



Cross-Platform Release Notes for Cisco IOS XE Release 2.5.1X

November 1, 2010

Cisco IOS Release 2.5.1XC and Earlier Releases

Text Part Number OL-22449-01 Rev. D

These release notes support the Cisco IOS XE Release 2.5.1XC Early Deployment (ED) software release and earlier releases are updated as needed. This release is based on Cisco IOS XE Release 2.5.1. Locator/ID Separation Protocol (LISP) capabilities are currently supported on a range of Cisco routing and switching platforms via ED software releases. These LISP ED releases are intended only for deployments on LISP nodes and are not intended nor recommended for general production deployments throughout a customer's network.



Note

Cisco IOS Release 2.5.1XB introduces changes to LISP packet formats as prescribed by draft-ietf-lisp-07. LISP in Cisco IOS Release 2.5.1XB is not backward compatible with previous LISP releases. All LISP deployments must move to Cisco IOS Release 2.5.1XB to retain compatibility.

Contents

These release notes describe the following topics:

- [Introduction, page 2](#)
- [System Requirements, page 2](#)
- [New and Changed Information, page 2](#)
- [Related Documentation, page 5](#)
- [Open Source License Notices, page 6](#)
- [Obtaining Documentation and Submitting a Service Request, page 8](#)



Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Introduction

Cisco IOS XE Release 2.5.1X is based on Cisco IOS XE Release 2.5.1. Cisco IOS XE Release 2.5.1XC and earlier releases are intended exclusively for the deployment of the LISP functionality on the routers that are listed in the [“Supported Hardware” section on page 2](#).

For information on this new feature and Cisco IOS commands that are supported by Cisco IOS XE Release 2.5.1X, see the [“New and Changed Information” section on page 2](#).

System Requirements

This section describes the system requirements for Cisco IOS XE Release 2.5.1XC and earlier releases and includes the following section:

- [Supported Hardware, page 2](#)

Supported Hardware

Cisco IOS XE Release 2.5.1XC and earlier releases support the following Cisco routers:

Cisco Aggregation Services Router ASR 1000 Series with:

- Cisco ASR 1002 Router
- Cisco ASR 1002-F Router
- Cisco ASR 1004 Router
- Cisco ASR 1006 Router

New and Changed Information

This section lists the new hardware and software features supported by Cisco IOS XE Release 2.5.1XC and earlier releases and contains the following subsections:

- [New Hardware Features in Cisco IOS XE Release 2.5.1XC, page 2](#)
- [New Software Features in Cisco IOS XE Release 2.5.1XC, page 3](#)
- [New Hardware Features in Cisco IOS XE Release 2.5.1XB, page 3](#)
- [New Software Features in Cisco IOS XE Release 2.5.1XB, page 3](#)
- [New Hardware Features in Cisco IOS XE Release 2.5.1XA, page 4](#)
- [New Software Features in Cisco IOS XE Release 2.5.1XA, page 4](#)

New Hardware Features in Cisco IOS XE Release 2.5.1XC

There are no new hardware features in Cisco IOS XE Release 2.5.1XC.

New Software Features in Cisco IOS XE Release 2.5.1XC

This section describes the following new and changed software features in Cisco IOS XE Release 2.5.1XC.

- [LISP Instance ID Support, page 3](#)

LISP Instance ID Support

The LISP Instance ID Support feature includes the following support:

- Single-tenancy support on xTR: Ability to associate an instance ID to a single LISP instance running on an xTR. This allows for xTRs that are connected to the same network to use different LISP instances resulting in segmentation of the EID prefixes that they support.
- Multi-tenancy support on MS/MR: Ability for an MS/MR to maintain segmentation of the EID prefixes between instance IDs when providing mapping services to xTRs that are running with different LISP instance IDs.

New Hardware Features in Cisco IOS XE Release 2.5.1XB

There are no new hardware features in Cisco IOS XE Release 2.5.1XB.

New Software Features in Cisco IOS XE Release 2.5.1XB

This section describes the following new and changed software features in Cisco IOS XE Release 2.5.1XB.

- [LISP Map Server and Map Resolver Functionality, page 3](#)

LISP Map Server and Map Resolver Functionality

Map Resolver

A LISP Map-Resolver is deployed as a LISP infrastructure component. A Map-Resolver receives LISP Encapsulated Control Messages (ECM) containing Map-Requests from LISP ITRs directly over the underlying locator-based network. The Map-Resolver decapsulates these messages and forwards them on the LISP-ALT topology, where they are then delivered either to an ETR that is directly connected to the LISP-ALT and that is authoritative for the EID being queried by the Map-Request, or to the Map-Server that is injecting EID-prefixes into the LISP-ALT on behalf of the authoritative ETR.

For more information, see the *Cisco IOS LISP Configuration Guide* at:

http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf

Map Server

A LISP Map-Server is deployed as a LISP Infrastructure component. LISP site commands are configured on the Map Server for a LISP ETR that registers to it, including an authentication key, which must match the one also configured on the ETR. A Map Server receives Map-Register control packets from ETRs. When the Map Server is configured with a service interface to the LISP-ALT, it injects aggregates for the registered EID prefixes into the LISP-ALT.

The Map-Server also receives Map-Request control packets from the LISP-ALT, which it then forwards as a LISP Encapsulated Control Messages (ECM) to the registered ETR that is authoritative for the EID prefix being queried. The ETR returns a Map-Reply message directly back to the ITR.

For more information, see the *Cisco IOS LISP Configuration Guide* at:
http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf

New Hardware Features in Cisco IOS XE Release 2.5.1XA

There are no new hardware features in Cisco IOS XE Release 2.5.1XA.

New Software Features in Cisco IOS XE Release 2.5.1XA

This section describes the following new and changed software features in Cisco IOS XE Release 2.5.1XA.

- [Locator/ID Separation Protocol, page 4](#)
- [LISP Proxy Ingress Tunnel Router \(PITR\) Support, page 5](#)
- [LISP Proxy Egress Tunnel Router \(PETR\) Support, page 5](#)
- [LISP Support for IPv6, page 5](#)

Locator/ID Separation Protocol

Locator/ID Separation Protocol (LISP) is a next-generation routing feature. LISP can be used for any multi-homing environments while reducing operational complexities.

LISP creates a new paradigm by splitting the device identity, known as Endpoint Identifier (EID), and its location, known as its Routing Locator (RLOC) into two different numbering spaces. Splitting EID and RLOC functions yields several advantages that include improved scalability of the routing system through greater aggregation of RLOCs and improved multi-homing efficiency and ingress traffic engineering while avoiding site renumbering and reducing opex costs.

The Cisco IOS implementation of LISP supports the following Internet Drafts:

- draft-ietf-lisp-07
- draft-ietf-lisp-alt-04
- draft-ietf-lisp-interworking-01
- draft-ietf-lisp-lig-00
- draft-ietf-lisp-ms-05

LISP Proxy Ingress Tunnel Router (PITR) Support

LISP Proxy Ingress Tunnel Router (PITR) support allows non-LISP enabled sites to communicate with LISP-enabled sites.

For more information, see the *Cisco IOS LISP Configuration Guide* at:

http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf

LISP Proxy Egress Tunnel Router (PETR) Support

LISP Proxy Egress Tunnel Router (PETR) support allows two LISP enabled sites with a common address-family to communicate with each other when the intermediate network between does not use that address family. PETR support also allows a LISP enabled site to communicate with non-LISP enabled sites when it is necessary to bypass Unicast Reverse Path Forwarding (uRPF) mechanisms.

For more information, see the *Cisco IOS LISP Configuration Guide* at:

http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf

LISP Support for IPv6

As a protocol, LISP was designed to operate in a mixed address-family manner. The initial Cisco IOS release of LISP did not implement IPv6 support. This release of Cisco IOS and Cisco IOS XE provides support for IPv6.

IPv6 support is provided for all LISP features available in these releases when LISP encapsulates IPv6 EIDs over IPv6 RLOCs or IPv6 EIDs over IPv4 RLOCs. This release does not support the LISP encapsulation of IPv4 EIDs over IPv6 RLOCs.

For more information, see the *Cisco LISP Configuration Guide* at:

http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf

Related Documentation

The following section describes the documentation available for Cisco IOS XE Release 2.5.1X:

Use these release notes with the following resources:

- [Release-Specific Documents, page 5](#)

Release-Specific Documents

The following documents are specific to Cisco IOS XE Release 2.5.1X and other LISP-specific early deployment releases:

- *Cisco IOS LISP Command Reference* at:
http://www.cisco.com/en/US/docs/ios/lisp/command/reference/LISP_command_reference.pdf
- *Cisco LISP Configuration Guide* at:
http://www.cisco.com/en/US/docs/ios/lisp/configuration/guide/LISP_configuration_guide.pdf
- *Cisco LISP Laboratory Testing Application Note* at:
http://www.cisco.com/en/US/docs/ios/lisp/app/note/LISP_lab_test_app_note.pdf

**Note**

If you do not find the answers to your questions or issues in the documentation that we have provided, please use the *lisp-support@cisco.com* mailing list.

Open Source License Notices

The following notices pertain to this software license.

OpenSSL/Open SSL Project

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>).

This product includes cryptographic software written by Eric Young (*ey@cryptsoft.com*).

This product includes software written by Tim Hudson (*tjh@cryptsoft.com*).

License Issues

The OpenSSL toolkit stays under a dual license, i.e. both the conditions of the OpenSSL License and the original SSLeay license apply to the toolkit. See below for the actual license texts. Actually both licenses are BSD-style Open Source licenses. In case of any license issues related to OpenSSL please contact *openssl-core@openssl.org*.

OpenSSL License:

Copyright © 1998-2007 The OpenSSL Project. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgment: “This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>)”.
4. The names “OpenSSL Toolkit” and “OpenSSL Project” must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact *openssl-core@openssl.org*.
5. Products derived from this software may not be called “OpenSSL” nor may “OpenSSL” appear in their names without prior written permission of the OpenSSL Project.
6. Redistributions of any form whatsoever must retain the following acknowledgment:
 “This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>)”.

THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT “AS IS” AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN

NO EVENT SHALL THE OpenSSL PROJECT OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This product includes cryptographic software written by Eric Young (*ey@cryptsoft.com*). This product includes software written by Tim Hudson (*tjh@cryptsoft.com*).

Original SSLeay License:

Copyright © 1995-1998 Eric Young (*ey@cryptsoft.com*). All rights reserved.

This package is an SSL implementation written by Eric Young (*ey@cryptsoft.com*).

The implementation was written so as to conform with Netscapes SSL.

This library is free for commercial and non-commercial use as long as the following conditions are adhered to. The following conditions apply to all code found in this distribution, be it the RC4, RSA, lhash, DES, etc., code; not just the SSL code. The SSL documentation included with this distribution is covered by the same copyright terms except that the holder is Tim Hudson (*tjh@cryptsoft.com*).

Copyright remains Eric Young's, and as such any Copyright notices in the code are not to be removed. If this package is used in a product, Eric Young should be given attribution as the author of the parts of the library used. This can be in the form of a textual message at program startup or in documentation (online or textual) provided with the package.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement:
 "This product includes cryptographic software written by Eric Young (*ey@cryptsoft.com*)".
 The word 'cryptographic' can be left out if the routines from the library being used are not cryptography-related.
4. If you include any Windows specific code (or a derivative thereof) from the apps directory (application code) you must include an acknowledgement: "This product includes software written by Tim Hudson (*tjh@cryptsoft.com*)".

THIS SOFTWARE IS PROVIDED BY ERIC YOUNG "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The license and distribution terms for any publicly available version or derivative of this code cannot be changed. i.e. this code cannot simply be copied and put under another distribution license [including the GNU Public License].

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

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)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

© 2010 Cisco Systems, Inc. All rights reserved.