

Cisco IOS XR Software Release 4.1.1 for Cisco ASR 9000 Series Routers

Product Overview

The Cisco® ASR 9000 Series Aggregation Services Routers deliver unprecedented scale, service flexibility, and high availability into Carrier Ethernet, Data Center Interconnect (DCI), Data Center WAN, and business VPN services transport networks. The routers are powered by Cisco IOS® XR Software – an innovative, self-healing, distributed operating system designed for always-on operation. Cisco IOS XR Software Release 4.1.1 provides new software and hardware feature support for Cisco ASR 9000 Series routers. This release further enhances the role 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 Internet Protocol Television (IPTV) and video on demand (VoD), Layer 2 (L2) and Layer 3 (L3) business-VPN services, DCI, and next-generation mobile backhaul transport.

New Hardware Features

Cisco IOS XR Software Release 4.1.1 introduces support for four new Cisco Small Form-Factor Pluggable (SFP) optical transceivers for Gigabit Ethernet applications on Cisco ASR 9000 Series routers. These new SFP optical transceivers have enhanced security to help ensure that genuine Cisco transceivers are used in all Cisco platforms. They support full compatibility with all line cards, Digital Optical Monitoring (DOM), and extended temperature range of operation (–5°C to 85°C). Additionally, they are lead-free and unique device identifier (UDI) compliant.

Table 1 lists the new hardware support added in Cisco IOS XR Software Release 4.1.1 for the Cisco ASR 9000 Series routers.

Table 1. New Hardware Supported on Cisco ASR 9000 Series Routers in Cisco IOS XR Software Release 4.1.1

Part Number	Description
GLC-SX-MMD	1000BASE-SX SFP transceiver, MMF, 850nm, 550m/220m, DOM
GLC-LH-SMD	1000BASE-LX/LH SFP transceiver, MMF/SMF, 1310nm, 10km, DOM
GLC-EX-SMD	1000BASE-EX SFP transceiver, SMF, 1310nm, 40km, DOM
GLC-ZX-SMD	1000BASE-ZX SFP transceiver, SMF, 1550nm, 70km, DOM

New Software Features

Cisco IOS XR Software Release 4.1.1 adds new software features for the Cisco ASR 9000 Series, including routing enhancements for Border Gateway Protocol (BGP): accept-own prefix recognition, enhanced equal cost multipathing (ECMP) load balancing, and DMZ link bandwidth to support advanced networking designs. The release adds support for significant operational features for Multiprotocol Label Switching Traffic Engineering (MPLS-TE): auto-tunnel mesh, Label Distribution Protocol (LDP) support for auto-mesh, and path preemption enhancement. The release also provides IPv6 enhancements: IPv6 Unicast Reverse Path Forwarding (uRPF) with Integrated Routing and Bridging (IRB), and Dynamic Host Configuration Protocol for IPv6 (DHCPv6) relay agent

enhancement for Prefix Delegation (PD). The release supports scale increases for multiple features: MPLS-TE midpoints, Address Resolution Protocol (ARP) and neighbor discovery (ND) for IRBv6, and bundle Ethernet Flow Points (EFPs).

Table 2 lists new software features in Cisco IOS XR Software Release 4.1.1 supported on the Cisco ASR 9000 Series Aggregation Services Routers.

Table 2. New Software Features Supported on Cisco ASR 9000 Series Routers in Cisco IOS XR Software Release 4.1.1

Feature	Description
Routing enhancements	• BGP accept-own: The BGP protocol is enhanced to allow a router to accept the prefixes that it has advertised itself when the prefix is reflected back by a route-reflector with modified attributes. This enhancement supports the auto-configuration of extranets within MPLS VPN networks. • BGP ECMP load balancing enhancement: The 8-way load balancing will increase the number of equal-cost paths supported for up to 8 BGP neighbors. • BGP DMZ link bandwidth: This feature allows external BGP (eBGP) neighbors (paths) to have weights assigned in the ratio of the interface bandwidths that are used to connect to those neighbors. This enhancement supports unequal load balancing for multiple Internet providers. • Large Virtual Route Forwarding (VRF) support: Cisco ASR 9000 VRF capability is enhanced to support an increased (up to global forwarding information base [FIB] size) number of prefixes per VRF ("big" VRF) for up to 16 user-configured VRF IDs. • IP dampening restart penalty: Enabling a restart penalty will delay IP adjacencies appearing on an interface after a system boot-up. • Loop Free Alternate (LFA) Fast Re-Route (FRR) on SIP-700: This feature helps ensure sub-50-ms restoration of traffic in IP or IP/MPLS networks after a network failure. LFA FRR is a unified convergence implementation for IP and LDP FRR with backup path computation done at the source node without requiring Resource Reservation Protocol – Traffic Engineering (RSVP-TE) and tunneling.
MPLS features	• Traffic Engineering (TE) auto-tunnel mesh: The MPLS-TE auto-tunnel mesh feature allows automatic setup for full mesh of TE tunnels between a set of provider edges with a minimal set of configurations. This minimizes both the initial configuration and the addition of tunnels resulting from network growth. • LDP support for auto-mesh: Conventionally, LDP is enabled over TE tunnels by manual configuration on statically configured tunnels. Auto-mesh supports the addition of TE mesh group IDs. LDP automatically learns the mesh group association for every TE tunnel and enables LDP over it, significantly improving the provisioning process. • MPLS-TE path preemption enhancement: This feature helps prevent traffic loss during MPLS-TE hard preemption when the link bandwidth is reduced.
IPv6 enhancements	• IPv6 uRPF: This feature enhances the uRPF to support IPv6 in addition to currently supported IPv4. The uRPF feature discards IP packets whose IP source subnet cannot be found in the routing table, thereby thwarting a number of common types of denial-of-service (DoS) attacks. The support includes L3 and IRB interfaces. • DHCPv6 relay agent enhancement for PD: DHCPv6 relay agent notification for prefix delegation allows the router working as a DHCPv6 relay agent to install a specific prefix signaled in the prefix delegation options in a DHCPv6 relay-reply. This allows flexible routing table management for DHCP-based hosts or neighbors.
Scale increase	• MPLS-TE midpoints are increased to 25K • Bundle EFP system scale is increased to 64K • ARP and ND with IRBv6 scale are enhanced to 128K
Management	• IPv4 destination-based accounting for NetFlow: Destination-based accounting is a NetFlow feature designed to collect destination usage statistics for accounting purpose. Destination-based accounting is a powerful tool that a service provider can employ to collect traffic data in a network and use the data as input for capacity planning and sophisticated billing schemes such as distance-based billing. • MAC accounting: MAC accounting support for detailed usage statistics and monitoring includes Simple Network Management Protocol (SNMP) MIB MAC accounting support.

Ordering Information

Table 3 lists ordering information for Cisco IOS XR Software Release 4.1.1 for Cisco ASR 9000 Series Aggregation Services Routers. Only these part numbers are orderable. When future releases of Cisco IOS Software Release 4.1.1 are available, we will automatically ship the latest release if you order these part numbers.

Table 3. Ordering Information for Cisco IOS XR Software Release 4.1.1 for Cisco ASR 9000 Series Aggregation Services Routers

Part Number	Product Name
A9K-04.11	Cisco IOS-XR IP/MPLS Core Software
A9K-K9-04.11	Cisco IOS-XR IP/MPLS Core Software 3DES

Release 4.1 Lifecycle

The Cisco IOS XR Software release strategy is time-based, with a fixed release date and lifecycle, rather than a feature-based release strategy with a variable release date.

Table 4 lists the major milestones of Cisco IOS XR Software Release 4.1.1.

Table 4. Major Milestones for Cisco IOS XR Software Release 4.1.1

Milestone	Definition	Date
Availability date	The date that Cisco IOS XR Software Release 4.1.1 information is published on Cisco.com and becomes available to the general public.	July 30, 2011
End-of-life announcement date	The date when the official end-of-life document that announces the end of sale and end of life of Cisco IOS XR Software Release 4.1.1 is distributed to the general public.	January 30, 2012
End-of-sale date and end-of-maintenance date	The last date to order Cisco IOS XR Software 4.1.1 through Cisco point-of-sale mechanisms. The product is no longer for sale after this date. This date also marks end of engineering, maintenance rebuilds, and software fixes through rebuilds of Cisco IOS XR Software 4.1.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.	January 30, 2013
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 through SMU. From January 30, 2013 until July 30, 2013, maintenance rebuilds and software fixes through SMU support for Cisco IOS XR Software 4.1.x will be provided only through migration to rebuilds of Cisco IOS XR Software 4.1.x. After July 30, 2013, Cisco Engineering will no longer develop, repair, maintain, or test Cisco IOS XR Software 4.1.x.	July 30, 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.	January 30, 2018

For official end-of-life and end-of-sale announcements for Cisco IOS XR Software, please visit 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 www.cisco.com/ or contact your local Cisco account representative.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)