

Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services.

- Objectives, page 1
- Document Revision History, page 1
- Organization, page 6
- Related Documentation, page 8
- Document Conventions, page 8
- Obtaining Documentation and Submitting a Service Request, page 10

Objectives

This document provides an overview of software functionality that is specific to the Cisco ASR 1000 Series Aggregation Services Routers. It is not intended as a comprehensive guide to all of the software features that can be run using the Cisco ASR 1000 Series Routers, but only the software aspects that are specific to these routers.

For information on general software features that are also available on the Cisco ASR 1000 Series Routers, see the Cisco IOS XE technology guide for that specific software feature.

Document Revision History

The Document Revision History records technical changes to this document. The table shows the Cisco IOS XE software release number and document revision number for the change, the date of the change, and a brief summary of the change.

Release No.	Date	Change Summary
Cisco IOS Denali 16.2.1	March 31, 2016	Added *Read Me First* chapter.

Release No.	Date	Change Summary
IOS XE 3.13.1	December 12, 2014	Added *PPP Half-Bridge on the Cisco ASR 1000 Series Routers* chapter.
IOS XE 3.13	July 30, 2014	Added new content to document IEEE 1588v2 PTP Support in the *IEEE 1588v2 PTP Support* chapter. Added HDLC-Ethernet Interworking feature updates in the "*High-Level Data Link Control-Ethernet Interworking*" section of the *Configuring MPLS Layer 2 VPNs*
IOS XE 3.12	March 28, 2014	Added Multi Member-link MLPPPoA or MLPPPoEoA feature updates in the "*Cisco IOS XE Scaling Limits for MLP Bundles*" section of the *Multilink PPP Support for the Cisco ASR 1000 Series Routers* chapter.
IOS XE 3.12	March 28, 2014	Added Minimal Disruptive Restart Phase 3 feature updates in the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 3.12	March 28, 2014	Added MVPNv6 support for the MVPN MLDP over GRE feature in the *LSM-MLDP-based MVPN Support* chapter.
IOS XE 3.11.0	November 21, 2013	Added MVPNv4 support for the MVPN MLDP over GRE feature in the *LSM-MLDP-based MVPN Support* chapter.
IOS XE 3.10.0	July 30, 2013	Added *Packet Trace* chapter.
IOS XE 3.9.0	March 28, 2013	Added new content to document UniDirectional Link Detection (UDLD) Protocol in the *UniDirectional Link Detection (UDLD) Protocol* chapter.

Release No.	Date	Change Summary
IOS XE 3.8.0	November 28, 2012	Added Minimal Disruptive Restart Process section in the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 3.7.0	July 25, 2012	Added new content to the Synchronous Ethernet in the *Network Synchronization Support* chapter. Added new content to document the Walk-by User Support for PWLAN in ISG in the *Broadband Scalability and Performance* chapter. Added new content to the bridge domain interface configurations in the *Configuring Bridge Domain Interfaces* chapter.
IOS XE 3.6.0	March 30, 2012	Added new content to document the Frame Relay to ATM Bridged Interworking in the *Configuring MPLS Layer 2 VPNs* chapter. Added new content to document the xconnect support on GEC (VPWS) on ASR1000 in the *Configuring MPLS Layer 2 VPNs* chapter.
IOS XE 3.4.0S	July 25, 2011	Added new content to document the Monitoring and Maintaining Multilink Frame Relay feature in the *Monitoring and Maintaining Multilink Frame Relay* chapter. Added new content to document In Service One-Shot Software Upgrade Procedure in the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.

Release No.	Date	Change Summary
IOS XE 3.3.0S	March 30, 2011	Added new content to document the Scalability and Performance in the *Broadband Scalability and Performance* chapter. Added software upgrade information for ASR 1001 chassis in the "*Using Subpackages for Software Upgrade on a Cisco ASR 1001 Router, Cisco ASR 1001-X Router or a Cisco ASR 1002-X Router*" section in *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 3.2.0S	November 24, 2010	Added new content to document bridge domain interface configurations in the *Configuring Bridge Domain Interfaces* chapter. Added new content to document the Synchronous Ethernet in the *Network Synchronization Support* chapter.
IOS XE 3.1.0S	July 30, 2010	Added upgrade and file package information in the *Software Packaging and Architecture* chapter. Added restriction regarding ISSU support in Cisco IOS XE Release 3.1S in *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 2.6	February 26, 2010	Moved the ISSU compatibility tables into the Release Notes for Cisco ASR 1000 Series Aggregation Services Routers document. Relocated other ISSU compatibility information into the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.

Release No.	Date	Change Summary
IOS XE 2.5	December 15, 2009	Updated the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter with new compatibility information.
IOS XE 2.4	June 30, 2009	Updated the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter with new compatibility information. Updated book with installation information for the new optional subpackage for the Cisco WebEx Node for ASR 1000 Series.
IOS XE 2.3	February 27, 2009	Updated the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter with new compatibility information.
IOS XE 2.2	November 20, 2008	Updated the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter with new compatibility information.
IOS XE 2.2	November 3, 2008	Added new content to document compatibility of different versions of Cisco IOS XE software in the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 2.2	October 3, 2008	Updated book to document ISSU procedures for Cisco IOS XE Release 2.2. Removed ISSU procedures from the *Consolidated Packages and SubPackage Management* chapter of the book and created the *Software Upgrade Processes Supported by Cisco ASR 1000 Series Routers* chapter.
IOS XE 2.2	September 23, 2008	Added the "*Troubleshooting Software Mismatch with ESP Board ASR1000-ESP10-N*" section for the Cisco ASR 1000 Embedded Services Processor 10G Non Crypto Capable feature.

Release No.	Date	Change Summary
IOS XE 2.1	July 2, 2008	Added the *Configuring and Accessing the Web User Interface* section. Added Appendix *Configuration Examples*.
IOS XE 2.1	May 2, 2008	First release of the book.

Organization

This document contains the following chapters:

Title	Description
Read Me First	Provides information that is pertinent to Cisco ASR 1000 Series Routers in Cisco IOS XE Denali 16.2.1.
Software Packaging and Architecture	Provides an introduction to Cisco ASR 1000 Series Routers software packaging, processes, and file systems.
Using Cisco IOS XE Software	Provides an introduction to accessing the command-line interface (CLI) and using the Cisco software and related tools.
Console Port, Telnet, and SSH Handling	Provides an overview and configuration options for the handling of incoming console port, telnet, and SSH traffic on the Cisco ASR 1000 Series Routers.
Consolidated Packages and SubPackage Management	Provides information on downloading, installing, and running the software on the Cisco ASR 1000 Series Routers.
Software Upgrade Process	Provides information on ISSU compatibility and performing limited-downtime software upgrades on the Cisco ASR 1000 Series Routers.
High Availability Overview	Provides an overview of the High Availability architecture, behavior, and features on the Cisco ASR 1000 Series Routers.
Scalability and Performance	Provides information on scaling and performance on the Cisco ASR 1000 Series Routers.
Cisco License Call Home	Provides information on activating the Cisco License for Call Home feature.

Title	Description
Configuring Call Home for Cisco ASR 1000 Series Aggregation Services Routers	Provides information about the Call Home feature, which supports e-mail-based and web-based notification of critical system events. A versatile range of message formats are available for optimal compatibility with pager services, standard e-mail, or XML-based automated parsing applications.
Configuring Cisco Right-To-Use License	Provides information on activating the Cisco Right-To-Use License.
UniDirectional Link Detection (UDLD) Protocol	Provides an overview and configuration options for the UDLD protocol on the Cisco ASR 1000 Series Routers.
Using the Management Ethernet Interface	Provides an overview and configuration options for the Management Ethernet interface on the Cisco ASR 1000 Series Routers.
Synchronous Ethernet Support On The Cisco ASR 1000 Series Routers	Provides an overview and configuration options for the Synchronous Ethernet on the Cisco ASR 1000 Series Routers.
Configuring Ethernet Over Soft GRE	Provides an overview and configuration for the Generic Routing Encapsulation (GRE) is a tunneling protocol that can encapsulate a wide variety of network layer protocols inside virtual point-to-point links over an IP internetwork.
Configuring Bridge Domain Interfaces	Provides an overview of configuration options for the Bridge Domain Interface on the Cisco ASR 1000 Series Routers.
Monitoring and Maintaining Multilink Frame Relay	Provides an overview of monitoring and maintaining the Multilink Frame Relay feature for the Cisco ASR 1000 Series Routers.
Configuring MPLS Layer 2 VPNs	Provides an overview of the Frame Relay to ATM Bridged Interworking feature.
LSM-MLDP-based MVPN Support	Provides information on the Label Switched Multicast (LSM) feature supports IPv4 and IPv6 multicast traffic over a Multi-Protocol Label Switching (MPLS) network.
Tracing and Trace Management	Provides an overview of tracing on the Cisco ASR 1000 Series Router, and how to manage the tracing process and files.

Title	Description
PPP Half-Bridge on the Cisco ASR 1000 Series Routers	Provides information about PPP half-bridge on the Cisco ASR 1000 Series Routers.
Configuring and Accessing the Web User Interface	Provides an overview of the Cisco ASR 1000 Series Router web user interface, and information on configuring and accessing the web user interface.

Related Documentation

This section refers you to other documentation that also might be useful as you configure your Cisco ASR 1000 Series Router. The documentation listed below is available online.

Cisco ASR 1000 Series Routers Documentation

- The Cisco ASR 1000 Series has a documentation roadmap that provides listings to a broad range of documentation available for the Cisco ASR 1000 Series Routers. See the Cisco ASR 1000 Series Router Documentation Roadmap at: http://cisco.com/en/US/products/ps9343/products_documentation_roadmaps_list.html
- The documentation homepage for the Cisco ASR 1000 Series Routers contains a wide variety of hardware and software information for the Cisco ASR 1000 Series Routers and can be viewed at: http://cisco.com/en/US/products/ps9343/tsd_products_support_series_home.html
- The documentation homepage for Cisco IOS XE contains Cisco IOS XE technology guides and feature documentation and can be viewed at: http://cisco.com/en/US/products/ps9587/tsd_products_support_series_home.html
- For information on commands, see the following: http://www.cisco.com/c/en/us/support/ios-nx-os-software/ios-xe-3s/products-command-reference-list.html

Document Conventions

Within the SIP and SPA software configuration guides, the term router is generally used to refer to a variety of Cisco products (for example, routers, access servers, and switches). Routers, access servers, and other networking devices that support Cisco IOS software are shown interchangeably within examples. These products are used only for illustrative purposes; that is, an example that shows one product does not necessarily indicate that other products are not supported.

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)

Convention	Description
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier font`	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier font`	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document uses the following conventions for reader alerts:



Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.



Tip Means *the following information will help you solve a problem.*



Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



Timesaver Means *the described action saves time.* You can save time by performing the action described in the paragraph.



Warning **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

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.