 4.0.1: • IPv4 Forwarding • Recursive next-hop capability • Support for up to three next hops with fallback capability
GRE	GRE can encapsulate a wide variety of protocol packet types inside IP tunnels, creating a virtual point-to-point link to Cisco routers at remote points over an IP internetwork. The following GRE features are supported in Cisco IOS XR Software Release 4.0.1: • IPv4 Forwarding • Routing over GRE interface • SSO
BFD per member link	BFD packets are sent out on each member link in an 802.3ad bundle to facilitate detection of link loss within the bundle.
Dynamic ECMP improvements	Cisco IOS XR Software Release 4.0.1 increases the IGP and LDP ECMP possible paths to a maximum of 32.
Per-VLAN Spanning Tree Plus (PVST+) access gateway	The solution supports PVST+ as part of an access gateway solution.
Pseudowire Flow-Based Load Balancing	This feature allows for pseudowire traffic to be load balanced using the IPv4 header information contained in the packets traversing the pseudowire.
EFP security	The following EFP security features are introduced in Cisco IOS XR Software Release 4.0.1 to prevent IP and MAC spoofing: • DAI IPSG • MAC security
LDP and IP Fast Reroute (FRR) with per-prefix Loop-Free Alternate (LFA)	Cisco IOS XR Software Release 4.0.1 extends the IP FRR support to include LDP FRR with per prefix LFA.
MPLS Traffic Engineering (MPLS TE) hop limit	Cisco IOS XR Software Release 4.0.1 allows you to limit the maximum number of MPLS TE hops.
Dynamic LAG with up to 64 members per bundle	Cisco IOS XR Software increases the maximum number of member links within a 802.3ad bundle to 64 while providing dynamic load balancing across member links to avoid polarization.
CFM on MC-LAG	Cisco IOS XR Software enables the use of 802.1ag CFM on MC-LAG bundles.
MIBs	The following MIBs are added to Cisco IOS XR Software Release 4.0.1: • snmp-entitymib, snmp-assetmib, snmp-sensormib, snmp-frucontrolmib, snmp-ifmib, sonet-mib, phys-mibs-t3e3, phys-mibs-t1e1, asr9k-spa-choc3, asr9k-spa-t3e3, and asr9k-spa-pos • IGMP Snooping • VidMon Trap and Clone

Feature	Description
Performance monitoring on Layer 2 sub-interfaces	Cisco IOS XR Software Release 4.0.1 introduces the support of performance monitoring on Layer 2 sub-interfaces, including Stats and Threshold for up to 64,000 EFPs.
QoS enhancements	Cisco IOS XR Software Release 4.0.1 enhances the QoS capabilities on the fixed Ethernet line cards to include the following features: • Increased maximum Weighted Random Early Detection (WRED) profiles to 128 • Packets per second policer within a class map • Port-level sub-rate shaping coupled with hierarchical policy assignment on individual EFPs
Transparent MPLS	Cisco IOS XR Software Release 4.0.1 introduces transparent MPLS functions to the Cisco ASR 9000, including the following: • Downstream on demand for Border Gateway Protocol (BGP) label redistribution • Pseudowire over labeled BGP (for internal BGP [I-BGP]+Label)
Traffic-mirroring enhancements	The following traffic-mirroring enhancements are introduced in Cisco IOS XR Software Release 4.0.1: • Pseudowire transport for mirrored traffic (pseudowire serves as the destination port) • Access control list (ACL)-based classification of traffic to be mirrored • Partial packet mirroring • Traffic mirroring for Layer 3 sub-interface source port
VidMon Trap and Clone	To supplement the VidMon feature set on the Cisco ASR 9000, Cisco IOS XR Software Release 4.0.1 adds the capability to trap video flows and clone them to a local or remote destination for analysis and troubleshooting.
License (A9K-L3XL-LIC)	This systemwide license enables even higher Layer 3 scale on the Cisco ASR 9000. It is not required in a system that uses only the high-queue line cards (that is, no medium- or low-queue line cards present) because the scale support is built into high-queue line cards. Activation of the L3-XL profile in a system that uses the medium- or low-queue line cards requires this license. The activation of VRF capability still requires the use of the appropriate per-line-card license (A9K-IVRF-LIC, A9K-AIP-LIC-B, or A9K-AIP-LIC-E).

Ordering Information

Table 3 lists ordering information for Cisco IOS XR Software Release 4.0.1 for Cisco ASR 9000 Series Aggregation Services Routers. Only these part numbers are orderable. When future releases of Cisco IOS Software Release 4.0.1 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 4.0.1 for Cisco ASR 9000 Series Aggregation Services Routers

Product Name	Part Number
A9K-04.00	Cisco IOS-XR IP/MPLS Core Software
A9K-K9-04.00	Cisco IOS-XR IP/MPLS Core Software 3DES

Release 4.0 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 4.0.0 and later.

Table 4. Major Milestones for Cisco IOS XR Software Release 4.0.0 and Later

Milestone	Definition	Date
Availability date	The date that the Cisco IOS XR Software Release 4.0.0 information is published on Cisco.com and becomes available to the general public.	September 13, 2010
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 4.0 is distributed to the general public.	June 13, 2011
End-of-sale date and end-of-maintenance date	The last date to order Cisco IOS XR Software 4.0 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 4.0.x. After this date, maintenance rebuilds and software-fix support will be provided only through rebuilds of Cisco IOS XR Software 4.1.x or later.	March 13, 2012
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 March 13, 2012 until March 13, 2013, maintenance rebuilds and software fix via SMU support for Cisco IOS XR Software 4.0.x will be provided only through migration to rebuilds of Cisco IOS XR Software 4.1.x. After March 14, 2013, Cisco Engineering will no longer develop, repair, maintain, or test Cisco IOS XR Software 4.0.x.	March 13, 2013
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.	March 13, 2017

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, please visit http://www.cisco.com/ or contact your local Cisco account representative.

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