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Cisco IOS LISP Command Reference
Cisco IOS Release 15.1(4)XB5

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> **Note** This Cisco IOS LISP Command Reference Guide is preliminary and subject to change. The commands and their usage, examples, and detailed outputs are provided as the best representation available at the time of this writing. This document will be replaced with the formal version that will be formatted and published in the same way as all other Cisco IOS and IOS XE guides and documentation.

CONTENTS

New and Changed Information

This chapter provides release-specific information for each new and changed feature in the Cisco IOS LISP Command Reference, Cisco IOS Release 15.1(4)XB5. The latest version of this document is referenced at the following Cisco website: **http://lisp.cisco.com**.

To check for additional information about Cisco IOS Release 15.1(4)XB5, see the latest version of the release notes referenced at the following Cisco website: **http://lisp.cisco.com**.

Table 1 summarizes the new and changed features for the Cisco IOS LISP Command Reference, Cisco IOS Release 15.1(4)XB5.

Table 1   New and Changed Information for Cisco IOS Release 15.1(4)XB4 LISP Command Reference Guide

Date	Feature	Change Description	Changed in Release	Where Documented
24 Dec 2009	LISP Ingress Tunnel Router (ITR)/Egress Tunnel Router (ETR) functionality	Initial LISP ITR/ETR configuration, show, and debug commands.	15.1(1)XB	LISP Global Configuration, Show, and Debug Commands
31 Mar 2010	LISP support for IOS-XE	Added LISP support to IOS XE platforms.	2.5.1XA	LISP Global Configuration, Show, and Debug Commands
31 Mar 2010	LISP Proxy Ingress Tunnel Router (PITR)/Proxy Egress Tunnel Router (PETR) functionality	Added LISP PITR/PETR configuration, show, and debug commands.	15.1(1)XB1 2.5.1XA	LISP Global Configuration, Show, and Debug Commands
31 Mar 2010	LISP IPv6 Address Family functionality.	Added LISP IPv6 address family functionality.	15.1(1)XB1 2.5.1XA	LISP Global Configuration, Show, and Debug Commands
30 Jun 2010	LISP Map-Server (MS)/Map-Resolver (MR) functionality	Added LISP MS/MR support to IOS and IOS XE platforms.	15.1(1)XB2 2.5.1XB	LISP Global Configuration, Show, and Debug Commands
29 Oct 2010	LISP Instance ID functionality	Added LISP Instance ID functionality to Map-Server and Map-Resolver, and xTR.	15.1(1)XB3 2.5.1XC	LISP Global Configuration, Show, and Debug Commands
18 April 2011	New CLI Format Multi-Tenancy LISP Instance-ID functionality	Converted to new LISP CLI format Added LISP Instance ID multi-tenancy functionality	15.1(4)XB4	LISP Global Configuration, Show, and Debug Commands
30 June 2011	LISP ALT Summary Route, LISP PETR Load Sharing, LISP Remote RLOC Probe, LISP RLOC Auto-Discovery, LISP Route-Import	Added new LISP commands.	15.1(4)XB5	LISP Global Configuration, Show, and Debug Commands

Cisco LISP Commands

The *Cisco IOS Release 15.1(4)XB5 LISP Command Reference* contains commands used to configure and monitor the following Locator/ID Separation Protocol (LISP) capabilities and features:

- LISP Ingress Tunnel Router (ITR) and Egress Tunnel Router (ETR) functionality
- LISP Proxy Ingress Tunnel Router (PITR) and Proxy Egress Tunnel Router (PETR) functionality
- LISP Map-Server (MS) and Map-Resolver (MR) functionality
- LISP Instance ID for LISP multi-tenancy (virtualization) functionality.

The *Cisco IOS LISP Command Reference* is organized in the following categories:

- Global Configuration Commands
- LISP Configuration Commands
- LISP Interface Configuration Commands
- LISP Site Configuration Commands
- LISP Show Commands
- LISP Debug Commands
- LISP Clear Commands
- Other LISP Related commands

This document describes the LISP commands, syntax, and usage for Cisco IOS and Cisco IOS XE only. For information on how to configure Cisco IOS LISP features, as well as configuration examples using the commands in this book, refer to the *Cisco LISP Configuration Guide*.

Global Configuration Commands

router lisp

To configure LISP on a router, enter lisp configuration mode using the **router lisp** command in global configuration mode. To remove the lisp configuration, use the **no** form of this command.

[no] router lisp

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router is not enabled to run LISP.

Command Modes

Global configuration

Command History

Release	Modification
15.1(4)XB4	This command was introduced into Cisco IOS 15.1(4)XB4

Usage Guidelines

The **router lisp** command is applicable to all LISP devices. When the **router lisp** command is entered, you are placed in lisp configuration mode. In this mode, most attributes associated with LISP site can be configured. (LISP interface configuration commands are entered in interface configuration mode).

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Caution   When the **no** form of the command is entered, all LISP configurations are removed from the router.

Examples

The following example configures the LISP site named 'Customer-1' and then enters the site command mode.

```
Router(config)# router lisp
Router(config-router-lisp)#
```

Related Commands

There are no related commands.

LISP Configuration Commands

alt summary-route

To configure a Map-Server to install a] summary IPv4 or IPv6 EID route directly in the LISP ALT, use the **alt summary-route** command in LISP configuration mode. To remove the summary route, use the **no** form of this command.

> **[no] alt summary-route** *EID-prefix/prefix-length* [**route-tag** *RIB-route-tag*]

Syntax Description

EID-prefix/prefix-length	The summary IPv4 or IPv6 EID prefix/length to be advertised by this router directly into the LISP ALT.
route-tag *RIB-route-tag*	(Optional) RIB route-tag associated with summary route (0-4294967295)

Defaults

No summary IPv4 or IPv6 EID prefix (route) by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

When the LISP Alternative Logical Topology (ALT) is used to tie together a LISP mapping system, a Map Server advertises the specific EID-prefix entries for its respective registered LISP sites directly into the ALT. For scalability purposes, it may be useful to advertise a summary route covering the more-specific IPv4 or IPv6 EID-prefixes associated with that Map-Server directly into the LISP ALT.

The command **alt summary-route** provides the mechanism for installing a summary IPv4 or IPv6 EID prefix into the ALT RIB. The choice of propagating only the summary prefix into the ALT or propagating the summary EID prefix and the more-specific EID prefixes associated with registered LISP sites is controlled by the BGP policy configured for the redistribution of LISP-installed RIB routes into ALT. The optional **route-tag** keyword can be used in configuring an ALT BGP policy for enforcing a route advertisement scheme.

> **Note** The use of the **alt summary-route** command does not prevent the more-specific registered EID prefixes to be installed in the ALT RIB. If this is desired, it must be controlled separately through the implementation of an ALT BGP route advertisement scheme.

> **Note** Currently, the **alt summary-route** command can only be used on a LISP device configured as a Map-Server. The summary route will not be installed unless the device is configured as a Map-Server.

When an ALT summary route is installed, the following occurs when a Map-Request for an EID is received. (Note the dependency on the device receiving the Map-Request as being a Map-Resolver or Map-Server.):

- When the **Map-Resolver** receives the Map-Request directly from the ITR (as an ECM), it does a longest-match lookup in the ALT RIB. In this case, there are four possible outcomes.

  1. If the lookup results in a longest-match on a locally installed LISP route, meaning the Map-Resolver is also configured as a Map-Server and the matching route for the EID being queried is from a LISP site registered to *this* Map-Server, then the Map-Request is forwarded to the registered ETR for handling. (If the proxy-reply feature has been requested by that ETR, the Map-Server will reply for the ETR.) Note that a Map-Reply for a registered EID prefix by default has a time-to-live (TTL) of 1440 minutes (24 hours).

2. If the lookup results in a longest-match on a LISP ALT route with valid next-hops, which could be a summary route or a more-specific route advertised by *some other* Map-Server that is injecting these into the ALT for its connected LISP Sites, then the Map-Resolver will forward the Map-Request over the ALT toward the next-hop. The receiving Map-Server will process the Map-Request.

3. If the lookup results in a longest-match on a local summary route installed by the **alt summary-route** command on *this* Map-Server (which has a next-hop of Null0) and there exists a LISP site configured on *this* Map-Server that contains an EID-prefix within the summary route but that it is currently not registered, then the Map-Resolver generates a Negative Map Reply (NMR) with a TTL of 1 minute. The 1-minute TTL reflects the notion that the LISP site could register shortly (it's configured) and the NMR should not prevent ITRs from encapsulating to it for an extended period of time.

4. If the lookup results in a longest-match on a local summary route installed by the **alt summary-route** command on *this* Map-Server (which has a next-hop of Null0) but where no LISP site is configured on *this* Map-Server with an EID-prefix within the summary route, or where no match at all is found, the Map-Resolver generates a Negative Map Reply (NMR) covering the queried EID back to the querying ITR with a TTL of 15 minutes.

- When the **Map-Server** receives the Map-Request directly over the ALT, it can be assumed that a LISP-installed summary route or more-specific route was advertised by *this* Map-Server and that the Map-Request arrived at *this* Map-Server because it was advertising the prefix. In this case, there are only two possible outcomes.

  1. If the lookup results in a longest-match on a locally installed LISP route, meaning the EID being queried for is from a LISP site registered to *this* Map-Server, then the Map-Request is forwarded to the registered ETR for handling. (If the proxy-reply feature has been requested by that ETR, the Map-Server will reply for the ETR.) Note that a Map-Reply for a registered EID prefix by default has a time-to-live (TTL) of 1440 minutes (24 hours).

  2. If the lookup results in a longest-match on a local summary route installed by the **alt summary-route** command on *this* Map-Server (which has a next-hop of Null0), then the Map-Resolver generates a Negative Map Reply (NMR) with a TTL of 1 minute. Again, the 1-minute TTL reflects the notion that there exists a LISP site configured on *this* Map-Server containing an EID-prefix within the summary route but that it is currently not registered, but that the LISP site could register shortly (it's configured) and the NMR should not prevent ITRs from encapsulating to it for an extended period of time.

  3. If the lookup results in a longest-match on a local summary route installed by the **alt summary-route** command on *this* Map-Server (which has a next-hop of Null0) but where no LISP site is configured on *this* Map-Server with an EID-prefix within the summary route, or where no match at all is found, the Map-Resolver generates a Negative Map Reply (NMR) covering the queried EID back to the querying ITR with a TTL of 15 minutes.

Note When the **alt summary-route** command is not used, a Map-Resolver or Map-Server receiving a Map-Request for an EID-prefix for which the lookup results in no match at all, sends a Negative Map Reply (NMR) covering the queried EID back to the querying ITR with a TTL of 15 minutes.

Examples

The following example configures an IPv4 summary route for the EID-prefix 192.168.0.0/22 and an IPv6 summary route for the EID-prefix 2001:DB8::/47 and installs them directly in the LISP ALT.

```
Router(config-router-lisp)# alt summary-route 192.168.0.0/23 route-tag 123
Router(config-router-lisp)# alt summary-route 2001:DB8::/47 route-tag 123
```

Related Commands

Command	Description
ipv4 alt-vrf	Configures which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
Ipv6 alt-vrf	Configures which VRF supporting the IPv6 address-family LISP should use when sending Map Requests for an IPv6 EID-to-RLOC mapping directly over the ALT.

database-mapping

To configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy use the **database-mapping** command in LISP configuration mode. To remove the configured database mapping, use the **no** form of this command.

[no] **database-mapping** *EID-prefix/prefix-length* {*locator* | {**IPv4-interface** *interface-name*} | {**IPv6-interface** *interface-name*}} **priority** *priority* **weight** *weight*

[no] **database-mapping** *EID-prefix/prefix-length* **auto-discover-rlocs**

Syntax Description

EID-prefix/prefix-length	The IPv4 or IPv6 EID prefix and length to be advertised by this router.
locator	The IPv4 or IPv6 Routing Locator (RLOC) associated with this EID-prefix/prefix-length
IPv4-interface *interface-name*	The IPv4 address from the interface *interface-name* is used as the RLOC for this EID prefix. (Useful when the interface address is obtained via DHCP for example.)
IPv6-interface *interface-name*	The IPv6 address from the interface *interface-name* is used as the RLOC for this EID prefix. (Useful when the interface address is obtained via DHCP for example.)
priority *priority*	The priority (value between 0 and 255) assigned to the RLOC. When multiple locators have the same priority they may be used in load-shared fashion. A lower value indicates a higher priority.
weight *weight*	The weight (value between 0 and 100) assigned to the locator, used to determine how to load-share traffic between multiple locators when the priorities assigned to multiple locators are the same. The value represents the percentage of traffic to be load-shared.
auto-discover-rlocs	Configures the ETR to discover the locators of all xTRs in its own LISP site when the site uses multiple xTRs and each xTR is configured to use DHCP-learned locators or configured with only its own locators.

Defaults

No LISP database entries are defined by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.
15.1(4)XB5	This command was modified to permit up to 100 database-mapping entries per site.

Usage Guidelines

This command configures the LISP database parameters for the specified IPv4 or IPv6 EID-prefix block. Parameters for each IPv4 or IPv6 EID-prefix block include its associated locator, priority and weight. The IPv4 or IPv6 EID-prefix/prefix-length is the LISP IPv4 or IPv6 EID-prefix block associated with the site and for which the router registers as being authoritative for with a Map-Server. The locator is typically the IPv4 or IPv6 address of a loopback interface but can be the IPv4 or IPv6 address of any interface used as the Routing Locator (RLOC) address for the EID-prefix assigned to the site. Associated with the locator address are a priority and weight used to define traffic policies when multiple RLOCs are defined for the same EID-prefix block.

When a router is configured as an ETR, these LISP **database-mapping** parameters are advertised within a Map-Reply message to indicate the EID-prefix block and ingress traffic preferences of the site. An ITR then selects a source locator (outer header) address for encapsulating packets destined to the EID-prefix based on these advertised parameters.

Note   When LISP is configured for virtualization, multi-tenancy can be achieved by associating a LISP instance-id with a virtual routing and forwarding (VRF) table, the **database-mapping** command is configured after entering the **eid-table** command in LISP configuration mode. This associates the subsequent **database-mapping** entries with the appropriate LISP instance-id. Additional details on this usage of the **database-mapping** command with instance-id's can be found with the **eid-table** command references.

When a LISP site has multiple locators associated with the same EID-prefix block, multiple **database-mapping** commands are used to configure all of the locators for a given EID-prefix block. Each locator may be assigned the same or a different priority value between 0 and 255. When multiple locators are assigned different priority values, the priority value alone is used to determine which locator to prefer. A lower value indicates a more preferable path. A value of 255 indicates that the locator must not be used for unicast traffic forwarding. When multiple locators have the same priority, this indicates they may be used in a load-sharing manner. In this case, for a given priority, the weight given to each locator is used to determine how to load-balance unicast packets between them. Weight is a value between 0 and 100 and represents the percentage of traffic to be load-shared to that locator. If a non-zero weight value is assigned to any locator for a given EID-prefix block, then all locators with the same priority for that same EID-prefix block must also be assigned a non-zero weight value and the sum of all weight values must equal 100. If a weight value of zero is assigned to any locator for a given EID-prefix block, then all locators with the same priority for that same EID-prefix block must also be assigned a weight value of zero. A weight value of zero indicates to an ITR receiving the Map-Reply that it may decide how to load-share traffic destined to that EID-prefix block.

When a LISP site is assigned multiple IPv4 or IPv6 EID-prefix blocks, the **database-mapping** is configured for each IPv4 or IPv6 EID-prefix block assigned to the site and for each locator by which the IPv4 or IPv6 EID-prefix block is reachable.

Note   Prior to release 15.1(4)XB5, a maximum of 10 database-mapping entries was permitted per site. Beginning with release 15.1(4)XB5, this limit has been raised to 100 database-mapping entries.

When multiple ETRs are used at a LISP site, the **database-mapping** command must be configured on all ETRs for all locators by which an IPv4 or IPv6 EID-prefix block is reachable, even when the locator is not local to the specific ETR being configured. For example, if a site uses two ETRs and each has a single locator, both ETRs must configure the **database-mapping** command for the assigned IPv4 or IPv6 EID-prefix block for its own locator as well as the locator of the other ETR. That is, all ETRs will have identical **database-mapping** command configurations.

When the IPv4 or IPv6 address of an interface(s) to be used as a routing locator is determined dynamically, such as by DHCP for example, specify the name of the interface that will be used as the locator rather than directly configuring the IP address. In this case, use the **IPv4-interface** *interface-name* and/or **IPv6-interface** *interface-name* for of the **database-mapping** command to configure the appropriate RLOC.

As described above, when multiple ETRs are used at a LISP site, it is required that consistent **database-mapping** commands be configured on all ETRs for all locators – including those local to and those not local to the each ETR. To accomplish this when the **database-mapping** *EID-prefix/prefix-length* **IPv4-interface** *interface-name* and/or **IPv6-interface** *interface-name* form of the **database-mapping** command is configured for local locators, the **database-mapping** *EID-prefix/prefix-length* **auto-discover-rlocs** form of the command must be used to indicate that other ETRs within the same LISP site also have dynamic locators. Configuring the **auto-discover-rlocs** form of the command signals to the Map-Server that it should *merge* all locators for the associated EID-prefixes within the Map-Register messages it receives from all of the ETRs within a LISP site, and indicate back to all registering ETRs via a Map-Notify message, this total set of merged locators.

Note   It may be useful to configure the **auto-discover-rlocs** form of the **database-mapping** command even when static addresses are used for local locators to reduce the configuration length and complextity when a LISP site contains multiple xTRs.

Examples

The following example configures lisp database-mapping entries for a single IPv4 EID-prefix block with two IPv4 locators. It also configures a single IPv6 EID-prefix block and the same two IPv4 locators. Each locator is assigned the same priority (1) and weight (50), indicating that ingress traffic is expected to be load-shared equally across both paths. In this example, both IPv4 and IPv6 EIDs are reachable via IPv4 locators.

```
Router(config-router-lisp)# database-mapping 172.16.91.0/24 10.1.1.1 priority 1 weight 50
Router(config-router-lisp)# database-mapping 172.16.91.0/24 10.2.1.1 priority 1 weight 50
Router(config-router-lisp)# database-mapping 2001:DB8:BB::/48 10.1.1.1 priority 1 weight 50
Router(config-router-lisp)# database-mapping 2001:DB8:BB::/48 10.2.1.1 priority 1 weight 50
```

The following example configures lisp database-mapping entries for a single IPv4 EID-prefix block with the IPv4 addresses from the interface GigabitEthernet0/0/0 referenced as the RLOC.

```
Router(config-router-lisp)# database-mapping 172.16.91.0/24 IPv4-interface
GigabitEthernet0/0/0 priority 1 weight 100
```

The following example configures database-mapping entries for two xTRs (xTR-1 and xTR-2) at a LISP site. Both xTRs have a single database-mapping entry for a single IPv6 EID-prefix block with the IPv4 addresses from the interface GigabitEthernet0/0/0 referenced as the RLOC. In this case, since both xTRs use dynamically determined locator addresses, the **auto-discovery-rloc** command is also added to indicate to the Map-Server that it should merge the locators and send the merged locator set back to the xTRs via Map-Notify messages.

On xTR-1

```
xTR-1(config-router-lisp)# database-mapping 2001:db8:a::/48 IPv4-interface
GigabitEthernet0/0/0 priority 1 weight 50
xTR-1(config-router-lisp)# database-mapping 2001:db8:a::/48 auto-discover-rlocs
```

On xTR-2

```
xTR-2(config-router-lisp)# database-mapping 2001:db8:a::/48 IPv4-interface
GigabitEthernet0/0/0 priority 1 weight 50
xTR-2(config-router-lisp)# database-mapping 2001:db8:a::/48 auto-discover-rlocs
```

Verification - on xTR-2

```
xTR-2# show ipv6 lisp database
LISP ETR IPv6 Mapping Database for EID-table default (IID 0), LSBs: 0x3, 1 entries

2001:db8:a::/48, auto-discover-rlocs
  Locator   Pri/Wgt  Source     State
  10.7.6.6   1/1    cfg-addr   site-self, reachable
  10.7.7.7   1/1    auto-disc  site-other, report-reachable
xTR-2#
```

Related Commands

Command	Description
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
locator-down	Configures an IPv4 or IPv6 locator from a locator-set associated with the IPv4 EID-prefix database mapping to be down.
map-cache	Configures a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
other-xtr-probe	Configures the interval that an xTR probes site-local RLOCs.

eid-table

To configure a LISP instance-id for association with a virtual routing and forwarding (VRF) table or default table through which the EID address space is reachable, use the **eid-table** command in LISP configuration mode. To remove this association, use the **no** form of this command.

> **[no] eid-table** {**default** | {**vrf** *vrf-name*}} **instance-id** *iid*

Syntax Description

default	Select the default (global) routing table for association with the configured instance-id.
vrf *vrf-name*	Select the VRF named *vrf-name* for association with the configured instance-id.
instance-id *iid*	The instance-id to be associated with this eid-table (value between 0 and 16777215)

Defaults

By default, a router configured for LISP associates the default table with instance-id 0.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB3	The command **xtr instance-id** was introduced to support LISP virtualization.
2.5.1XC	The command **xtr instance-id** was introduced to support LISP virtualization.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

The **eid-table** command is used to associate a LISP instance-id with either the default routing table, or a virtual routing and forwarding (VRF) table through which its EID address space is reachable. When a LISP instance-id is specified, LISP Map-Registration (control plane) messages include this instance-id along with the associated EID-prefixes upon registering, and LISP data plane packets include this instance-id in the LISP header.

LISP virtualization can be used to support multiple organizations within a LISP site, also known as multi-tenancy. For example, this may be useful when multiple organizations use private addresses [RFC1918] as EID-prefixes and where these addresses might be duplicated between organizations, or when segmentation of customer traffic in general is required. Adding a LISP instance-id in the address encoding makes the entire address unique, thus preventing duplication and providing segmentation. Multiple segmented VPNs can be created inside a LISP site by associating a LISP instance-id with the specific VRF tables used for these VPNs.

✎

Note When LISP is configured without virtualization, the **eid-table** command is not required and all LISP commands are simply entered directly under the **router lisp** command. The **eid-table** command is only required for configuring LISP virtualization. However, the **eid-table** command may be used even when LISP is configured without virtualization by using the **eid-table default instance-id 0** command form. When this form is used, the keyword **default** can **only** be used with **instance-id 0** when other instance-id's are specified.

When an instance-id is configured on any LISP device, the same instance-id must be configured on all other LISP devices participating in the same virtualized LISP environment. For example, when an instance-id is configured on an xTR, this instance-id is included with the EID-prefixes during registration with the Map-Server. The Map-Server must therefore also be configured to use the same instance-id within the EID-prefix configurations for this LISP site in order for the registration to succeed. (A LISP instance-id is configured on the Map-Server using the **eid-prefix** command within the LISP site command mode.)

When considering LISP deployments, especially with virtualization, the following guidelines may be helpful in understanding the configuration:

- When LISP is first configured by entering the **router lisp** command to begin the configuration process, all LISP subcommands (e.g. **database-mapping**, **map-cache**, **ipv4 map-resolver**, **ipv4 map-server**, etc.) are available for entry and are applied directly below the **router lisp** and without considering virtualization. You will notice upon inspection of the **show ip lisp** output that **instance-id 0** is indicated even though the **eid-table** command was not configured, and that the **show running-config** output does not indicate that the command **eid-table** has been configured. That is, all LISP commands appear directly below **router lisp**.

- Upon entering the **eid-table** command for the first time, any existing **database-mapping, map-cache**, or **alt-vrf** configurations previously configured directly under **router lisp** will automatically be moved underneath and associated with **eid-table default instance-id 0**. All subsequent entries of **database-mapping or map-cache** configurations can only then be made from within a specific **eid-table** command. LISP commands that can be associated on a global or virtual basis (e.g. **ipv4 map-resolver, ipv4 map-server**, etc.) can be entered either directly under the **router lisp** command, in which case they are inherited by all configured **eid-tables**, or within a specific **eid-table**, in which case their scope extends only to that specific instance.

✎

Note When the **eid-table vrf** *vrf-name* command is used, the referenced VRF must already been created using the **vrf definition** command, and at least one address family must be enabled within that VRF.

Examples

In this example, an xTR is configured to segment traffic using two vrf's named **green** and **blue**. In addition, the loopback interface is configured for management purposes using the default table. Hence, the management loopback is carried in the default table in instance-id 0, the EID prefix associated with vrf **green** is connected to instance-id **123**, and the EID prefixes associated with vrf **blue** is connected to instance-id **456**.

```
Router(config)# vrf definition blue
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit
Router(config-vrf)# vrf definition green
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit
Router(config-vrf)# exit
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# database-mapping 10.1.1.1/32 172.1.0.2 priority 1
weight 100
Router(config-router-lisp-eid-table)# exit
Router(config-router-lisp)# eid-table vrf green instance-id 123
Router(config-router-lisp-eid-table)# database-mapping 192.168.1.0/24 172.1.0.2 priority 1
weight 100
Router(config-router-lisp-eid-table)# exit
Router(config-router-lisp)# eid-table vrf blue instance-id 456
Router(config-router-lisp-eid-table)# database-mapping 192.168.2.0/24 172.1.0.2 priority 1
weight 100
```

In this example, Map-Server/Map-Resolver site functionality is configured to match the previous example.

```
Router(config)# router lisp
Router(config-router-lisp)# site Site-1
Router(config-router-lisp-site)# authentication-key secret
Router(config-router-lisp-site)# eid-prefix 10.1.1.1/32
Router(config-router-lisp-site)# eid-prefix instance-id 123 192 168.1.0/24
Router(config-router-lisp-site)# eid-prefix instance-id 456 192.168.2.0/24
Router(config-router-lisp-site)# exit
```

Related Commands

Command	Description
eid-prefix	LISP Map-Server site configuration mode subcommand for configuring the EID-prefix and associated instance-id for a LISP Site.

ipv4 alt-vrf

To associate a virtual routing and forwarding (VRF) instance supporting the IPv4 address-family to LISP for use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the LISP-ALT, use the **ipv4 alt-vrf** command in LISP configuration mode. To remove this VRF reference, use the no form of the command.

      [no] ipv4 alt-vrf *vrf-name*

Syntax Description

vrf-name	Name assigned to the LISP-ALT VRF.

Defaults

By default, no IPv4 LISP-ALT VRF is referenced by LISP.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB3	The use of this command was modified.
2.5.1XC	The use of this command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv4 alt-vrf** command to configure which virtual routing and forwarding (VRF) instance supporting the IPv4 address-family the LISP device should use for control plane mapping resolution functions.

The **ipv4 alt-vrf** command is required for any LISP device that is connected to the Alternate Logical Topology (ALT) for sending a Map-Request LISP control plane message for EID-to-RLOC mapping resolution. Primarily this includes LISP Map-Server (MS), Map-Resolver (MR), and Proxy Ingress Tunnel Router (PITR) devices. This can also include directly ALT-connected xTRs.

- A LISP ITR will typically use a configured Map-Resolver (MR) (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. In this case, the ITR will send a Map-Request in a LISP Encapsulated Control Message (ECM) to the MR. Alternatively, an ITR can be directly attached to the ALT using the **ipv4 alt-vrf** command. In this case, the ITR will send a Map-Request directly on the LISP ALT.

- A LISP Map-Resolver (MR) and/or Map-Server (MS) device must be directly attached to the ALT using the **ipv4 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv4 EID-to-RLOC mapping resolution. In this case, an MR forwards Map-Requests over the ALT to the MS that is authoritative for (advertising) the requested EID. However, when a device is configured as a stand-alone MS/MR (i.e. when it is not connected to any ALT and it has full knowledge of the LISP Mapping System, as in the case of a private LISP deployment for example), the use of the **ipv4 alt-vrf** command is not required. In this case, the MR resolves IPv4 EID-to-RLOC mappings internally with its concurrently configured MS.

- A LISP PITR device can be directly attached to the ALT using the **ipv4 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. In this case, the PITR will send a Map-Request directly on the LISP ALT in order to obtain IPv4 EID-to-RLOC mappings. Beginning with Release 15.1(4)XB4, a PITR can instead be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. Prior to this release, PITRs were required to be LISP ALT connected as they could only forward Map-Requests directly over the LISP ALT for EID-to-RLOC mapping resolution.

✎

Note When the **ipv4 alt-vrf** command is used, the referenced VRF must already have been created using the **vrf definition** command. In addition, when the device is connected to the ALT (i.e not a stand-alone configuration), the corresponding tunnel mechanism (typically a GRE tunnel) and routing process (such as BGP, OSPF, or static routes) associated with the VRF must also be created.

The LISP ALT does not currently support virtualization. Therefore, when LISP virtualization is configured, the LISP architecture must be deployed so that an ALT infrastructure is not required. The following guidelines may be helpful in understanding the use of the **ipv4 alt-vrf** command when virtualization is configured:

- When instance-id's are used, a LISP ITR must be configured to use a configured Map-Resolver (MR) (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. It **must not** be configured to directly attach to the ALT using the **ipv4 alt-vrf** command.

- Map-Resolver (MR) and Map-Server (MS) devices **must be** concurrently configured in a stand-alone manner and see registrations from all ETRs in the LISP network in order to properly resolve Map-Requests when instance-id's are used. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv4 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MR/MS device configured for virtualization **must not** use the **ipv4 alt-vrf** command.
- When a LISP PITR is configured to support LISP virtualization, it must be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. The LISP ALT does not currently support virtualization.

Examples

The following example configures the VRF named *lisp*, and then configures LISP to use this VRF when resolving IPv4 EID-to-RLOC mappings.

```
Router(config)# vrf definition lisp
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit-address-family
Router(config-vrf)# exit
Router(config)# router lisp
Router(config-router-lisp)# ipv4 alt-vrf lisp
```

Related Commands

Command	Description
ipv4 itr map-resolver	Configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv4 Map-Request messages
ipv4 etr map-server	Configure the IPv4 or IPv6 locator address of the LISP Map-Server to which the ETR registers.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv4 proxy-itr	Configure the router to act as an IPv4 LISP Proxy Ingress Tunnel Router (PITR)

ipv4 etr

To configure a router to act as an IPv4 LISP Egress Tunnel Router (ETR), use the **ipv4 etr** command in LISP configuration mode. To remove LISP ETR functionality, use the **no** form of this command.

[no] ipv4 etr

Syntax Description

This command has no arguments or keywords.

Defaults

The router does not provide ETR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv4 LISP Egress Tunnel Router (ETR) functionality on the router. When a router is configured as an IPv4 ETR, it is typically also configured with **database-mapping** commands so that the ETR knows what IPv4 or IPv6 EID-prefix blocks and corresponding locators are used for the LISP site. In addition, the ETR should be configured to register with a Map-Server with the **ipv4 etr map-server** command, or to use static LISP EID-to-RLOC mappings with the **map-cache** command in order to participate in LISP networking.

✎

Note It is common for a device configured as an ETR to also be configured as an ITR. However, the LISP architecture does not require this and ETR and ITR functionality can occur in different devices.

Examples

The following example configures IPv4 LISP ETR functionality on the router.

```
Router(config-router-lisp)# ipv4 etr
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
map-cache	Configures a static IPv4 or IPv6 EID-prefix-to-RLOC map-cache entry.

---

ipv4 etr accept-map-request-mapping

To configure an ETR to cache IPv4 mapping data contained in a Map-Request message, use the **ipv4 etr accept-map-request-mapping** command in LISP configuration mode. To remove this functionality, use the **no** form of this command.

> **[no] ipv4 etr accept-map-request-mapping** [**verify**]

Syntax Description

verify	(Optional) Specifies that mapping data should be cached but not used for forwarding packets until the ETR can send its own Map-Request to one of the locators from the mapping data record and receive a Map-Reply with the same data in response.

Defaults

The router does not cache mapping data contained in a Map-Request message.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When an ETR receives a Map-Request message, this message may contain mapping data for the invoking IPv4 source-EID's packet. By default, the ETR will ignore mapping data included in Map-Request messages. However, by configuring the **ipv4 etr accept-map-request-mapping** command, the ETR will cache the mapping data in its map-cache and immediately use it for forwarding packets.

When the optional **verify** keyword is configured, the ETR will still cache the mapping data but will not use it for forwarding packets until the ETR can send its own Map-Request to one of the locators from the mapping data record, and receives the same data in a Map-Reply message.

When this command is enabled and then later disabled, issuing the command **clear ip lisp map-cache** is required to clear any map-cache entries that are currently in the "tentative" state. Map-cache entries can remain in the "tentative" state for up to one minute and thus it may be desirable to clear these entries manually when this command is removed.

Examples

The following example configures the ETR to cache IPv4 mapping data included in Map-Request messages but to verify its accuracy prior to using this data to forward packets.

```
Router(config-router-lisp)# ipv4 etr accept-map-request-mapping verify
```

Related Commands

Command	Description
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR).
clear ip lisp map-cache	Clear the LISP IPv4 map-cache on the local router.

---

ipv4 etr map-cache-ttl

To configure the TTL value inserted into LISP IPv4 Map-Reply messages, use the **ipv4 etr map-cache-ttl** command in LISP configuration mode. To remove the configured TTL value and return to the default value, use the **no** form of this command.

> **[no] ipv4 etr map-cache-ttl** *time-to-live*

Syntax Description

time-to-live	A value, in minutes, to be inserted in the TTL field in Map-Reply messages. Valid entries are between 60 minutes (1 hour) and 10080 minutes (1 week).

Defaults

The default TTL value is 1440 minutes (24 hours).

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to change the default value associated with the Time-to-Live (TTL) field in IPv4 Map-Reply messages. This may be useful when you wish to change the default TTL that remote ITRs will cache and use for your sites IPv4 EID prefix. The default value is 1440 minutes (24 hours), the minimum value cannot be less than 60 minutes, and the maximum cannot be greater than 10080 minutes (one week).

Examples

The following example configures the ETR to use a TTL of 120 minutes in its IPv4 Map-Reply messages.

```
Router(config-router-lisp)# ipv4 etr map-cache-ttl 120
```

Related Commands

Command	Description
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR).

---

ipv4 etr map-server

To configure the IPv4 or IPv6 locator address of the LISP Map-Server to be used by the ETR when registering for IPv4 EIDs, use the **ipv4 etr map-server** command in LISP configuration mode. To remove the configured locator address of the LISP Map-Server, use the **no** form of this command.

[**no**] **ipv4 etr map-server** *map-server-address* {[**key** *key-type authentication-key*] | **proxy-reply**}

Syntax Description

map-server-address	Specifies the IPv4 or IPv6 locator addresses of the Map-Server.
key *key-type*	Specifies the key-type. Type (0) indicates the password is entered as cleartext, and Type (6) indicates the password is in the AES encrypted form.
authentication-key	Specifies the password used for computing the SHA-1 HMAC hash that is included in the header of the Map-Register message.
proxy-reply	Specifies that the ETR should indicate to the Map-Server via a Map-Register message that the Map-Server should send Map-Replies on behalf of the site.

Defaults

No LISP Map-Server locator addresses are configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv4 etr map-server** command to configure the IPv4 or IPv6 locator of the Map-Server to which the ETR will register for its IPv4 EID(s). A password used for a SHA-1 HMAC hash that is included in the header of the Map-Register message must also be provided after the **key** *key-type* entry. You can configure the ETR to register with at most two Map-Servers. Once the ETR registers with the Map-Server(s), the Map-Server(s) will begin to advertise the EID-prefix block(s) and RLOC(s) for the LISP site.

The password used for the SHA-1 HMAC may be entered in unencrypted (cleartext) form or encrypted form. To enter an unencrypted password, specify a *key-type* value of 0. To enter an AES encrypted password, specify a *key-type* value of 6.

⚠️

Caution Authentication keys entered in cleartext form will remain in cleartext form and be displayed in the configuration in cleartext form unless the Cisco IOS Encrypted Preshared Key feature is enabled. The Encrypted Preshared Key feature allows you to securely store plain text passwords in type 6 (AES) encryption format in NVRAM. To enable this functionality, use the following commands:

```
key config-key password-encrypt <password>
password encryption aes
```

For additional information on the Encrypted Preshared Key feature and its usage see:
http://www.cisco.com/en/US/tech/tk583/tk372/technologies_configuration_example09186a00801f2336.shtml

⚠️

Caution When the Encrypted Preshared Key feature is enabled and then removed, for security reasons all type 6 encrypted keys will immediately become unusable. This is a result of deleting the master key, which renders all currently configured keys in the router configuration useless (a warning message displays that details this and confirms the master key deletion). Since the master key no longer exists, the type 6 passwords cannot be unencrypted and used by the router.

✎

Note The Map-Server must be pre-configured with IPv4 or IPv6 EID prefixes that match the IPv4 or IPv6 EID-prefixes configured on this ETR using the **database-mapping** command, as well as a password matching the one provided with the **key** keyword on this ETR.

When the command keyword **proxy-reply** form of the command is used, the ETR indicates to the Map-Server via a Map-Register message that the Map-Server should send Map-Replies on behalf of the site. The Map-Server will send non-authoritative Map-Replies for all the EID-prefixes contained in the Map-Register message. On the Map-Server, the **show lisp site** command indicates whether proxy-reply is enabled or not.

✎

Note The proxy-reply functionality is particularly useful for supporting the LISP VM-Mobility capabilities. LISP VM-mobility functionality is currently available in NX-OS based LISP platforms. (See LISP VM-Mobility Configuration Commands in NX-OS LISP Command Reference document).

Note The command **ipv4 itr map-resolver** need not be configured when the locator address used in the command **ipv4 etr map-server** is the same as the locator for the Map-Resolver. This allows for the minimum LISP configuration on an IOS xTR of:

```
router lisp
 ipv4 itr
 ipv4 etr
 database-mapping ....
 ipv4 etr map-server ...
```

The output of the command **show ip lisp** indicates whether the Map-Server locator is also used as a Map-Resolver locator.

Examples

The following example configures the ETR to register to two Map-Servers, one with the locator 10.1.1.1 and another with the locator 172.16.1.7.

```
Router(config-router-lisp)# ipv4 etr map-server 10.1.1.1 key 0 s3cr3t-k3y
Router(config-router-lisp)# ipv4 etr map-server 172.16.1.7 key 0 s3cr3t-k3y
```

The following example configures the ETR to register to the Map-Server with the locator 10.1.1.1 and requests that the Map-Server proxy-reply for the site.

```
Router(config-router-lisp)# ipv4 etr map-server 10.1.1.1 key 0 p433w0rd
Router(config-router-lisp)# ipv4 etr map-server 10.1.1.1 proxy-reply
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR)
ipv4 itr map-resolver	Configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv4 Map-Request messages
site	Configure a LISP site and enter site configuration mode on a Map-Server

ipv4 itr

To configure a router to act as an IPv4 LISP Ingress Tunnel Router (ITR), use the **ipv4 itr** command in LISP configuration mode. To remove LISP ITR functionality, use the **no** form of this command.

[no] ipv4 itr

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide ITR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv4 LISP Ingress Tunnel Router (ITR) functionality.

When a router is configured as an ITR, it must decide how to handle the packets it receives. If the source address of the packet matches an IPv4 EID-prefix block configured using the **database-mapping** command or **map-cache** command, then the packet is considered a candidates for LISP encapsulation. The ITR then looks in the FIB and forwards the packet according to information contained there based on the following:

- Natively forward the packet for any non-LISP destination (as covered by a non-LISP routing entry or LISP negative map-cache entry)
- Drop the packet (as covered by a map-cache entry with "drop" attribute)
- LISP-encapsulate the packet to another LISP site (as covered by a valid map-cache entry)
- LISP encapsulate the packet to a configured PETR (as covered by the **ipv4 use-petr** command)
- Send a Map-Request for the EID prefix (when no covering map-cache entry exits)

If the source of the packet does not match a configured IPv4 EID-prefix, normal forwarding procedures are followed.

Note It is common for a device configured as an ITR to also be configured as an ETR. However, the LISP architecture does not require this and the functionality can occur in a different device. It should be noted that, as described above, in order for a packet to be considered as candidate for LISP encapsulation, it must match a **database-mapping** entry. The **database-mapping** command is normally associated with the functionality of an ETR. When a device is configured as an ITR only, it is required that suitable **database-mapping** entries be configured to permit the ITR to satisfy the source EID check for LISP encapsulation. Note also that these **database-mapping** entries are also required on a separately configured ETR for LISP site registration and Map-Reply purposes.

The ITR may use one of two methods to send a Map-Request to obtain an IPv4 EID-to-RLOC mapping:

- When a Map-Resolver is configured via the **ipv4 itr map-resolve**r command, the ITR will send its Map-Request in a LISP Encapsulated Control Message (ECM) to the Map-Resolver.
- When the ITR is directly attached to the ALT using the **ipv4 alt-vrf** command, the ITR will send its Map-Request directly on the alternate LISP Alternate Logical Topology (ALT).

The ITR caches the resultant IPv4 EID-to-RLOC mapping information returned by the associated Map-Reply in its map-cache. Subsequent packets destined to the same IPv4 EID-prefix block are then LISP-encapsulated according to this IPv4 EID-to-RLOC mapping entry.

Note When instance-id's are used to support LISP virtualization, an ITR must be configured to use a Map-Resolver (MR) (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. It **must not** be configured to directly attach to the ALT using the **ipv4 alt-vrf** command.

Note It is common for a device configured as an ITR to also be configured as an ETR. However, the LISP architecture does not require this and the functionality can occur in a different device.

Examples

The following example configures IPv4 LISP ITR functionality on the router.

```
Router(config-router-lisp)# ipv4 itr
```

Related Commands

Command	Description
ipv4 alt-vrf	Configures which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 itr map-resolver	Configured the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv4 Map-Request messages
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.

ipv4 itr map-resolver

To configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to be used by the ITR when sending Map-Requests for IPv4 EID-to-RLOC mapping resolution, use the **ipv4 itr map-resolver** command in LISP configuration mode. To remove the configured locator address of the LISP Map-Resolver, use the **no** form of this command.

> **[no] ipv4 itr map-resolver** *map-resolver-address*

Syntax Description

map-resolver-address	Specifies the IPv4 or IPv6 locator addresses of the Map-Resolver.

Defaults

No LISP Map-Resolver locator address is configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB3	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

This command configures the locator to be used by a LISP ITR to reach the configured Map-Resolver when sending a map request for IPv4 EID-to-RLOC mapping resolution. Up to two Map-Resolvers can be configured per ITR within a site.

When a LISP ITR needs to resolve an IPv4 EID-to-RLOC mapping for a destination EID, it can be configured to send a map request message either to a Map Resolver configured using the **ipv4 itr map-resolver** command, or directly over the LISP ALT using the **ipv4 alt-vrf** command. When a Map Resolver is used, map requests are sent to the Map Resolver with the additional LISP Encapsulated Control Message (ECM) header that includes the Map Resolver RLOC as its destination address. When the ALT is used, map requests sent directly over the ALT without the additional LISP Encapsulated Control Message (ECM) header, where the destination of the map request is the EID being queried.

✎

Note The command **ipv4 itr map-resolver** need not be configured when the locator address used in the command **ipv4 etr map-server** is the same as the locator for the Map-Resolver. This allows for the minimum LISP configuration on an IOS xTR of:

```
router lisp
 ipv4 itr
 ipv4 etr
 database-mapping ....
 ipv4 etr map-server ...
```

The output of the command **show ip lisp** indicates whether the Map-Server locator is also used as a Map-Resolver locator.

Examples

The following example configures an ITR to use the Map-Resolver located at 10.1.1.1 when sending its Map-Request messages.

```
Router(config-router-lisp)# ipv4 itr map-resolver 10.1.1.1
```

Related Commands

Command	Description
ipv4 alt-vrf	Configures which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv4 map-request-source	Configure the source IPv4 or IPv6 address to be used in IPv4 LISP Map-Request messages.

ipv4 map-cache-limit

To configure the maximum number of IPv4 LISP map-cache entries allowed to be stored by the router, use the **ipv4 map-cache-limit** command in LISP configuration mode. To remove the configured map-cache limit, use the **no** form of this command.

    [no] ipv4 map-cache-limit *cache-limit* [**reserve-list** *list*]

Syntax Description

cache-limit	The maximum number of IPv4 LISP map-cache entries allowed to be stored on the router. The valid range is from 0 to 10000.
reserve-list *list*	(Optional) Specifies a set of IPv4 EID-prefixes in the referenced prefix-list for which dynamic map-cache entries shall always be stored.

Defaults

The default map-cache limit is 1000 entries.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to limit the maximum number of IPv4 LISP map-cache entries allowed on this router. The optional **reserve-list** can be configured to guarantee that the referenced IPv4 EID-prefixes as always stored.

LISP map-cache entries are added in one of two ways – dynamically or statically. Dynamic entries are added when a valid Map-Reply message is returned for a Map-Request message generated in response to a cache-miss lookup. Static IPV4 entries are added via the **ipv4 map-cache** command. Whether a new map-cache entry is stored depends on the following conditions.

- Dynamic map-cache entries are always added until the default or configured cache-limit is reached. After the default or configured cache-limit is reached, unless the optional **reserve-list** is configured, no further dynamic entries are added and no further Map-Requests are generated in response to cache-miss lookups until a free position is available. Existing dynamic IPv4 map-cache entries can time-out due to inactivity or can be removed by the administrator via the **clear ip lisp map-cache** command to create a free position in the map-cache. When the optional reserve-list is configured, a Map-Request will be generated and a new dynamic map-cache entry will be added for IPv4 EID-prefixes found in the prefix-list referenced by the **reserve-list** keyword. In this case, a new entry will replace an existing dynamic entry such that the cache-limit is maintained. The dynamic entry deleted will be either a non-reserve idle map-cache entry, non-reserve active map-cache entry, reserve idle map-cache entry, or reserve active map-cache entry – in that order, whichever is available first for deletion. Idle map-cache entries are those that have seen no activity in the last 10 minutes.
- Static map-cache entries are always added, even if the addition of the static entry exceeds the default or configured cache-limit. If the current map-cache contains dynamic entries, the addition of a new static entry will replace an existing dynamic entry such that the cache-limit is maintained. The dynamic entry deleted will be either a non-reserve idle map-cache entry, non-reserve active map-cache entry, reserve idle map-cache entry, or reserve active map-cache entry – in that order, whichever is available first for deletion. Idle map-cache entries are those that have seen no activity in the last 10 minutes.

⚠
Caution Static map-cache entries count against the default or configured cache-limit. Since static entries are always added, static entries can be added up to and beyond the default or configured cache limit. If the number of static entries configured exceeds the default or configured cache-limit, no dynamic entries can be added.

✎
Note When the **reserve-list** command is used, be sure that the prefix-list includes all entries that you expect to receive a Map-Reply for, including the more-specifics. This can be ensured by appending "le 32" to the end of all prefix-list entries for IPv4 prefixes. For example, if you want to match on any more specifics to 172.16.0.0/16, you specify **ip prefix-list lisp-list seq 5 permit 172.16.0.0/16 le 32** in order to cover all replies within this range.

✎
Note The command **show ip lisp map-cache detail** provides additional details about EID-to-RLOC mapping entries stored in the LISP map-cache, including whether the prefix is covered by the reserve-list prefix list.

Examples

The following example configures a lisp cache-limit of 2000 entries and a reserve-list referencing the IPv4 prefix-list LISP-v4-always.

```
Router(config)# ip prefix-list LISP-v4-always seq 10 permit 172.16.0.0/16 le 32
Router(config)# router lisp
Router(config-router-lisp)# ipv4 map-cache-limit 2000 reserve-list LISP-v4-always
```

Related Commands

Command	Description
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
clear ip lisp map-cache	Clear the LISP IPv4 map-cache on the local router.

ipv4 map-cache-persistent

To configure how often, in minutes, that an ITR should save its dynamically learned map-cache entries to a file in flash, use the **ipv4 map-cache-persistent** command in LISP configuration mode. Use the **default ipv4 map-cache-persistent** form of the command to return to the default setting if the map-cache persistence value is changed. To disable the map-cache persistence feature, use the **no** form of this command.

> **[no] ipv4 map-cache-persistent** {**interval** *interval*}
>
> **default ipv4 map-cache-persistent**

Syntax Description

interval *interval*	Specifies how often, in minutes, the ITR should save its dynamically learned map-cache entries to a file in flash memory, (Default 60 minutes, range 1-1440 minutes).

Defaults

By default, map-cache persistence is enabled with a default time of 60 minutes.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

An ITR forwards LISP packets based on EID-to-RLOC mapping policy data obtained from destination ETRs and stored in its local map-cache. When the map-cache does not contain an entry for the destination prefix, the map-resolution process is executed in order to build the map-cache entry. Even though this process takes a small amount of time, upon router reload it may be undesirable to wait for data-driven events to cause map-cache entries to be built.

The LISP map-cache persistence feature periodically stores dynamically learned remote EID map-cache entries to a file located in flash. When the router reloads, it checks for these files and uses the list of remote EIDs to prime the map-cache after reboot. Overall this ensure that the packet loss after an xTR comes up is minimal, as data-driven triggers are not required to re-populate the map-cache for previously active EID prefixes.

Note The remote EID prefixes listed in the stored file are used to trigger map-requests. The map-replies that return based on these map-requests are what prime the map-cache. In this way, the map-cache is ensured of containing fresh information upon reload.

Use the **ipv4 map-cache-persistent** command to control how often, in minutes, that the ITR or PITR should save dynamically learned IPv4 map-cache entries to a file in flash. By default, map-cache persistence is enabled and with a default time of 10 minutes. Use the **no** form of the command to disable LISP map-cache persistence. If the default value is changed, use the **default ipv4 map-cache-persistent** form of the command to return to the default setting,

Note Use **show run | include persistent** to show the current state of this feature. When this command returns nothing, map-cache persistence is enabled and set to the default value. Other output results are self-explanatory.

Examples

The following example configures the lisp map-cache persistence feature to save dynamically learned EID prefixes to file every 30 minutes.

```
Router(config-router-lisp)# ipv4 map-cache-persistent interval 30
```

Related Commands

Command	Description
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
clear ip lisp map-cache	Clear the LISP IPv4 map-cache on the local router.

---

ipv4 map-request-source

To configure an IPv4 or IPv6 address to be used as the source address for LISP IPv4 Map-Request messages, use the **ipv4 map-request-source** command in LISP configuration mode. To remove the configured Map-Request source address, use the **no** form of this command.

[no] ipv4 map-request-source *source-address*

Syntax Description

source-address	The IPv4 or IPv6 source address to be used in LISP IPv4 Map-Request messages.

Defaults

The router uses one of the locator addresses configured in the **database-mapping** command as the default source address for LISP Map-Request messages.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv4 map-request-source** command to configure the IPv4 or IPv6 source address to be used by the ITR for LISP IPv4 Map-Request messages. Typically, the address of the egress physical interface is used as the source address in the Encapsulated Control Message (ECM) header for LISP IPv4 Map-Request messages sent to a configured Map-Resolver. There may be cases where it is desirable to configure the specified source address for these Map-Request messages. For example, a site may have an access control policy upstream that requires all packets that egress the site to come from a particular source address. The **ipv4 map-request-source** command can be used to specify this address for Map-Request messages.

Examples

The following example configures an ITR to use the source IP address 172.16.1.7 in its IPv4 Map-Request messages.

```
Router(config-router-lisp)# ipv4 map-request-source 172.16.1.7
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ip lisp source-locator	Configures a source locator to be used for IPv4 LISP encapsulated packets.

ipv4 map-resolver

To configure a router to act as an IPv4 LISP Map-Resolver (MR), use the **ipv4 map-resolver** command in LISP configuration mode. To remove LISP Map-Resolver functionality, use the **no** form of this command.

> **[no] ipv4 map-resolver**

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide Map-Resolver functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv4 LISP Map-Resolver (MR) functionality. An MR is deployed as a LISP Infrastructure component.

A MR receives a LISP Encapsulated Control Message (ECM) containing a Map-Request from a LISP ITR directly over the locator-based network. The MR decapsulates this message and forwards it over the LISP-ALT, where it is then delivered either to the Map-Server that is injecting EID-prefixes into the LISP ALT on behalf of the authoritative ETR, or to the ETR that is authoritative for the EID being queried by the Map-Request and that is directly connected to the LISP ALT. An MR will also send a Negative Map-Reply message directly back to an ITR in response to a query for non-LISP address, also in LISP ECM format.

When deploying a LISP MR, the following guidelines may be helpful in its configuration:

- A LISP MR must be directly attached to the ALT and use the **ipv4 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv4 EID-to-RLOC mapping resolution. In this case, an MR forwards Map-Requests over the ALT to the MS that is authoritative for the requested EID.

- When an MR is configured concurrently with a Map-Server (MS) as a stand-alone MR/MS, the **ipv4 alt-vrf** command is not required since the MR/MS is not connected to an ALT due to its full knowledge of the LISP Mapping System (as in the case of a private LISP deployment for example). In this case, the MR resolves IPv4 EID-to-RLOC mappings internally with its concurrently configured MS.

- When an MR supports a LISP deployment that is configured for virtualization (i.e. when instance-id's are used), the MR **must be** concurrently configured in a stand-alone manner with an MS that sees registrations from all ETRs in the LISP network in order to properly resolve Map-Requests. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv4 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MR/MS device configured for virtualization **must not** use the **ipv4 alt-vrf** command.

Examples

The following example configures IPv4 LISP Map-Resolver functionality on the router.

```
Router(config-router-lisp)# ipv4 map-resolver
```

Related Commands

Command	Description
ipv4 alt-vrf	Configure which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.

---

ipv4 map-server

To configure a router to act as an IPv4 LISP Map-Server (MS), use the **ipv4 map-server** command in LISP configuration mode. To remove LISP Map-Server functionality, use the **no** form of this command.

[no] ipv4 map-server

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide Map-Server functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB3	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv4 LISP Map-Server (MS) functionality. An MS is deployed as a LISP Infrastructure component. A LISP site is configured on the MS and the ETR(s) within the site registers to it. The LISP site includes an authentication key that must match the one also configured on the ETR(s) of the site. An MS receives Map-Register control packets from site ETR(s). When the MS is configured with a service interface to the LISP ALT, it injects aggregates for the registered EID prefixes into the ALT.

When deploying a LISP MS, the following guidelines may be helpful in its configuration:

- A LISP MS must be directly attached to the ALT using the **ipv4 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each

only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv4 EID-to-RLOC mapping resolution. In this case, an MS receives Map-Request control packets from the 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.

- When an MS is configured concurrently with a Map-Resolver (MR) as a stand-alone MS/MR, the **ipv4 alt-vrf** command is not required since the MS/MR is not connected to an ALT due to its full knowledge of the LISP Mapping System (as in the case of a private LISP deployment for example). In this case, the MR resolves IPv4 EID-to-RLOC mappings internally with its concurrently configured MS.

- When an MS supports a LISP deployment that is configured for virtualization (i.e. when instance-id's are used), the MS **must be** concurrently configured in a stand-alone manner with an MR and see registrations from all ETRs in the LISP network in order to properly resolve Map-Requests. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv4 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MS/MR device configured for virtualization **must not** use the **ipv4 alt-vrf** command.

Examples

The following example configures IPv4 LISP Map-Server functionality on the router.

```
Router(config-router-lisp)# ipv4 map-server
```

Related Commands

Command	Description
Ipv4 alt-vrf	Configure which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.

---

ipv4 path-mtu-discovery

To configure the upper and/or lower bounds to be considered by IPv4 path MTU discovery (PMTUD), use the **ipv4 path-mtu-discovery** command including parameters in LISP configuration mode. To return the IPv4 PMTUD parameters to their default settings, use the **ipv4 path-mtu-discovery** form of the command without additional parameters. To disable the use of IPv4 PMTUD by LISP, use the **no** form of this command

> **[no] ipv4 path-mtu-discovery** {**min** *lower-bound* | **max** *upper-bound* }

Syntax Description

min *lower-bound*	(Optional) Lower bound on path MTU accepted. Valid range is 68 to 65535 bytes.
max *upper-bound*	(Optional) Upper bound on path MTU accepted. Valid range is 68 to 65535 bytes.

Defaults

By default, LISP participates in IPv4 PMTUD and LISP is capable of adjusting the MTU used LISP on a per-destination locator basis. The default minimum and maximum MTU boundaries are 576 bytes and 65535 bytes respectively.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

By default, IPv4 Path MTU Discovery (PMTUD) is enabled for LISP. When IPv4 PMTUD is enabled, all LISP packets are sent with DF=1 in the outer IP header, and incoming IPv4 ICMP Type 3 Code 4 ("Destination Unreachable, Fragmentation Needed and Don't Fragment was Set") messages are processed and maintained by LISP on a per-destination locator basis. The MTU setting for a destination locator will be updated according to the ICMP message as long as the requested new MTU is lower than the existing MTU but is still within the configured **min** and **max** MTU boundaries.

IPv4 PMTUD can be disabled for LISP using the command **no ipv4 path-mtu-discovery** in global configuration mode. When IPv4 PMTUD is disabled, all LISP packets are sent with DF=0 in the outer IP header and LISP does not process incoming ICMP Type 3 Code 4 messages. Disabling IPv4 PMTUD for LISP is not recommended. To re-enable IPv4 PMTUD, use the command **ipv4 path-mtu-discovery** in global configuration mode without any additional parameters.

Examples

The following example modifies PMTUD for LISP to only accept ICMP Type 3 Code 4 messages requesting an MTU of a minimum of 1200 bytes (the maximum of 65535 bytes remains unchanged).

```
Router(config-router-lisp)# ipv4 path-mtu-discovery min 1200
```

Related Commands

Command	Description
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)

---

ipv4 proxy-etr

To configure a router to act as an IPv4 LISP Proxy Egress Tunnel Router (PETR), use the **ipv4 proxy-etr** command in LISP configuration mode. To remove LISP PETR functionality, use the **no** form of this command.

    [no] ipv4 proxy-etr

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide PETR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv4 LISP Proxy Egress Tunnel Router (PETR) functionality on the router. PETR functionality is a special case of ETR functionality where the router accepts LISP-encapsulated packets from an ITR or PITR that are destined to non-LISP sites, de-encapsulates them, and then forwards them natively toward the non-LISP destination.

PETR services may be necessary in several cases.

1. By default when a LISP sites forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of a site EID(s). When the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) it may consider these packets to be spoofed and drop them since EIDs are not advertised in the provider core network. In this case, instead of natively forwarding packets destined to non-LISP sites, the ITR encapsulates these packets using its site locator(s) as the source address and the PETR as the destination address. (Note that packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR as normal.)

2. When a LISP IPv6 (EID) site wishes to talk to a non-LISP IPv6 site and some portion of the intermediate network does not support IPv6 (it is IPv4 only), the PETR can be used to "hop over" the address family incompatibility, assuming that the PETR has both IPv4 and IPv6 connectivity. The ITR in this case can LISP-encapsulate the IPv6 EIDs with IPv4 locators destined for the PETR, which de-encapsulates the packets and forwards them natively to the non-LISP IPv6 site over its IPv6 connection. In this case, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv4 portion of network using the LISP mixed protocol encapsulation support.

> **Note** An IOS/IOS XE router can be configured to perform ETR and PETR functions at the same time. A router that is configured as an ETR performs a check to verify that the LISP packet inner header destination address is within the address range of a local EID prefix, whereas a router configured as a PETR does not perform this check.

> **Note** When an ITR or PITR requires the use of IPv4 PETR services, the ITR or PITR must be configured to forward IPv4 EID packets to the PETR using the **ipv4 use-petr** command.

Examples

The following example configures IPv4 LISP PETR functionality on the router.

```
Router(config-router-lisp)# ipv4 proxy-etr
```

Related Commands

Command	Description
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR)
ipv4 use-petr	Configures an ITR or PITR to use the PETR for traffic destined to non-LISP IPv4 destinations.

ipv4 proxy-itr

To configure a router to act as an IPv4 LISP Proxy Ingress Tunnel Router (PITR), use the **ipv4 proxy-itr** command in LISP configuration mode. To remove LISP PITR functionality, use the **no** form of this command.

> **[no] ipv4 proxy-itr** *ipv4-local-locator* [*ipv6-local-locator*]

Syntax Description

ipv4-local-locator	The IPv4 locator address used as a source address for encapsulation of data packets, a Data Probe, or a Map-Request message.

ipv6-local-locator	(Optional) The IPv6 locator address used to as a source address for encapsulation of data packets, a Data Probe, or a Map-Request message when the locator-hash function returns a destination RLOC in the IPv6 address-family.

Defaults

By default, the router does not provide PITR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv4 LISP Proxy Ingress Tunnel Router (PITR) functionality on the router. PITR functionality is a special case of ITR functionality where the router receives native packets from non-LISP sites (for example, the Internet) that are destined for LISP sites, and encapsulates them to the destination LISP site.

PITR services are required to provide interconnectivity between non-LISP sites and LISP sites. For example, when connected to the Internet, a PITR acts as a gateway between the legacy Internet and the LISP enabled network. To accomplish this, the PITR must advertise one or more highly aggregated EID prefixes on behalf of LISP sites into the underlying DFZ (i.e. Internet) in order to attract packets destined to LISP EIDs. The PITR then acts like an ITR for traffic received from the public Internet. The main difference between the PITR and ITR functionality is that an ITR is expected to encapsulate only packets originated from its configured ISP EIDs that are destined to LISP sites. A PITR on the other hand is expected to encapsulate packets originating from non-LISP sites that are destined to LISP sites.

PITR services are enabled using the **ipv4 proxy-itr** command. When PITR services are enabled, the device must be able to obtain EID-to-RLOC mappings in order to LISP encapsulate packets to LISP sites. A PITR can be configured either as an ALT-connected device, for which it can therefore directly determine whether a destination is a LISP EID or a non-LISP destination, or as a non-ALT-connected device, in which case it must be configured to use a Map-Resolver (in the same way that an ITR uses a Map-Resolver) to obtain EID-to-RLOC mappings and build a map-cache.

When deploying a LISP PITR, the following guidelines may be helpful in its configuration:

- A LISP PITR device can be directly attached to the ALT using the **ipv4 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. In this case, the PITR will send a Map-Request directly on the LISP ALT in order to obtain IPv4 EID-to-RLOC mappings.

- Beginning with Release 15.1(4)XB4, a PITR can be configured as a non-ALT-connected device which sends a Map-Request to a configured Map-Resolver (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. Prior to this release, PITRs were required to be LISP ALT connected as they could only forward Map-Requests directly over the LISP ALT for EID-to-RLOC mapping resolution.

  ✎

  Note When a device is configured as a non-ALT-connected PITR, it must also be configured with information defining the extent of the LISP EID space it is proxying for. This can be done using either static **map-cache** entries incorporating the **map-request** keyword, or by importing RIB routes using the **ipv4 route-import** command. The use of either method provides information to the non-

ALT-connected PITR that allows it to send Map-Requests for destinations in order to determine their IPv4 EID-to-RLOC mappings, or negative-mapping results.

- A PITR may also be concurrently configured on the same device as a stand-alone MR/MS device, simplifying the overall LISP architecture. When a device is concurrently configured as an MS/MR/PITR, the use of the **ipv4 alt-vrf** command is **required**, even when the stand-alone MS/MR/PITR is not connected to an ALT as this is used to support IPv4 EID-to-RLOC mapping resolutions by the PITR.

The PITR LISP-encapsulated packets when it sends a data packet to a LISP site. The outer (LISP encapsulation) header address-family and source address are determined as follows:

- When the locator-hash function returns a destination RLOC within the IPv4 address-family, the address *ipv4-local-locator* is used as the source address from the locator namespace, and
- When the locator-hash function returns a destination RLOC within the IPv6 address-family (assuming an optional address *ipv6-local-locator* is configured), it will be used as a source locator for encapsulation.

The LISP ALT does not currently support virtualization. Therefore, when LISP virtualization is configured, the LISP architecture must be deployed so that an ALT infrastructure is not required. The following guidelines may be helpful when configuring PITR virtualization:

- When a LISP PITR is configured to support LISP virtualization, it must be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv4 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. It must not be configured to send a Map-Request directly over the LISP ALT. The LISP ALT does not currently support virtualization.

✎

Note An IOS router cannot be configured to perform ITR and PITR functions at the same time. It must be configured for one or the other purpose. A router that is configured as an ITR performs a check to verify that the source of any packet intended for LISP encapsulation is within the address range of a local EID prefix, whereas a router configured as a PITR does not perform this check. If a router is configured as an ITR using the **ipv4 itr** command and an attempt is made to also configure PITR functionality, an error indicating that ITR functionality must first be disabled will be returned.

Examples

The following example configures a router to act as a PITR, with encapsulation using an IPv4 source locator of 10.1.1.1 and an IPv6 source locator of 2001:db8:bb::1. In this example, the PITR is assumed to be ALT-connected (not shown).

```
Router(config-router-lisp)# ipv4 proxy-itr 10.1.1.1 2001:db8:bb::1
```

The following example configures a router to act as a PITR but without using the LISP ALT. In this example, the PITR is configured to use the MR with the locator 10.2.1.1, and to provide proxy-ITR services for the EID-prefix 192.168.0.0/16 with encapsulation using an IPv4 source locator of 10.1.1.1 and an IPv6 source locator of 2001:db8:bb::1.

```
Router(config)# router lisp
Router(config-router-lisp)# ipv4 proxy-itr 10.1.1.1 2001:db8:bb::1
Router(config-router-lisp)# ipv4 map-resolver 10.2.1.1
Router(config-router-lisp)# map-cache 192.168.0.0/16 map-request
Router(config-router-lisp)# exit
Router(config)# ip route 192.168.0.0 255.255.0.0 Null0
```

Related Commands

Command	Description
ipv4 alt-vrf	Configure which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv4 map-resolver	Configure the router to act as a LISP Map Resolver.
ipv4 route-import	Configure the IPv4 EID space to be considered as a candidate for LISP encapsulation on a PITR.

ipv4 route-import

To configure dynamic proxying of IPv4 LISP EID space by a Proxy ITR, use the **ipv4 route-import** command in LISP configuration mode. To remove dynamic proxying for IPv4 LISP EID space, use the **no** form of this command.

[no] ipv4 route-import {map-cache {bgp *bgp-as* | static} [route-map *route-map-name*]

[no] ipv4 route-import maximum-prefix *max-limit threshold* [warning-only]

Syntax Description

map-cache	Specifies that IPv4 prefixes in the URIB should be used to define EID address space in the map-cache.
bgp *bgp-as*	Specifies that IPv4 prefixes known via BGP AS *bgp-as* should be imported to define EID address space in the map-cache.
static	Specifies that IPv4 prefixes known via static routes should be imported to define EID address space in the map-cache.
route-map *route-map-name*	(Optional) Specifies that imported IPv4 prefixes should be filtered according to the route-map named *route-map-name*.
maximum-prefix	Specifies that the maximum number of IPv4 prefixes that can be imported to define EID address space in the map-cache is going to be defined.
max-limit	Specifies the maximum number of IPv4 prefixes that can be imported to define EID address space in the map-cache.
threshold	Specifies the threshold value (in percent) at which to generate a warning message while importing IPv4 prefixes.
warning-only	(Optional) Specifies that only a warning message is given and entries are not limited.

Defaults

IPv4 route-import is not configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

When a device is configured as a non-ALT-connected PITR, it must be informed about the extent of the IPv4 LISP EID space for which it is proxying. A PITR requires this information to: (1) advertise these LISP EID prefixes into the underlying default-free-zone (DFZ), such as the Internet, in order to attract non-LISP sourced packets to itself for proxying to LISP sites, and (2) to provide a means for signaling the LISP control plane process (Map-Request generation) for populating the PITR IPv4 LISP map cache when it receives traffic. Advertising IPv4 prefixes into the DFZ is typically accomplished with standard BGP mechanisms. However, when a PITR is configured to use a Map-Resolver (that is, it is not ALT-connected), the PITR must be informed of the LISP EID space for which it is proxying. The **ipv4 route-import** command is used as a simple mechanism for a non-ALT-connected PITR to define the extent of IPv4 LISP EID space on a PITR to drive the LISP control plane by taking advantage of the existing RIB infrastructure. (Prior to the **ipv4 route-import** command, static **map-cache** entries with the **map-request** keyword were required in order to drive the LISP control plane.)

The extent of the IPv4 LISP EID space can be configured using the **ipv4 route-import** command. Using **ipv4 route-import** provides simple method for the non-ALT-connected PITR to send Map-Requests for destinations in order to determine their IPv4 EID-to-RLOC mappings, or negative-mapping results. The feature **ipv4 route-import map-cache** can be configured using the **bgp** *bgp-as* or **static** commands, or both, to import all appropriate EID prefixes. In both cases, an optional **route-map** can be added to provide filtering to selective import appropriate EID prefixes.

> **Note** For IPv4 BGP routes, the route-map can match on any useful criteria such as community, tag, or local preference. Also note that if **ipv4 route-import map-cache** is configured to use BGP and then BGP is removed (**no router bgp** *AS*), the corresponding **ipv4 route-import map-cache bgp** configuration is not automatically removed.

The feature **ipv4 route-import map-cache** can also be configured using the optional **maximum-prefix** keyword to provide a mechanism for placing an upper limit on the total number of prefixes that can be imported, regardless of the source (BGP or static). The **warning-only** keyword permits all prefixes to be imported, but alerts the user when the threshold is exceeded.

> **Note** See the **clear ip lisp route-import** command for guidance on initiating a re-import of prefixes covered by the **ipv4 route-import map-cache** command.

Examples

The following example configures a PITR to import IPv4 static routes representing EID prefixes to be used for signaling the LISP control plane to send a Map-Request for EID-to-RLOC mapping resolution. A route-map called static-lisp is also configured to filter on static routes only matching the tag 123. The resultant imported static routes are then shown using the **show ip lisp route** command.

```
PITR(config)# route-map static-lisp permit 10
PITR(config-route-map)# match tag 123
PITR(config-route-map)# exit
PITR(config)# ip route 10.0.1.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.2.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.3.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.4.0 255.255.255.0 null0 tag 456
PITR(config)# route lisp
PITR(config-router-lisp)# eid-table default instance-id 0
PITR(config-router-lisp-eid-table)# ipv4 route-import map-cache static route-map static-lisp
PITR(config-router-lisp-eid-table)# Ctrl-Z
PITR#
PITR# show ip lisp route
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 3
Prefix                    Uptime     Source  Map-cache    State
10.0.1.0/24               00:05:31   static  installed
10.0.2.0/24               00:05:31   static  installed
10.0.3.0/24               00:05:31   static  installed
PITR#
```

Related Commands

Command	Description
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
show ip route-import	Display all the routes that have been picked up from the RIB for import.
clear ip route-import	Clear the table and force a re-evaluation of all imported routes.

ipv4 solicit-map-request ignore

To configure an ITR to ignore an IPv4 Map-Request message that has the solicit-map-request (SMR) bit set, use the **ipv4 solicit-map-request ignore** command in LISP configuration mode. To remove this functionality, use the **no** form of this command.

[no] ipv4 solicit-map-request ignore

Syntax Description

This command has no arguments or keywords.

Defaults

A LISP ITR will respond to an IPv4 Map-Request message that has the solicit-map-request (SMR) bit set when it has an existing IPv4 map-cache entry for the EID in the SMR map-request.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB4	The syntax of this command was added.

Usage Guidelines

When a change occurs on an ETR for some attribute of an IPv4 EID prefix configured using the **database-mapping** command, such as an associated RLOC, priority, or weight, the ETR will automatically attempt to inform all LISP sites with which it has recently been communicating of this change. It does this by sending a Map-Request with the Solicit-Map-Request (SMR) bit in the header set (on), to the RLOC addresses of the other xTRs with which it has recently been communicating. It obtains these RLOCs by reviewing its own IPv4 LISP map-cache, which contains these entries for the most recent conversations. When an xTR receives this SMR Map-Request message, by default it will respond to this message by sending a new Map-Request message with the SMR bit cleared, through the Mapping System (i.e. via the configured Map-Resolver), to get an up-to-date mapping for the EID indicated in the SMR Map-Request. Once the Map-Reply is received for this new Map-Request, the xTR will have an updated cache entry representing the changed state of the ETR that initially sent the SMR Map-Request (as will all other xTRs that completed the SMR Map-Request process).

By default, an xTR processes and responds to Map-Request message that has the SMR bit set. The **ipv4 solicit-map-request ignore** command can be used to disable this behavior. When this command is entered, an xTR will ignore all Map-Request messages that have the SMR bit set. To restore SMR Map-Request handling capabilities, use the **no ipv4 solicit-map-request ignore** command.

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Note A LISP ITR will only respond to an SMR Map-Request when it has an existing IPv4 map-cache entry for the EID in the SMR Map-Request. If it does not have an entry, the SMR Map-Request is ignored.

Examples

The following example configures the xTR to ignore Map-Request messages that have the SMR bit set.

```
Router(config-router-lisp)# ipv4 solicit-map-request ignore
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR).
Ipv4 itr	Configures the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)..

---

ipv4 use-petr

To configure an ITR or PITR to use an IPv4 LISP Proxy Egress Tunnel Router (PETR), use the **ipv4 use-petr** command in LISP configuration mode. To remove the use of a LISP PETR, use the **no** form of this command.

[no] ipv4 use-petr *locator-address* [**priority** *priority* **weight** *weight*]

Syntax Description

locator-address	IPv4 or IPv6 locator address of the PETR.
priority *priority*	(Optional) The priority (value between 0 and 255) assigned to this PETR. When multiple PETRs are specified, *priority* is used to determine load-sharing among PETR resources. A lower value indicates a higher priority.
weight *weight*	(Optional) The weight (value between 0 and 100) assigned to this PETR. When multiple PETRs are specified, *weight* is used to determine how to load-share traffic between multiple PETRs of identical priority. The value represents the percentage of traffic to be load-shared.

Defaults

By default, the router does not use PETR services.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.
15.1(4)XB5	This command was modified to add **priority** and **weight** keywords.

Usage Guidelines

Use the **ipv4 use-petr** command to enable an ITR or PITR to use IPv4 Proxy Egress Tunnel Router (PETR) services. When the use of PETR services is enabled, instead of natively forwarding LISP EID (source) packets destined to non-LISP sites, these packets are LISP-encapsulated and forwarded to the PETR. Upon receiving these packets, the PETR decapsulates them, and then forwards them natively toward the non-LISP destination. An ITR or PITR can be configured to use PETR services.

PETR services may be necessary in several cases.

1. By default when a LISP sites forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of an EID. When the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) or an anti-spoofing access list, it may consider these packets to be spoofed and drop them since EIDs are not advertised in the provider core network. In this case, instead of natively forwarding packets destined to non-LISP sites, the ITR encapsulates these packets using its site locator(s) as the source address and the PETR as the destination address.

> **Note** Note that the use of the **ipv4 use-petr** command does not change LISP-to-LISP or non-LISP-to-non-LISP forwarding behavior. LISP EID packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR as normal. Non-LISP-to-non-LISP packets are never candidates for LISP encapsulation and are always forwarded natively according to normal processes.

2. When a LISP IPv6 (EID) site wishes to talk to a non-LISP IPv6 site and the ITR locators or some portion of the intermediate network does not support IPv6 (it is IPv4 only), the PETR can be used to "hop over" the address family incompatibility, assuming that the PETR has both IPv4 and IPv6 connectivity. The ITR in this case can LISP-encapsulate the IPv6 EIDs with IPv4 locators destined for the PETR, which de-encapsulates the packets and forwards them natively to the non-LISP IPv6 site over its IPv6 connection. In this case, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv4 portion of network using the LISP mixed protocol encapsulation support.

> **Note** Because LISP supports mixed protocol encapsulations, the locator specified for the PETR in this case can either be an IPv4 or IPv6 address.

Up to eight (8) PETR locators can be entered per address family. When multiple entries are made, the packet forwarding behavior is as follows:

- When multiple PETRs are configured using the **ipv4 use-petr** command by itself (that is, without the optional **priority** and **weight** configurations), packets are sent to each PETR based on hash-based load sharing.

- When multiple PETRs are configured using the **ipv4 use-petr** command and including the optional **priority** and **weight** configurations, packets are sent to each PETR according the normal LISP priority and weight load sharing algorithms.

> ✎
>
> **Note** The use of the **ipv4 use-petr** command by itself (that is, without the optional **priority** and **weight** configurations) and with the optional **priority** and **weight** configurations at the same time is not permitted. Only one method may be used. If the **ipv4 use-petr** command is already configured without **priority** and **weight**, adding an additional PETR entry that includes **priority** and **weight**, is not permitted. All entries that do not include **priority** and **weight** must first be removed prior to adding any entries that include **priority** and **weight**.

Examples

The following example configures an ITR to use the PETR with the IPv4 locator of 10.1.1.1. In this case, LISP site IPv4 EIDs destined to non-LISP IPv4 sites will be encapsulated in an IPv4 LISP header destined to the PETR located at 10.1.1.1.

```
Router(config-router-lisp)# ipv4 use-petr 10.1.1.1
```

The following example configures an ITR to use two PETRs; one has an IPv4 locator of 10.1.1.1 and is configured as the primary PETR (priority 1 weight 100), and the other has an IPv4 locator of 10.1.2.1 and is configured as the secondary PETR (priority 2 weight 100). In this case, LISP site IPv4 EIDs destined to non-LISP IPv4 sites will be encapsulated in an IPv4 LISP header to the primary PETR located at 10.1.1.1 unless it fails, in which case the secondary will be used.

```
Router(config-router-lisp)# ipv4 use-petr 10.1.1.1 priority 1 weight 100
Router(config-router-lisp)# ipv4 use-petr 10.1.2.1 priority 2 weight 100
```

Related Commands

Command	Description
ipv4 proxy-etr	Configures the router to act as an IPv4 LISP Proxy Egress Tunnel Router (PETR)

---

ipv6 alt-vrf

To associate a virtual routing and forwarding (VRF) instance supporting the IPv6 address-family to LISP for use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the LISP-ALT, use the **ipv6 alt-vrf** command in LISP configuration mode. To remove this VRF reference, use the no form of the command.

   [no] ipv6 alt-vrf *vrf-name*

Syntax Description

vrf-name	Name assigned to the ALT VRF.

Defaults

By default, no IPv6 ALT VRF is referenced by LISP.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB3	The use of this command was modified.
2.5.1XC	The use of this command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv6 alt-vrf** command to configure which virtual routing and forwarding (VRF) instance supporting the IPv6 address-family that the LISP device should use for control plane mapping resolution functions.

The **ipv6 alt-vrf** command is required for any LISP device that is connected to the Alternate Logical Topology (ALT) for sending a Map-Request LISP control plane message for EID-to-RLOC mapping resolution. Primarily this includes LISP Map-Server (MS), Map-Resolver (MR), and Proxy Ingress Tunnel Router (PITR) devices. This can also include directly ALT-connected xTRs.

- A LISP ITR will typically use a configured Map-Resolver (MR) (configured via the **ipv6 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. In this case, the ITR will send a Map-Request in a LISP Encapsulated Control Message (ECM) to the MR. Alternatively, an ITR can be directly attached to the ALT using the **ipv6 alt-vrf** command. In this case, the ITR will send a Map-Request directly on the LISP ALT.

- A LISP Map-Resolver (MR) and Map-Server (MS) device must be directly attached to the ALT using the **ipv6 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv6 EID-to-RLOC mapping resolution. In this case, an MR forwards Map-Requests over the ALT to the MS that is authoritative for (advertising) the requested EID. However, when a device is configured as a stand-alone MS/MR (i.e. when it is not connected to any ALT and it has full knowledge of the LISP Mapping System, as in the case of a private LISP deployment for example), the use of the **ipv6 alt-vrf** command is not required. In this case, the MR resolves IPv6 EID-to-RLOC mappings internally with its concurrently configured MS.

- A LISP PITR device can be directly attached to the ALT using the **ipv6 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. In this case, the PITR will send a Map-Request directly on the LISP ALT in order to obtain IPv6 EID-to-RLOC mappings. Beginning with Release 15.1(4)XB4, a PITR can instead be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv6 itr map-resolve**r command) to obtain IPv6 EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. Prior to this release, PITRs were required to be LISP ALT connected as they could only forward Map-Requests directly over the LISP ALT for EID-to-RLOC mapping resolution.

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Note When the **ipv6 alt-vrf** command is used, the referenced VRF must already have been created using the **vrf definition** command. In addition, when the device is connected to the ALT (i.e not a stand-alone configuration), the corresponding tunnel mechanism (typically a GRE tunnel) and routing process (such as BGP, OSPF, or static routes) associated with the VRF must also be created.

The LISP ALT does not currently support virtualization. Therefore, when LISP virtualization is configured, the LISP architecture must be deployed so that an ALT infrastructure is not required. The following guidelines may be helpful in understanding the use of the **ipv6 alt-vrf** command when virtualization is configured:

- When instance-id's are used, a LISP ITR must be configured to use a configured Map-Resolver (MR) (configured via the **ipv6 itr map-resolve**r command) to obtain IPv4 EID-to-RLOC mappings. It **must not** be configured to directly attach to the ALT using the **ipv6 alt-vrf** command.

- Map-Resolver (MR) and Map-Server (MS) devices **must be** concurrently configured in a stand-alone manner and see registrations from all ETRs in the LISP network in order to properly resolve Map-Requests when instance-id's are used. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv4 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MR/MS device configured for virtualization **must not** use the **ipv6 alt-vrf** command.

- When a LISP PITR is configured to support LISP virtualization, it must be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv6 itr map-resolve**r command) to obtain IPv6

EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. The LISP ALT does not currently support virtualization.

Examples

The following example configures the VRF named 'lisp' and then configures LISP to use this VRF when resolving IPv6 EID-to-RLOC mappings.

```
Router(config)# vrf definition lisp
Router(config-vrf)# address-family ipv6
Router(config-vrf-af)# exit-address-family
Router(config-vrf)# exit
Router(config)# router lisp
Router(config-router-lisp)# ipv6 alt-vrf lisp
```

Related Commands

Command	Description
ipv6 itr map-resolver	Configured the locator address of the LISP Map-Resolver to which the ITR sends Map-Request messages
lpv6 etr map-server	Configure the IPv4 or IPv6 locator address of the LISP Map-Server to which the ETR registers.
ipv6 itr	Configure the router to act as a LISP Ingress Tunnel Router (ITR)
ipv6 pitr	Configures the router to act as a LISP Proxy Ingress Tunnel Router (PITR)

---

ipv6 etr

To configure a router to act as an IPv6 LISP Egress Tunnel Router (ETR), use the **ipv6 etr** command in LISP configuration mode. To remove LISP ETR functionality, use the **no** form of this command.

[no] ipv6 etr

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide ETR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv6 LISP Egress Tunnel Router (ETR) functionality on the router. When a router is configured as an IPv6 ETR, it is typically also configured with **database-mapping** commands so that the ETR knows what IPv4 or IPv6 EID-prefix blocks and corresponding locators are used for the LISP site. In addition, the ETR should be configured to register with a Map-Server with the **ipv6 etr map-server** command, or to use static LISP EID-to-RLOC mappings with the **map-cache** command in order to participate in LISP networking.

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Note It is common for a device configured as an ETR to also be configured as an ITR. However, the LISP architecture does not require this and ETR and ITR functionality can occur in different devices.

Examples

The following example configures IPv6 LISP ETR functionality on the router.

```
Router(config-router-lisp)# ipv6 etr
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.

Ipv6 etr accept-map-request-mapping

To configure an ETR to cache IPv6 mapping data contained in a Map-Request message, use the **ipv6 etr accept-map-request-mapping** command in LISP configuration mode. To remove this functionality, use the **no** form of this command.

> **[no] ipv6 etr accept-map-request-mapping** [**verify**]

Syntax Description

verify	(Optional) Specifies that mapping data should be cached but not used for forwarding packets until the ETR can send its own Map-Request to one of the locators from the mapping data record and receive a Map-Reply with the same data in response.

Defaults

The router does not cache mapping data contained in a Map-Request message.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When an ETR receives a Map-Request message, this message may contain mapping data for the invoking IPv6 source-EID's packet. By default, the ETR will ignore mapping data included in Map-Request messages. However, by configuring the **ipv6 etr accept-map-request-mapping** command, the ETR will cache the mapping data in its map-cache and immediately use it for forwarding packets.

When the optional **verify** keyword is configured, the ETR will still cache the mapping data but will not use it for forwarding packets until the ETR can send its own Map-Request to one of the locators from the mapping data record, and receives the same data in a Map-Reply message.

When this command is enabled and then later disabled, issuing the command **clear ipv6 lisp map-cache** is required to clear any map-cache entries that are currently in the "tentative" state. Map-cache entries can remain in the "tentative" state for up to one minute and thus it may be desirable to clear these entries manually when this command is removed.

Examples

The following example configures the ETR to cache IPv6 mapping data included in Map-Request messages but to verify its accuracy prior to using this data to forward packets.

```
Router(config-router-lisp)# ipv6 etr accept-map-request-mapping verify
```

Related Commands

Command	Description
ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR).
clear ipv6 lisp map-cache	Clear the LISP IPv6 map-cache on the local router.

ipv6 etr map-cache-ttl

To configure the TTL value inserted into LISP IPv6 Map-Reply messages, use the **ipv6 etr map-cache-ttl** command in global configuration mode. To remove the configured TTL value and return to the default value, use the **no** form of this command.

[no] **ipv6 etr map-cache-ttl** *time-to-live*

Syntax Description

time-to-live	A value, in minutes, to be inserted in the TTL field in Map-Reply messages. Valid entries are between 60 minutes (1 hour) and 10080 minutes (1 week).

Defaults

The default TTL value is 1440 minutes (24 hours).

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to change the default value associated with the Time-to-Live (TTL) field in IPv6 Map-Reply messages. This may be useful when you wish to change the default TTL that remote ITRs will cache and use for your sites IPv6 EID prefix. The default value is 1440 minutes (24 hours), and the minimum value cannot be less than 60 minutes, and the maximum cannot be greater than 10080 minutes (one week)..

Examples

The following example configures the ETR to use a TTL of 120 minutes in its IPv6 Map-Reply messages.

```
Router(config-router-lisp)# ipv6 etr map-cache-ttl 120
```

Related Commands

Command	Description
ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR).

---

ipv6 etr map-server

To configure the IPv4 or IPv6 locator address of the LISP Map-Server to be used by the ETR when registering for IPv6 EIDs, use the **ipv6 etr map-server** command in LISP configuration mode. To remove the configured locator address of the LISP Map-Server, use the **no** form of this command.

[no] ipv6 etr map-server *map-server-address* {[**key** *key-type authentication-key*] | **proxy-reply**}

Syntax Description

map-server-address	Specifies the IPv4 or IPv6 locator addresses of the Map-Server.
key *key-type*	Specifies the key-type. Type (0) indicates the password is entered as cleartext, and Type (6) indicates the password is in the AES encrypted form.
authentication-key	Specifies the password used for computing the SHA-1 HMAC hash that is included in the header of the Map-Register message.
proxy-reply	Specifies that the ETR should indicate to the Map-Server via a Map-Register message that the Map-Server should send Map-Replies on behalf of the site.

Defaults

No LISP Map-Server locator addresses are configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv6 etr map-server** command to configure the IPv4 or IPv6 locator of the Map-Server to which the ETR will register for its IPv6 EID(s). A password used for a SHA-1 HMAC hash that is included in the header of the Map-Register message must also be provided after the **key** *key-type* entry. You can configure the ETR to register with at most two Map-Servers. Once the ETR registers with the Map-Server(s), the Map-Server(s) will begin to advertise the IPv6 EID-prefix block(s) and RLOC(s) for the LISP site.

The password used for the SHA-1 HMAC may be entered in unencrypted (cleartext) form or encrypted form. To enter an unencrypted password, specify a *key-type* value of 0. To enter an AES encrypted password, specify a *key-type* value of 6.

⚠️

Caution Authentication keys entered in cleartext form will remain in cleartext form and be displayed in the configuration in cleartext form unless the Cisco IOS Encrypted Preshared Key feature is enabled. The Encrypted Preshared Key feature allows you to securely store plain text passwords in type 6 (AES) encryption format in NVRAM. To enable this functionality, use the following commands:

```
key config-key password-encrypt <password>
password encryption aes
```

For additional information on the Encrypted Preshared Key feature and its usage see: http://www.cisco.com/en/US/tech/tk583/tk372/technologies_configuration_example09186a00801f2336.shtml

⚠️

Caution When the Encrypted Preshared Key feature is enabled and then removed, for security reasons all type 6 encrypted keys will immediately become unusable. This is a result of deleting the master key, which renders all currently configured keys in the router configuration useless (a warning message displays that details this and confirms the master key deletion). Since the master key no longer exists, the type 6 passwords cannot be unencrypted and used by the router.

✎

Note The Map-Server must be pre-configured with IPv4 or IPv6 EID prefixes that match the IPv4 or IPv6 EID-prefixes configured on this ETR using the **database-mapping** command, as well as a password matching the one provided with the **key** keyword on this ETR.

When the command keyword **proxy-reply** form of the command is used, the ETR indicates to the Map-Server via a Map-Register message that the Map-Server should send Map-Replies on behalf of the site. The Map-Server will send non-authoritative Map-Replies for all the EID-prefixes contained in the Map-Register message. On the Map-Server, the **show lisp site** command indicates whether proxy-reply is enabled or not.

✎

Note The proxy-reply functionality is particularly useful for supporting the LISP VM-Mobility capabilities. (See LISP VM-Mobility Configuration Commands in NX-OS LISP Command Reference document).

✎

Note The command **ipv6 itr map-resolver** need not be configured when the locator address used in the command **ipv6 etr map-server** is the same as the locator for the Map-Resolver. This allows for the minimum LISP configuration on an IOS xTR of:

```
router lisp
 ipv6 itr
 ipv6 etr
 database-mapping ....
 ipv6 etr map-server ...
```

The output of the command **show ipv6 lisp** indicates whether the Map-Server locator is also used as a Map-Resolver locator.

Examples

The following example configures the ETR to register to two Map-Servers, one with the locator 2001:DB8:0A::1 and another with the locator 2001:DB8:0B::1.

```
Router(config-router-lisp)# ipv6 etr map-server 2001:DB8:0A::1 key 0 s3cr3t-k3y
Router(config-router-lisp)# ipv6 etr map-server 2001:DB8:0B::1 key 0 s3cr3t-k3y
```

The following example configures the ETR to register to the Map-Server with the locator 10.1.1.1 and requests that the Map-Server proxy-reply for the site.

```
Router(config-router-lisp)# ipv6 etr map-server 10.1.1.1 key 0 p433w0rd
Router(config-router-lisp)# ipv6 etr map-server 10.1.1.1 proxy-reply
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR)
lpv6 itr map-resolver	Configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv6 Map-Request messages
site	Configure a LISP site and enter site configuration mode on a Map-Server

ipv6 itr

To configure a router to act as an IPv6 LISP Ingress Tunnel Router (ITR), use the **ipv6 itr** command in LISP configuration mode. To remove LISP ITR functionality, use the **no** form of this command.

   [no] ipv6 itr

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide ITR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv6 LISP Ingress Tunnel Router (ITR) functionality.

When a router is configured as an ITR, it must decide how to handle the packets it receives. If the source address of the packet matches an IPv6 EID-prefix block configured using the **database-mapping** command or **map-cache** command, then the packet is considered a candidates for LISP encapsulation. The ITR then looks in the FIB and forwards the packet according to information contained there based on the following:

- Natively forward the packet for any non-LISP destination (as covered by a non-LISP routing entry or LISP negative map-cache entry)
- Drop the packet (as covered by a map-cache entry with "drop" attribute)
- LISP-encapsulate the packet to another LISP site (as covered by a valid map-cache entry)
- LISP encapsulate the packet to a configured PETR (as covered by the **ipv6 use-petr** command)
- Send a Map-Request for the EID prefix (when no covering map-cache entry exits)

If the source of the packet does not match a configured IPv6 EID-prefix, normal forwarding procedures are followed.

Note It is common for a device configured as an ITR to also be configured as an ETR. However, the LISP architecture does not require this and the functionality can occur in a different device. It should be noted that, as described above, in order for a packet to be considered as candidate for LISP encapsulation, it must match a **database-mapping** entry. The **database-mapping** command is normally associated with the functionality of an ETR. When a device is configured as an ITR only, it is required that suitable **database-mapping** entries be configured to permit the ITR to satisfy the source EID check for LISP encapsulation. Note also that these **database-mapping** entries are also required on a separately configured ETR for LISP site registration and Map-Reply purposes.

The ITR may use one of two methods to send a Map-Request to obtain an IPv6 EID-to-RLOC mapping:

- When a Map-Resolver is configured via the **ipv6 itr map-resolve**r command, the ITR will send its Map-Request in a LISP Encapsulated Control Message (ECM) to the Map-Resolver.
- When the ITR is directly attached to the ALT using the **ipv6 alt-vrf** command, the ITR will send its Map-Request directly on the alternate LISP Alternate Logical Topology (ALT).

The ITR caches the resultant IPv6 EID-to-RLOC mapping information returned by the associated Map-Reply in its map-cache. Subsequent packets destined to the same IPv6 EID-prefix block are then LISP-encapsulated according to this IPv6 EID-to-RLOC mapping entry.

Note When instance-id's are used to support LISP virtualization, an ITR must be configured to use a Map-Resolver (MR) (configured via the **ipv6 itr map-resolve**r command) to obtain IPv6 EID-to-RLOC mappings. It **must not** be configured to directly attach to the ALT using the **ipv6 alt-vrf** command.

Examples

The following example configures IPv6 LISP ITR functionality on the router.

```
Router(config-router-lisp)# ipv6 itr
```

Related Commands

Command	Description
ipv6 alt-vrf	Configures which VRF supporting the IPv4 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv6 itr map-resolver	Configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv6 Map-Request messages
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.

ipv6 itr map-resolver

To configure the IPv4 or IPv6 locator address of the LISP Map-Resolver to be used by the ITR when sending Map-Requests for IPv6 EID-to-RLOC mapping resolution, use the **ipv6 itr map-resolver** command in LISP configuration mode. To remove the configured locator address of the LISP Map-Resolver, use the **no** form of this command.

> **[no] ipv6 itr map-resolver** *map-resolver-address*

Syntax Description

map-resolver-address	Specifies the IPv4 or IPv6 locator addresses of the Map-Resolver.

Defaults

No LISP Map-Resolver locator address is configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB3	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

This command configures the locator to be used by a LISP ITR to reach the configured Map-Resolver when sending a map request for IPv6 EID-to-RLOC mapping resolution. Up to two Map-Resolvers can be configured per ITR within a site.

When a LISP ITR needs to resolve an IPv6 EID-to-RLOC mapping for a destination EID, it can be configured to send a map request message either to a Map Resolver configured using the **ipv6 itr map-resolver** command, or directly over the LISP ALT using the **ipv6 alt-vrf** command. When a Map Resolver is used, map requests are sent to the Map Resolver with the additional LISP Encapsulated Control Message (ECM) header that includes the Map Resolver RLOC as its destination address. When the ALT is used, map requests sent directly over the ALT without the additional LISP Encapsulated Control Message (ECM) header, where the destination of the map request is the EID being queried.

✎

Note The command **ipv6 itr map-resolver** need not be configured when the locator address used in the command **ipv6 etr map-server** is the same as the locator for the Map-Resolver. This allows for the minimum LISP configuration on an IOS xTR of:

```
router lisp
 ipv6 itr
 ipv6 etr
 database-mapping ....
 ipv6 etr map-server ...
```

The output of the command **show ipv6 lisp** indicates whether the Map-Server locator is also used as a Map-Resolver locator.

Examples

The following example configures an ITR to use the Map-Resolver located at 2001:DB8:0A::1 when sending its Map-Request messages.

```
Router(config-router-lisp)# ipv6 itr map-resolver 2001:DB8:0A::1
```

Related Commands

Command	Description
ipv6 alt-vrf	Configures which VRF supporting the IPv6 address-family LISP should use when sending Map Requests for an IPv4 EID-to-RLOC mapping directly over the ALT.
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)
ipv6 map-request-source	Configure the source IPv4 or IPv6 address to be used in IPv6 LISP Map-Request messages.

ipv6 map-cache-limit

To configure the maximum number of IPv6 LISP map-cache entries allowed to be stored by the router, use the **ipv6 map-cache-limit** command in LISP configuration mode. To remove the configured map-cache limit, use the **no** form of this command.

> **[no] ipv6 map-cache-limit** *cache-limit* [**reserve-list** *list*]

Syntax Description

cache-limit	The maximum number of IPv6 LISP map-cache entries allowed to be stored on the router. The valid range is from 0 to 10000.
reserve-list *list*	(Optional) Specifies a set of IPv6 EID-prefixes in the referenced prefix-list for which dynamic map-cache entries shall always be stored.

Defaults

The default map-cache limit is 1000 entries.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to limit the maximum number of IPv6 LISP map-cache entries allowed on this router. The optional **reserve-list** can be configured to guarantee that the referenced IPv6 EID-prefixes as always stored.

LISP map-cache entries are added in one of two ways – dynamically or statically. Dynamic entries are added when a valid Map-Reply message is returned for a Map-Request message generated in response to a cache-miss lookup. Static IPv6 entries are added via the **ipv6 map-cache** command. Whether a new map-cache entry is stored depends on the following conditions.

- Dynamic map-cache entries are always added until the default or configured cache-limit is reached. After the default or configured cache-limit is reached, unless the optional **reserve-list** is configured, no further dynamic entries are added and no further Map-Requests are generated in response to cache-miss lookups until a free position is available. Existing dynamic IPv6 map-cache entries can time-out due to inactivity or can be removed by the administrator via the **clear ipv6 lisp map-cache** command to create a free position in the map-cache. When the optional reserve-list is configured, a Map-Request will be generated and a new dynamic map-cache entry will be added for IPv6 EID-prefixes found in the prefix-list referenced by the **reserve-list** keyword. In this case, a new entry will replace an existing dynamic entry such that the cache-limit is maintained. The dynamic entry deleted will be either a non-reserve idle map-cache entry, non-reserve active map-cache entry, reserve idle map-cache entry, or reserve active map-cache entry – in that order, whichever is available first for deletion. Idle map-cache entries are those that have seen no activity in the last 10 minutes.
- Static map-cache entries are always added, even if the addition of the static entry exceeds the default or configured cache-limit. If the current map-cache contains dynamic entries, the addition of a new static entry will replace an existing dynamic entry such that the cache-limit is maintained. The dynamic entry deleted will be either a non-reserve idle map-cache entry, non-reserve active map-cache entry, reserve idle map-cache entry, or reserve active map-cache entry – in that order, whichever is available first for deletion. Idle map-cache entries are those that have seen no activity in the last 10 minutes.

⚠ **Caution** Static map-cache entries count against the default or configured cache-limit. Since static entries are always added, static entries can be added up to and beyond the default or configured cache

limit. If the number of static entries configured exceeds the default or configured cache-limit, no dynamic entries can be added.

Note When the **reserve-list** command is used, be sure that the prefix-list includes all entries that you expect to receive a Map-Reply for, including the more-specifics. This can be ensured by appending "le 128" to the end of all prefix-list entries for IPv6 prefixes. For example, if you want to match on any more specifics to 2001:DDB8:BB::/48, you specify **ipv6 prefix-list lisp-list seq 5 permit 2001:DB8:BB::/48 le 128** in order to cover all replies within this range.

Note The command **show ipv6 lisp map-cache detail** provides additional details about the EID-to-RLOC mapping entries stored in the LISP map-cache, including whether the prefix is covered by the reserve-list prefix list.

Examples

The following example configures a lisp cache-limit of 2000 entries and a reserve-list referencing the IPv6 prefix-list LISP-v6-always.

```
Router(config)# ip prefix-list LISP-always seq 10 permit 2001:DB8:B8::/46 le 128
Router(config)# router lisp
Router(config-router-lisp)# ipv6 map-cache-limit 2000 reserve-list LISP-v6-always
```

Related Commands

Command	Description
map-cache	Configures a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
clear ipv6 lisp map-cache	Clear the LISP IPv6 map-cache on the local router.

ipv6 map-cache-persistent

To configure how often, in minutes, that an ITR should save its dynamically learned map-cache entries to a file in flash, use the **ipv6 map-cache-persistent** command in LISP configuration mode. Use the **default ipv6 map-cache-persistent** form of the command to return to the default setting if the map-cache persistence value is changed. To disable the map-cache persistence feature, use the **no** form of this command.

[no] ipv6 map-cache-persistent {**interval** *interval*}

default ipv6 map-cache-persistent

Syntax Description

interval *interval*	Specifies how often, in minutes, the ITR should save its dynamically learned map-cache entries to a file in flash memory, (Default 60 minutes, range 1-1440 minutes).

Defaults

By default, map-cache persistence is enabled with a default time of 60 minutes.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

An ITR forwards LISP packets based on EID-to-RLOC mapping policy data obtained from destination ETRs and stored in its local map-cache. When the map-cache does not contain an entry for the destination prefix, the map-resolution process is executed in order to build the map-cache entry. Even though this process takes a small amount of time, it may be undesirable upon router reload to wait for data-driven events to cause map-cache entries to be built.

The LISP map-cache persistence feature periodically stores dynamically learned remote EID map-cache entries to a file located in flash. When the router reloads, it checks for these files and uses the list of remote EIDs to prime the map-cache after reboot. Overall this ensure that the packet loss after an xTR comes up is minimal, as data-driven triggers are not required to re-populate the map-cache for previously active EID prefixes.

Note The remote EID prefixes listed in the stored file are used to trigger map-requests. The map-replies that return based on these map-requests are what prime the map-cache. In this way, the map-cache is ensured of containing fresh information upon reload.

Use the **ipv6 map-cache-persistent** command to control how often, in minutes, that the ITR or PITR should save dynamically learned IPv6 map-cache entries to a file in flash. By default, map-cache persistence is enabled and with a default time of 10 minutes. Use the **no** form of the command to disable LISP map-cache persistence. If the default value is changed, use the **default ipv6 map-cache-persistent** form of the command to return to the default setting,

Note Use **show run | include persistent** to determine the current state of this feature. If this command returns nothing, then map-cache persistence is enabled and set to the default value. Other output results are self-explanatory.

Examples

The following example configures the lisp map-cache persistence feature to save dynamically learned EID prefixes to file every 30 minutes.

```
Router(config-router-lisp)# ipv6 map-cache-persistent interval 30
```

Related Commands

Command	Description
map-cache	Configures a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
clear ip lisp map-cache	Clear the LISP IPv4 map-cache on the local router.

---

ipv6 map-request-source

To configure an IPv4 or IPv6 address to be used as the source address for LISP IPv6 Map-Request messages, use the **ipv6 map-request-source** command in LISP configuration mode. To remove the configured Map-Request source address, use the **no** form of this command.

      [no] ipv6 map-request-source *source-address*

Syntax Description

source-address	The IPv4 or IPv6 source address to be used in LISP IPv6 Map-Request messages.

Defaults

The router uses one of the locator addresses configured in the **database-mapping** command as the default source address for LISP Map-Request messages.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use the **ipv6 map-request-source** command to configure the IPv4 or IPv6 source address to be used by the ITR for LISP IPv6 Map-Request messages. Typically, the address of the egress physical interface is used as the source address in the Encapsulated Control Message (ECM) header for LISP IPv6 Map-Request messages sent to a configured Map-Resolver. There may be cases where it is desirable to configure the specified source address for these Map-Request messages. For example, a site may have an access control policy upstream that requires all packets that egress the site to come from a particular source address. The **ipv6 map-request-source** command can be used to specify this address for Map-Request messages.

Examples

The following example configures an ITR to use the source IPv6 address 2001:DB8:0A::1 in its IPv6 Map-Request messages.

```
Router(config-router-lisp)# ipv6 map-request-source 2001:DB8:0A::1
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv6 lisp source-locator	Configures a source locator to be used for IPv6 LISP encapsulated packets.

ipv6 map-resolver

To configure a router to act as an IPv6 LISP Map-Resolver (MR), use the **ipv6 map-resolver** command in LISP configuration mode. To remove LISP Map-Resolver functionality, use the **no** form of this command.

[no] ipv6 map-resolver

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide Map-Resolver functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv6 LISP Map-Resolver (MR) functionality. An MR is deployed as a LISP Infrastructure component.

A MR receives a LISP Encapsulated Control Message (ECM) containing a Map-Request from a LISP ITR directly over the locator-based network. The MR decapsulates this message and forwards it over the LISP-ALT, where it is then delivered either to the Map-Server that is injecting EID-prefixes into the LISP ALT on behalf of the authoritative ETR, or to the ETR that is authoritative for the EID being queried by the Map-Request and that is directly connected to the LISP ALT. An MR will also send a Negative Map-Reply message directly back to an ITR in response to a query for non-LISP address, also in LISP ECM format.

When deploying a LISP MR, the following guidelines may be helpful in its configuration:

- A LISP MR must be directly attached to the ALT and use the **ipv6 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv6 EID-to-RLOC mapping resolution. In this case, an MR forwards Map-Requests over the ALT to the MS that is authoritative for the requested EID.

- When an MR is configured concurrently with a Map-Server (MS) as a stand-alone MR/MS, the **ipv6 alt-vrf** command is not required since the MR/MS is not connected to an ALT due to its full knowledge of the LISP Mapping System (as in the case of a private LISP deployment for example). In this case, the MR resolves IPv6 EID-to-RLOC mappings internally with its concurrently configured MS.

- When an MR supports a LISP deployment that is configured for virtualization (i.e. when instance-id's are used), the MR **must be** concurrently configured in a stand-alone manner with an MS that sees registrations from all ETRs in the LISP network in order to properly resolve Map-Requests. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv6 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MR/MS device configured for virtualization **must not** use the **ipv6 alt-vrf** command.

Examples

The following example configures IPv6 LISP Map-Resolver functionality on the router.

```
Router(config-router-lisp)# ipv6 map-resolver
```

Related Commands

Command	Description
Ipv6 alt-vrf	Configure which VRF supporting the IPv6 address-family LISP should use when sending Map Requests for an IPv6 EID-to-RLOC mapping directly over the ALT.

ipv6 map-server

To configure a router to act as an IPv6 LISP Map-Server (MS), use the **ipv6 map-server** command in LISP configuration mode. To remove LISP Map-Server functionality, use the **no** form of this command.

[no] ipv6 map-server

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide Map-Server functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB3	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable the router to perform IPv6 LISP Map-Server (MS) functionality. An MS is deployed as a LISP Infrastructure component. A LISP site is configured on the MS and the ETR(s) within the site registers to it. The LISP site includes an authentication key that must match the one also configured on the ETR(s) of the site. An MS receives Map-Register control packets from site ETR(s). When the MS is configured with a service interface to the LISP ALT, it injects aggregates for the registered EID prefixes into the ALT.

When deploying a LISP MS, the following guidelines may be helpful in its configuration:

- A LISP MS must be directly attached to the ALT using the **ipv6 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. That is, when multiple MS devices are configured and each only has partial knowledge of the overall LISP architecture, an ALT is required to connect the overall mapping system to achieve IPv6 EID-to-RLOC mapping resolution. In this case, an MS receives Map-Request control packets from the 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.

- When an MS is configured concurrently with a Map-Resolver (MR) as a stand-alone MS/MR, the **ipv6 alt-vrf** command is not required since the MS/MR is not connected to an ALT due to its full knowledge of the LISP Mapping System (as in the case of a private LISP deployment for example). In this case, the MR resolves IPv6 EID-to-RLOC mappings internally with its concurrently configured MS.

- When an MS supports a LISP deployment that is configured for virtualization (i.e. when instance-id's are used), the MS **must be** concurrently configured in a stand-alone manner with an MR and see registrations from all ETRs in the LISP network in order to properly resolve Map-Requests. An MR cannot forward a Map-Request with an instance-id over the LISP ALT, as would normally be the case in a non-virtualized deployment. The MR must be able to full resolve (query) IPv6 EID-to-RLOC mapping resolutions directly within the eid-tables maintained by the concurrent MS in a virtualized LISP deployment. A stand-alone MS/MR device configured for virtualization **must not** use the **ipv6 alt-vrf** command.

Examples

The following example configures IPv6 LISP Map-Server functionality on the router.

```
Router(config-router-lisp)# ipv6 map-server
```

Related Commands

Command	Description
Ipv6 alt-vrf	Configure which VRF supporting the IPv6 address-family LISP should use when sending Map Requests for an IPv6 EID-to-RLOC mapping directly over the ALT.

---

ipv6 path-mtu-discovery

To configure the upper and/or lower bounds to be considered by IPv6 path MTU discovery (PMTUD), use the **ipv6 path-mtu-discovery** command including parameters in LISP configuration mode. To return the IPv6 PMTUD parameters to their default settings, use the **ipv6 path-mtu-discovery** form of the command without additional parameters. IPv6 PMTUD cannot be disabled and hence there is no **no** form of the command.

> **ipv6 path-mtu-discovery** {**min** *lower-bound* | **max** *upper-bound* }

Syntax Description

min *lower-bound*	(Optional) Lower bound on path MTU accepted. Valid range is 1280 to 65535 bytes.
max *upper-bound*	(Optional) Upper bound on path MTU accepted. Valid range is 1280 to 65535 bytes.

Defaults

By IPv6 standards requirements, IPv6 always participates in PMTUD and hence, LISP is capable of adjusting the MTU used on a per-destination locator basis. The default minimum and maximum MTU boundaries are 1280 bytes and 65535 bytes respectively.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

By IPv6 standards requirements, LISP always participates in IPv6 PMTUD and LISP is capable of adjusting the MTU used on a per-destination locator basis. Incoming IPv6 ICMP "Packet Too Big" messages are processed and maintained by LISP on a per-destination locator basis. The MTU setting for a destination locator will be updated according to the ICMP message as long as the requested new MTU is lower than the existing MTU but is still within the configured **min** and **max** MTU boundaries.

Note IPv6 PMTUD cannot be disabled for LISP.

Examples

The following example modifies IPv6 PMTUD for LISP to only accept ICMP "Packet Too Big" messages requesting an MTU of a minimum of 1300 bytes (the maximum of 65535 bytes remains unchanged).

```
Router(config-router-lisp)# ipv6 path-mtu-discovery min 1300
```

ipv6 proxy-etr

To configure a router to act as an IPv6 LISP Proxy Egress Tunnel Router (PETR), use the **ipv6 proxy-etr** command in LISP configuration mode. To remove LISP PETR functionality, use the **no** form of this command.

> **[no] ipv6 proxy-etr**

Syntax Description

This command has no arguments or keywords.

Defaults

By default, the router does not provide PETR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv6 LISP Proxy Egress Tunnel Router (PETR) functionality on the router. PETR functionality is a special case of ETR functionality where the router accepts LISP-encapsulated packets from an ITR or PITR that are destined to non-LISP sites, de-encapsulates them, and then forwards them natively toward the non-LISP destination.

PETR services may be necessary in several cases.

1. By default when a LISP sites forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of a site EID(s). When the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) it may consider these packets to be spoofed and drop them since EIDs are not advertised in the provider core network. In this case, instead of natively forwarding packets destined to non-LISP sites, the ITR encapsulates these packets using its site locator(s) as the source address and the PETR as the destination address. (Note that packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR as normal.)

2. When a LISP IPv4 (EID) site wishes to talk to a non-LISP IPv4 site and some portion of the intermediate network does not support IPv4 (it is IPv6 only), the PETR can be used to "hop over" the address family incompatibility, assuming that the PETR has both IPv4 and IPv6 connectivity. The ITR in this case can LISP-encapsulate the IPv4 EIDs with IPv6 locators destined for the PETR, which de-encapsulates the packets and forwards them natively to the non-LISP IPv4 site over its IPv4 connection. In this case, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv6 portion of network using the LISP mixed protocol encapsulation support.

✎

Note An IOS/IOS XE router can be configured to perform ETR and PETR functions at the same time. A router that is configured as an ETR performs a check to verify that the LISP packet inner header destination

address is within the address range of a local EID prefix, whereas a router configured as a PETR does not perform this check.

✎

Note When an ITR or PITR requires the use of IPv6 PETR services, the ITR or PITR must be configured to forward IPv6 EID packets to the PETR using the **ipv6 use-petr** command.

Examples

The following example configures IPv6 LISP PETR functionality on the router.

```
Router(config-router-lisp)# ipv6 proxy-etr
```

Related Commands

Command	Description
ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR)
ipv6 use-petr	Configures an ITR or PITR to use the PETR for traffic destined to non-LISP IPv6 destinations.

---

ipv6 proxy-itr

To configure a router to act as an IPv6 LISP Proxy Ingress Tunnel Router (PITR), use the **ipv6 proxy-itr** command in LISP configuration mode. To remove LISP PITR functionality, use the **no** form of this command.

[no] ipv6 proxy-itr *ipv6-local-locator* [*ipv4-local-locator*]

Syntax Description

ipv6-local-locator	The IPv6 locator address used as a source address for encapsulation of data packets, a Data Probe, or a Map-Request message.
ipv4-local-locator	(Optional) The IPv4 locator address used to as a source address for encapsulation of data packets, a Data Probe, or a Map-Request message when the locator-hash function returns a destination RLOC in the IPv4 address-family.

Defaults

By default, the router does not provide PITR functionality.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

Use this command to enable IPv6 LISP Proxy Ingress Tunnel Router (PITR) functionality on the router. PITR functionality is a special case of ITR functionality where the router receives native packets from non-LISP sites (for example, the Internet) that are destined for LISP sites, and encapsulates them to the destination LISP site.

PITR services are required to provide interconnectivity between non-LISP sites and LISP sites. For example, when connected to the Internet, a PITR acts as a gateway between the legacy Internet and the LISP enabled network. To accomplish this, the PITR must advertise one or more highly aggregated EID prefixes on behalf of LISP sites into the underlying DFZ (i.e. Internet) in order to attract packets destined to LISP EIDs. The PITR then acts like an ITR for traffic received from the public Internet. The main difference between the PITR and ITR functionality is that an ITR is expected to encapsulate only packets originated from its configured ISP EIDs that are destined to LISP sites. A PITR on the other hand is expected to encapsulate packets originating from non-LISP sites that are destined to LISP sites.

PITR services are enabled using the **ipv6 proxy-itr** command. When PITR services are enabled, the device must be able to obtain EID-to-RLOC mappings in order to LISP encapsulate packets to LISP sites. A PITR can be configured either as an ALT-connected device, for which it can therefore directly determine whether a destination is a LISP EID or a non-LISP destination, or as a non-ALT-connected device, in which case it must be configured to use a Map-Resolver (in the same way that an ITR uses a Map-Resolver) to obtain EID-to-RLOC mappings and build a map-cache.

When deploying a LISP PITR, the following guidelines may be helpful in its configuration:

- A LISP PITR device can be directly attached to the ALT using the **ipv6 alt-vrf** command when a distributed mapping system uses an ALT infrastructure. In this case, the PITR will send a Map-Request directly on the LISP ALT in order to obtain IPv6 EID-to-RLOC mappings.

- Beginning with Release 15.1(4)XB4, a PITR can be configured as a non-ALT-connected device which sends a Map-Request to a configured Map-Resolver (configured via the **ipv6 itr map-resolve**r command) to obtain IPv6 EID-to-RLOC mappings as an alternative to sending a Map-Request directly over the LISP ALT. Prior to this release, PITRs were required to be LISP ALT connected as they could only forward Map-Requests directly over the LISP ALT for EID-to-RLOC mapping resolution.

    ✎

    Note   When a device is configured as a non-ALT-connected PITR, it must also be configured with information defining the extent of the LISP EID space it is proxying for. This can be done using either static **map-cache** entries incorporating the **map-request** keyword, or by importing RIB routes using the **ipv6 route-import** command. The use of either method provides information to the non-ALT-connected PITR that allows it to send Map-Requests for destinations in order to determine their IPv4 EID-to-RLOC mappings, or negative-mapping results.

- A PITR may also be concurrently configured on the same device as a stand-alone MR/MS device, simplifying the overall LISP architecture. When a device is concurrently configured as an MS/MR/PITR, the use of the **ipv6 alt-vrf** command is **required**, even when the stand-alone MS/MR/PITR is not connected to an ALT as this is used to support IPv6 EID-to-RLOC mapping resolutions by the PITR.

The PITR LISP-encapsulated packets when it sends a data packet to a LISP site. The outer (LISP encapsulation) header address-family and source address are determined as follows:

- When the locator-hash function returns a destination RLOC within the IPv6 address-family, the address *ipv6-local-locator* is used as the source address from the locator namespace, and
- When the locator-hash function returns a destination RLOC within the IPv4 address-family (assuming the optional address *ipv4-local-locator* is entered), it will be used as a source locator for encapsulation.

The LISP ALT does not currently support virtualization. Therefore, when LISP virtualization is configured, the LISP architecture must be deployed so that an ALT infrastructure is not required. The following guidelines may be helpful when configuring PITR virtualization:

- When a LISP PITR is configured to support LISP virtualization, it must be configured to send a Map-Request to a configured Map-Resolver (configured via the **ipv6 itr map-resolve**r command) to obtain IPv6 EID-to-RLOC mappings. It must not be configured to send a Map-Request directly over the LISP ALT. The LISP ALT does not currently support virtualization.

    ✎

Note   An IOS router cannot be configured to perform ITR and PITR functions at the same time. It must be configured for one or the other purpose. A router that is configured as an ITR performs a check to verify

that the source of any packet intended for LISP encapsulation is within the address range of a local EID prefix, whereas a router configured as a PITR does not perform this check. If a router is configured as an ITR using the **ipv6 itr** command and an attempt is made to also configure PITR functionality, an error indicating that ITR functionality must first be disabled will be returned.

Examples

The following example configures a router to act as a PITR, with encapsulation using an IPv6 source locator of 2001:db8:bb::1 and an IPv4 source locator of 10.1.1.1. In this example, the PITR is assumed to be ALT-connected (not shown).

```
Router(config-router-lisp)# ipv6 proxy-itr 2001:db8:bb::1 10.1.1.1
```

The following example configures a router to act as a PITR but without using the LISP ALT. In this example, the PITR is configured to use the MR with the locator 2001:db8:cc::1, and to provide proxy-ITR services for the EID-prefix 2001:db8:a::/48 with encapsulation using an IPv6 source locator of 2001:db8:bb::1 and an IPv4 source locator of 10.1.1.1.

```
Router(config)# router lisp
Router(config-router-lisp)# ipv6 proxy-itr 2001:db8:bb::1 10.1.1.1
Router(config-router-lisp)# ipv6 map-resolver 2001:db8:cc::1
Router(config-router-lisp)# map-cache 2001:db8:a::/48 map-request
Router(config-router-lisp)# exit
Router(config)# ipv6 route 2001:db8:a::/48 Null0
```

Related Commands

Command	Description
ipv6 alt-vrf	Configure which VRF supporting the IPv6 address-family LISP should use when sending Map Requests for an IPv6 EID-to-RLOC mapping directly over the ALT.
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)
Ipv6 map-resolver	Configure the router to act as a LISP Map Resolver.
Ipv6 route-import	Configure the IPv6 EID space to be considered as a candidate for LISP encapsulation on a PITR.

ipv6 route-import

To configure dynamic proxying of IPv4 LISP EID space by a Proxy ITR, use the **ipv4 route-import** command in LISP configuration mode. To remove dynamic proxying for IPv4 LISP EID space, use the **no** form of this command.

> [no] **ipv6 route-import** {**map-cache** {**bgp** *bgp-as* | **static**} [**route-map** *route-map-name*]

> [no] **ipv6 route-import maximum-prefix** *max-limit threshold* [**warning-only**]

Syntax Description

map-cache	Specifies that IPv6 prefixes in the URIB should be used to define EID address space in the map-cache.
bgp *bgp-as*	Specifies that IPv6 prefixes known via BGP AS *bgp-as* should be imported to define EID address space in the map-cache.
static	Specifies that IPv6 prefixes known via static routes should be imported to define EID address space in the map-cache.
route-map *route-map-name*	(Optional) Specifies that imported IPv6 prefixes should be filtered according to the route-map named *route-map-name*.
maximum-prefix	Specifies that the maximum number of IPv46prefixes that can be imported to define EID address space in the map-cache is going to be defined.
max-limit	Specifies the maximum number of IPv6 prefixes that can be imported to define EID address space in the map-cache.
threshold	Specifies the threshold value (in percent) at which to generate a warning message while importing IPv6 prefixes.

warning-only	(Optional) Specifies that only a warning message is given and entries are not limited.

Defaults

IPv6 route-import is not configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

When a device is configured as a non-ALT-connected PITR, it must be informed about the extent of the IPv6 LISP EID space for which it is proxying. A PITR requires this information to: (1) advertise these LISP EID prefixes into the underlying default-free-zone (DFZ), such as the Internet, in order to attract non-LISP sourced packets to itself for proxying to LISP sites, and (2) to provide a means for signaling the LISP control plane process (Map-Request generation) for populating the PITR IPv6 LISP map cache when it receives traffic. Advertising IPv4 prefixes into the DFZ is typically accomplished with standard BGP mechanisms. However, when a PITR is configured to use a Map-Resolver (that is, it is not ALT-connected), the PITR must be informed of the LISP EID space for which it is proxying. The **ipv6 route-import** command is used as a simple mechanism for a non-ALT-connected PITR to define the extent of IPv6 LISP EID space on a PITR to drive the LISP control plane by taking advantage of the existing RIB infrastructure. (Prior to the **ipv6route-import** command, static **map-cache** entries with the **map-request** keyword were required in order to drive the LISP control plane.)

The extent of the IPv6 LISP EID space can be configured using the **ipv6 route-import** command. Using **ipv6 route-import** provides simple method for the non-ALT-connected PITR to send Map-Requests for destinations in order to determine their IPv6 EID-to-RLOC mappings, or negative-mapping results. The feature **ipv6 route-import map-cache** can be configured using the **bgp** *bgp-as* or **static** commands, or both, to import all appropriate EID prefixes. In both cases, an optional **route-map** can be added to provide filtering to selective import appropriate EID prefixes.

✎

Note For IPv6 BGP routes, the route-map can match on any useful criteria such as community, tag, or local preference. Also note that if **ipv6 route-import map-cache** is configured to use BGP and then BGP is removed (**no router bgp** *AS*), the corresponding **ipv6 route-import map-cache bgp** configuration is not automatically removed.

The feature **ipv6 route-import map-cache** can also be configured using the optional **maximum-prefix** keyword to provide a mechanism for placing an upper limit on the total number of prefixes that can be imported, regardless of the source (BGP or static). The **warning-only** keyword permits all prefixes to be imported, but alerts the user when the threshold is exceeded.

✎

Note See the **clear ipv6 lisp route-import** command for guidance on initiating a re-import of prefixes covered by the **ipv6 route-import map-cache** command.

Examples

The following example configures a PITR to import IPv6 static routes representing EID prefixes to be used for signaling the LISP control plane to send a Map-Request for EID-to-RLOC mapping resolution. A route-map called static-lisp is also configured to filter on static routes only matching the tag 123. The resultant imported static routes are then shown using the **show ipv6 lisp route** command.

```
PITR(config)# route-map static-lisp permit 10
PITR(config-route-map)# match tag 123
PITR(config-route-map)# exit
PITR(config)# ipv6 route 2001:db8:a::/48 null0 tag 123
PITR(config)# ipv6 route 2001:db8:b::/48 null0 tag 123
PITR(config)# ipv6 route 2001:db8:c::/48 null0 tag 123
```

```
PITR(config)# ipv6 route 2001:db8:d::/48 null0 tag 456
PITR(config)# route lisp
PITR(config-router-lisp)# eid-table default instance-id 0
PITR(config-router-lisp-eid-table)# ipv6 route-import map-cache static route-map static-lisp
PITR(config-router-lisp-eid-table)# Ctrl-Z
PITR# show ipv6 lisp route
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 3
Prefix                       Uptime     Source Map-cache   State
2001:DB8:A::/48              00:02:35   static installed
2001:DB8:B::/48              00:02:35   static installed
2001:DB8:C::/48              00:02:35   static installed
PITR#
```

Related Commands

Command	Description
map-cache	Configure a static IPv4 or IPv6 EID-prefix to locator map-cache entry.
show ipv6 route-import	Display all the routes that have been picked up from the RIB for import.
clear ipv6 route-import	Clear the table and force a re-evaluation of all imported routes.

---

ipv6 solicit-map-request

To configure an ITR to ignore an IPv6 Map-Request message that has the solicit-map-request (SMR) bit set, use the **ipv6 solicit-map-request ignore** command in LISP configuration mode. To remove this functionality, use the **no** form of this command.

> **[no] ipv6 solicit-map-request ignore**

Syntax Description

This command has no arguments or keywords.

Defaults

A LISP ITR will respond to an IPv6 Map-Request message that has the solicit-map-request (SMR) bit set when it has an existing IPv6 map-cache entry for the EID in the SMR map-request.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB4	The syntax of this command was added.

Usage Guidelines

When a change occurs on an ETR for some attribute of an IPv6 EID prefix configured using the **database-mapping** command, such as an associated RLOC, priority, or weight, the ETR will automatically attempt to inform all LISP sites with which it has recently been communicating of this change. It does this by sending a Map-Request with the Solicit-Map-Request (SMR) bit in the header set (on), to the RLOC addresses of the other xTRs with which it has recently been communicating. It obtains these RLOCs by reviewing its own IPv6 LISP map-cache, which contains these entries for the most recent conversations. When an xTR receives this SMR Map-Request message, by default it will respond to this message by sending a new Map-Request message with the SMR bit cleared, through the Mapping System (i.e. via the configured Map-Resolver), to get an up-to-date mapping for the EID indicated in the SMR Map-Request. Once the Map-Reply is received for this new Map-Request, the xTR will have an updated cache entry representing the changed state of the ETR that initially sent the SMR Map-Request (as will all other xTRs that completed the SMR Map-Request process).

By default, an xTR processes and responds to Map-Request message that has the SMR bit set. The **ipv6 solicit-map-request ignore** command can be used to disable this behavior. When this command is entered, an xTR will ignore all Map-Request messages that have the SMR bit set. To restore SMR Map-Request handling capabilities, use the **no ipv6 solicit-map-request ignore** command.

✎

Note A LISP ITR will only respond to an SMR Map-Request when it has an existing IPv6 map-cache entry for the EID in the SMR Map-Request. If it does not have an entry, the SMR Map-Request is ignored.

Examples

The following example configures the xTR to ignore Map-Request messages that have the SMR bit set.

```
Router(config-router-lisp)# ipv6 solicit-map-request ignore
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
Ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR).
Ipv6 itr	Configures the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)..

ipv6 use-petr

To configure an ITR or PITR to use an IPv6 LISP Proxy Egress Tunnel Router (PETR), use the **ipv6 use-petr** command in LISP configuration mode. To remove the use of a LISP PETR, use the **no** form of this command.

[no] ipv6 use-petr *locator-address* [**priority** *priority* **weight** *weight*]

Syntax Description

locator-address	IPv4 or IPv6 locator address of the PETR.
priority *priority*	(Optional) The priority (value between 0 and 255) assigned to this PETR. When multiple PETRs are specified, *priority* is used to determine load-sharing among PETR resources. A lower value indicates a higher priority.
weight *weight*	(Optional) The weight (value between 0 and 100) assigned to this PETR. When multiple PETRs are specified, *weight* is used to determine how to load-share traffic between multiple PETRs of identical priority. The value represents the percentage of traffic to be load-shared.

Defaults

By default, the router does not use PETR services.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.
15.1(4)XB5	This command was modified to add **priority** and **weight** keywords.

Usage Guidelines

Use the **ipv6 use-petr** command to enable an ITR or PITR to use IPv6 Proxy Egress Tunnel Router (PETR) services. When the use of PETR services is enabled, instead of natively forwarding LISP EID (source) packets destined to non-LISP sites, these packets are LISP-encapsulated and forwarded to the PETR. Upon receiving these packets, the PETR de-encapsulates them, and then forwards them natively toward the non-LISP destination. An ITR or PITR can be configured to use PETR services.

PETR services may be necessary in several cases. For example, by default when a LISP sites forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of a site EID(s). If the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) it would consider these packets to be spoofed and drop them since EIDs are not advertised in the provider default free zone (DFZ). In this case, instead of natively forwarding packets destined to non-LISP sites, the ITR encapsulates these packets using the site locator as the source address and the PETR as the destination address.

PETR services may be necessary in several cases.

1. By default when a LISP sites forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of an EID. When the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) or an anti-spoofing access list, it may consider these packets to be spoofed and drop them since EIDs are not advertised in the provider core network. In this case, instead of natively forwarding packets destined to non-LISP sites, the ITR encapsulates these packets using its site locator(s) as the source address and the PETR as the destination address. (Note that packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR as normal.)

    > **Note** Note that the use of the **ipv6 use-petr** command does not change LISP-to-LISP or non-LISP-to-non-LISP forwarding behavior. LISP EID packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR as normal. Non-LISP-to-non-LISP packets are never candidates for LISP encapsulation and are always forwarded natively according to normal processes.

2. When a LISP IPv4 (EID) site wishes to talk to a non-LISP IPv4 site and the ITR locators or some portion of the intermediate network does not support IPv4 (it is IPv6 only), the PETR can be used to "hop over" the address family incompatibility, assuming that the PETR has both IPv4 and IPv6 connectivity. The ITR in this case can LISP-encapsulate the IPv4 EIDs with IPv6 locators destined for the PETR, which de-encapsulates the packets and forwards them natively to the non-LISP IPv4 site over its IPv4 connection. In this case, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv6 portion of network using the LISP mixed protocol encapsulation support.

    > **Note** Because LISP supports mixed protocol encapsulations, the locator specified for the PETR in this case can either be an IPv4 or IPv6 address.

Up to eight (8) PETR locators can be entered per address family. When multiple entries are made, the packet forwarding behavior is as follows:

*   When multiple PETRs are configured using the **ipv6 use-petr** command by itself (that is, without the optional **priority** and **weight** configurations), packets are sent to each PETR based on hash-based load sharing.

*   When multiple PETRs are configured using the **ipv6 use-petr** command and including the optional **priority** and **weight** configurations, packets are sent to each PETR according the normal LISP priority and weight load sharing algorithms.

    > **Note** The use of the **ipv6 use-petr** command by itself (that is, without the optional **priority** and **weight** configurations) and with the optional **priority** and **weight** configurations at the same time is not permitted. Only one method may be used. If the **ipv6 use-petr** command is already configured

without **priority** and **weight**, adding an additional PETR entry that includes **priority** and **weight**, is not permitted. All entries that do not include **priority** and **weight** must first be removed prior to adding any entries that include **priority** and **weight**.

Examples

The following example configures an ITR to use the PETR with the IPv4 locator of 10.1.1. In this case, LISP site IPv6 EIDs destined for IPv6 non-LISP sites will be encapsulated in an IPv4 LISP header to the PETR located at 10.1.1.1. When it receives these packets, the PETR will decapsulate the IPv4 LISP header and natively forward the IPv6 packets toward their IPv6 non-LISP destination.

```
Router(config-router-lisp)# ipv6 use-petr 10.1.1.1
```

The following example configures an ITR to use two PETRs; one has an IPv4 locator of 10.1.1.1 and is configured as the primary PETR (priority 1 weight 100), and the other has an IPv4 locator of 10.1.2.1 and is configured as the secondary PETR (priority 2 weight 100). In this case, LISP site IPv6 EIDs destined to non-LISP IPv6 sites will be encapsulated in an IPv4 LISP header to the primary PETR located at 10.1.1.1 unless it fails, in which case the secondary will be used.

```
Router(config-router-lisp)# ipv6 use-petr 10.1.1.1 priority 1 weight 100
Router(config-router-lisp)# ipv6 use-petr 10.1.2.1 priority 2 weight 100
```

Related Commands

Command	Description
ipv6 proxy-etr	Configures the router to act as an IPv6 LISP Proxy Egress Tunnel Router (PETR)

---

loc-reach-algorithm

To configure a LISP locator reachability algorithm, use the **lisp loc-reach-algorithm** command in LISP configuration mode. To disable this functionality, use the **no** form of this command.

> **[no] loc-reach-algorithm** {rloc-probing}

Syntax Description

rloc-probing	Enable the rloc-probing locator reachability algorithm.

Defaults

The locator reachability algorithm rloc-probing is disabled by default by LISP.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When a LISP site communicates with a remote LISP site, it maintains EID-to-RLOC mapping information in its local map-cache. In order for a LISP site to maintain an accurate status of locators at remote LISP sites with which it is communicating, the xTR can be configured to send RLOC probes to RLOCs at other sites.

Use this command to enable or disable LISP locator reachability algorithms. At this time, rloc-probing is the only locator reachability algorithm available in Cisco IOS and Cisco IOS XE versions of LISP, and it is disabled by default. To enable rloc-probing, enter this command. To disable rloc-probing, use the **no** form of the command.

The rloc-probing algorithm is a method used by a LISP to determine the reachability status of locators cached in its map-cache. It involves the periodic exchange of special Map-Request/Map-Reply messages between an ITR and ETR to validate locator reachability. The advantage of using RLOC probing is that it can handle a variety of failure scenarios, allowing the ITR to determine when the path to a specific locator is reachable or has become unreachable. This provided a robust mechanism for switching to using another locator from the cached locator.

Examples

The following example configures the locator reachability algorithm rloc-probing functionality on the router.

```
Router(config-router-lisp)# loc-reach-algorithm rloc-probing
```

Related Commands

Command	Description
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR)
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR)
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)

---

locator-down

To configure a locator from a local site locator-set associated with an IPv4 or IPv6 EID-prefix database-mapping to be unreachable (down), use the **locator-down** command in LISP configuration mode. To return the local site locator to a reachable (up) status, remove the configuration using the **no** form of this command.

[no] locator-down *EID-prefix/prefix-length locator*

Syntax Description

EID-prefix/prefix-length	The IPv4 or IPv6 EID prefix and length advertised by this router.
locator	The IPv4 or IPv6 Routing Locator (RLOC) associated with this EID-prefix.

Defaults

An IPv4 or IPv6 locator at the local site associated with a configured IPv4 or IPv6 EID-prefix is considered reachable (up) unless local site rloc-probing indicates it is down.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When LISP database parameters are configured on an ITR for specified IPv4 or IPv6 EID-prefixes using the **database-mapping** command, locators from the local LISP site are associated with these IPv4 or IPv6 EID-prefix blocks. A local site locator is considered reachable (up) (unless local site rloc-probing indicates it is down).

The **locator-down** command can be used to configure a locator from a local site locator-set associated with the EID-prefix database mapping to be down.

When this command is configured, the Locator Status Bits (LSBs) for the configured locator will be cleared when encapsulating packets to remote sites. ETRs at remote sites look for changes in the LSBs when decapsulating LISP packets, and when the LSBs indicate that a specific locator is down, the ETR will refrain from encapsulating packets using this locator to reach the local site.

Note If this command is configured on an ITR to indicate that a local site locator is unreachable (down) and the LISP site includes multiple ITRs, this command must be configured on all ITRs at the site to ensure that the site consistently tells remote sites that the configured locator is not reachable.

Note When the **eid-table** command is configured, the **locator-down** command is available within that **eid-table** configuration. When the **eid-table** command is not configured, the **locator-down** command is available directly within LISP configuration mode (i.e. under the router lisp command).

Examples

The following example configures the locator 10.1.1.1 to a down state for the EID-prefix block 172.16. 1.0/24.

```
Router(config-router-lisp)# locator-down 172.16.1.0/24 10.1.1.1
```

The following example configures the locator 2001:DB8:0A::1 to a down state for the IPv6 EID-prefix block 2001:DB8:BB::/48.

```
Router(config-router-lisp)# locator-down 2001:DB8:BB::/48 2001:DB8:0A::1
```

Related Commands

Command	Description
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table
database-mapping	Configure an IPv4 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)
map-cache	Configures a static IPv4 EID-prefix to locator map-cache entry.

map-cache

To configure a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or to statically configure the packet handling behavior for a specified destination IPv4 or IPv6 EID-prefix, use the **map-cache** command in LISP configuration mode. To remove the configuration, use the **no** form of this command.

[no] **map-cache** *destination-EID-prefix/prefix-length* {*locator* **priority** *priority* **weight** *weight*}

[no] **map-cache** *destination-EID-prefix/prefix-length* {**drop | map-request | native-forward**}

Syntax Description

destination-EID-prefix/prefix-length	Destination IPv4 or IPv6 EID-prefix/prefix-length.
locator	The IPv4 or IPv6 Routing Locator (RLOC) associated with this EID-prefix/prefix-length
priority *priority*	The priority (value between 0 and 255) assigned to the RLOC. When multiple locators have the same priority they may be used in load-shared fashion. A lower value indicates a higher priority.

weight *weight*	The weight (value between 0 and 100) assigned to the locator. Used in order to determine how to load-share traffic between multiple locators when the priorities assigned to multiple locators are the same. The value represents the percentage of traffic to be load-shared.
drop	(Optional) Drop packets that match this map-cache entry
map-request	(Optional) Send a Map-Request for packets that match this map-cache entry
native-forward	(Optional) Natively forward packets that match this map-cache entry

Defaults

No static destination EID-to-RLOC mapping relationships are configured by default.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

The first use of this command configures an ITR with a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy. For each entry, a destination IPv4 or IPv6 EID-prefix block and its associated locator, priority and weight are entered. The IPv4 or IPv6 EID-prefix/prefix-length is the LISP EID-prefix block at the destination site. The locator is an IPv4 or IPv6 address of the remote site where the IPv4 or IPv6 EID-prefix can be reached. Associated with the locator address is a priority and weight that are used to define traffic policies when multiple RLOCs are defined for the same EID-prefix block. This command can be entered up to eight (8) times for a given EID-prefix. Static IPv4 or IPv6 EID-to-RLOC mapping entries configured using this command take precedence over dynamic mappings learned through Map-Request/Map-Reply exchanges.

The second, optional use of this command is to statically configure the packet handling behavior associated with a specified destination IPv4 or IPv6 EID-prefix. For each entry, a destination IPv4 or IPv6 EID-prefix block is associated with a configured forwarding behavior. When a packet's destination address matches the EID-prefix, one of the following packet handling options can be configured:

> **drop** – Packets matching the destination IPv4 or IPv6 EID-prefix are dropped. For example, this action may be useful when administrative policies define that packets should be prevented from reaching a site.

> **native-forward** – Packets matching the destination IPv4 or IPv6 EID-prefix are natively forwarded without LISP encapsulation. This action may be useful when the destination site is known to always be reachable natively and LISP encapsulation should never be used.

> **map-request** – Packets matching the destination IPv4 or IPv6 EID-prefix cause a Map-Request to be sent. It is implied that the Map-Reply returned by this request will allow subsequent packets matching this EID-prefix to be LISP-encapsulated. This action may be useful for troubleshooting map-request activities and other diagnostic actions.

Note When the **eid-table** command is configured, the **map-cache** command is available within that **eid-table** configuration. When the **eid-table** command is not configured, the **map-cache** command is available directly within LISP configuration mode (i.e. under the router lisp command).

Examples

The following example configures a destination EID-to-RLOC mapping and associated traffic policy for the IPv4 EID-prefix block 172.16. 1.0/24. In this example, the locator for this EID-prefix block is 10.1.1.1 and the traffic policy for this locator has a priority of 1 and a weight of 100.

```
Router(config-router-lisp)#map-cache 172.16.1.0/24 10.1.1.1 priority 1 weight 100
```

The following example configures a destination EID-to-RLOC mapping and associated traffic policy for the IPv6 EID-prefix block 2001:DB8:BB::/48. In this example, the locator for this EID-prefix block is 2001:DB8:0A::1 and the traffic policy for this locator has a priority of 1 and a weight of 100.

```
Router(config-router-lisp)#map-cache 2001:DB8:BB::/48 2001:DB8:0A::1 priority 1 weight 100
```

Related Commands

Command	Description
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table
database-mapping	Configure an IPv4 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv6 itr	
ipv4 map-cache-limit	Configure the maximum number of IPv4 LISP map-cache entries allowed to be stored by the router.
ipv6 map-cache-limit	Configure the maximum number of IPv6 LISP map-cache entries allowed to be stored by the router.

---

other-xtr-probe

To configure the interval, in seconds, that an xTR probes site-local RLOCs, use the **other-xtr-probe** command in LISP configuration mode. To return to the default setting, use the **no** or **default** form of this command.

[no] other-xtr-probe {**period** *period*}

default other-xtr-probe period

Syntax Description

period *period*	Configure the site-local RLOC probing period (between 5 and 900 seconds).

Defaults

Probing of site-local RLOCs is enabled by default and cannot be disabled. Only the probing interval can be changed. The default interval is 30 seconds.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When a LISP site contains more than one xTR, all xTRs that are part of the same LISP site must be configured with consistent EID-to-RLOC mapping information via the **database-mapping** command. From the perspective of any xTR within the LISP site, one or more RLOCs will be local to that xTR (referred to as **site-self** in **show** outputs), and one or more RLOCs will be local the other xTRs that are part of the same LISP site (and referred to as **site-other** in **show** outputs). In order for a LISP site to maintain an accurate status of all locators within the site, each xTR sends RLOC probes to all **site-other** RLOCs.

Use the command **other-xtr-probe** to change the probe interval for sending RLOC probes to all **site-other** RLOCs.

✎ **Note** This functionality is enabled by default and cannot be disabled. The default probing interval is 30 seconds. Use the **show run | include other-xtr-probe** command to display the configured interval. When an output value is displayed, the value is configured for something other than the default value. When no output is displayed, it is configured for the default.

✎ **Note** When the **eid-table** command is configured, the **other-xtr-probe** command is available within that **eid-table** configuration. When the **eid-table** command is not configured, the **other-xtr-probe** command is available directly within LISP configuration mode (i.e. under the router lisp command).

Examples

The following example configures the **other-xtr-probe** interval to 20 seconds.

```
Router(config-router-lisp)# other-xtr-probe 20
```

Related Commands

Command	Description
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

---

remote-rloc-probe

To configure an ITR or PITR to send triggered RLOC probes for remote locators when the next-hops for those remote locators change, use the **remote-rloc-probe** command in LISP configuration mode. To disable sending triggered RLOC probes for remote locator next-hop changes, use the **no** form of this command.

> **[no] remote-rloc-probe on-route-change**

Syntax Description

on-route-change	Configures sending triggered RLOC probes for remote locator next-hop changes.

Defaults

Be default, triggered RLOC probes are sent for a remote locator when its next-hop changes.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

All LISP ITR and PITR devices maintain a map-cache of remote EID-to-RLOC mapping information. This map-cache information is used by the ITR and PITR for LISP encapsulation to remote sites. Prior to release 15.1(4)XB5, an ITR or PITR sent triggered RLOC probes to a remote locators (RLOCs) only upon recognition of a status change from "unreachable" to "reachable" in order to maintain current and consistent map-cache information for LISP encapsulation to remote sites.

In addition to a remote locator undergoing a status change from "unreachable" to "reachable," it is also possible for a remote locator to experience a change in its next-hop, for example as a result of a change from an underlying routing update. Prior to release 15.1(4)XB5, this change in next-hop did not result in a triggered probe being sent to the remote locator. (The separate feature **loc-reach-algorithm rloc-probing** can be enabled to send periodic probes to remote locators. When this **rloc-probing** feature is enabled, a change in remote locator next-hop will be discovered, but subject to a delay of between 1 and 60 seconds, depending on the timing of when the most previous periodic probe was sent and the change of remote locator next-hop. During this period of time, the ITR or PITR will be unable to encapsulate LISP traffic using that remote locator.)

Beginning with release 15.1(4)XB5, triggered RLOC probes are now sent to remote locators (RLOCs) upon recognition of a next-hop change. Now, instead of waiting for periodic probes (if configured) to recognize a next-hop change for a remote locator, a triggered probe is sent immediately upon recognition that the remote locator next-hop has change. This results in quicker detection of remote locator next-hop changes and allows the ITR or PITR to encapsulate LISP traffic using that updated remote locator next-hop information.

The default setting is for an ITR or PITR to send a triggered probe immediately upon recognition that the remote locator next-hop has change. Because remote locator triggered probing can be aggressive in some conditions, or may be considered unnecessary in certain deployments, the **no remote-rloc-probe on-route-change** command can be used to disable sending remote locator triggered probes for next-hop changes. To re-enable this feature, enter the **remote-rloc-probe on-route-change** command.

Note The current status of the **remote-rloc-probe on-route-change** command can be viewed by using the **show running-config all | include probe** command. For example:

```
xTR-1#show running-config all | include probe
 other-xtr-probe period 30
 remote-rloc-probe on-route-change
xTR-1#
```

Examples

The following example disables remote locator triggered probes.

```
xTR-1(config-router-lisp)# no remote-rloc-probe on-route-change
```

The following example shows remote locator triggered probing as being disabled.

```
xTR-1#show running-config all | include probe
 other-xtr-probe period 30
 no remote-rloc-probe on-route-change
xTR-1#
```

Related Commands

Command	Description
loc-reach-algorithm	Configure a LISP locator reachability algorithm.
other-xtr-probe	Configures the interval that an xTR probes site-local RLOCs.

site

To configure a LISP site and enter site configuration mode on a LISP Map-Server, use the **site** command in LISP configuration mode. To remove the reference to a LISP site, use the **no** form of this command.

[no] site *site-name*

Syntax Description

site-name	Locally significant name assigned to a LISP site.

Defaults

By default, no LISP sites are defined.

Command Modes

LISP configuration

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

The **site** command is applicable only to a LISP Map-Server. When the **site** command is entered, the referenced LISP site is created and you are placed in the site configuration mode. In this mode, all attributes associated with the referenced LISP site can be entered.

When a LISP ETR registers with a Map-Server, the Map-Server must already have been configured with certain LISP site attributes that match those of the ETR. At a minimum, this includes the EID-prefix(es) to be registered by the ETR, and a shared authentication key. On the ETR, these attributes are configured using the **database-mapping** and **[ipv4|ipv6] etr map-server** commands.

Examples

The following example configures the LISP site named 'Customer-1' and then enters the site command mode.

```
Router(config-router-lisp)# site Customer-1
Router(config-router-lisp-site)#
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.

LISP Interface Configuration Commands

ip lisp source-locator

To configure a source locator to be used for IPv4 encapsulated packets, use the **ip lisp source-locator** command in interface configuration mode. To remove the configured source locator, use the **no** form of this command.

> **[no] ip lisp source-locator** *interface*

Syntax Description

interface	The name of the interface whose IPv4 address should be used as the source locator address for outbound encapsulated packets.

Defaults

The IPv4 address of the outbound interface is used by default as the source locator address for outbound encapsulated packets.

Command Modes

Interface configuration

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

When sending a LISP encapsulated packet (data or control message), a destination lookup is done to determine the appropriate outgoing interface. By default, the IPv4 address of this outgoing interface is used as the source locator for the outbound encapsulated packet. This applies to both Encapsulated Control Message (ECM) control packets, as well as LISP encapsulated data packets.

In some circumstances it may be necessary to use the IPv4 address of a different interface as the source locator for the outbound LISP encapsulated packets rather than that of the outgoing interface. For example, when an ITR has multiple egress interfaces you may configure a loopback interface for stability purposes and instruct the ITR to use the address of this loopback interface as the source locator for the outbound LISP encapsulated packets rather than one or both of the physical interface addresses. The use of this command is also important for maintaining locator consistency between the two xTRs when rloc-probing is used.

Examples

The following example configures the ITR to use the IPv4 address of interface Loopback0 as the source-locator when sending LISP encapsulated packets out interfaces FastEthernet0/0 and FastEthernet1/0.

```
Router(config)# interface FastEthernet0/0
Router(config-if)# ip lisp source-locator Loopback0
Router(config-if)# interface FastEthernet1/0
Router(config-if)# ip lisp source-locator Loopback0
```

Related Commands

Command	Description
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)

ipv6 lisp source-locator

To configure a source locator to be used for IPv6 encapsulated packets, use the **ipv6 lisp source-locator** command in interface configuration mode. To remove the configured source locator, use the **no** form of this command.

> **[no] ipv6 lisp source-locator** *interface*

Syntax Description

interface	The name of the interface whose IPv6 address should be used as the source locator address for outbound encapsulated packets.

Defaults

The IPv6 address of the outbound interface is used by default as the source locator address for outbound encapsulated packets.

Command Modes

Interface configuration

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

When sending a LISP encapsulated packet (data or control message), a destination lookup is done to determine the appropriate outgoing interface. By default, the IPv6 address of this outgoing interface is used as the source locator for the outbound encapsulated packet. This applies to both Encapsulated Control Message (ECM) control packets, as well as LISP encapsulated data packets.

In some circumstances it may be necessary to use the IPv6 address of a different interface as the source locator for the outbound LISP encapsulated packets rather than that of the outgoing interface. For example, when an ITR has multiple egress interfaces you may configure a loopback interface for stability purposes and instruct the ITR to use the address of this loopback interface as the source locator for the outbound LISP encapsulated packets rather than one or both of the physical interface addresses. The use of this command is also important for maintaining locator consistency between the two xTRs when rloc-probing is used.

Examples

The following example configures the ITR to use the IPv6 address of interface Loopback0 as the source-locator when sending LISP encapsulated packets out interfaces FastEthernet0/0 and FastEthernet1/0.

```
Router(config)# interface FastEthernet0/0
Router(config-if)# ipv6 lisp source-locator Loopback0
Router(config-if)# interface FastEthernet1/0
Router(config-if)# ipv6 lisp source-locator Loopback0
```

Related Commands

Command	Description
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)

LISP Site Configuration Commands

allowed-locators

To configure a list of locators to be verified in a Map-Register message sent by an ETR when registering to the Map-Server, use the **allowed-locator** command in site configuration mode. To remove the locators, use the **no** form of this command.

> **[no] allowed-locator** *rloc*

Syntax Description

rloc	IPv4 or IPv6 Routing Locator (RLOC) allowed within Map-Registration message.

Defaults

By default, allowable locators are not defined and the Map-Server will accept any locators.

Command Modes

LISP site configuration mode.

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

When a LISP ETR registers with a Map-Server, it sends a Map-Register message that contains, among other things, one or more EID-prefixes and routing locators that the ETR is configured to use. After verifying the authentication data, the Map-Server checks the presented EID-prefixes against those configured on the Map-Server. If they agree, the Map-Register is accepted and the ETR registration is completed.

The Map-Server default behavior can be further constrained such that the ETR can only register using specific routing locators. To enable this functionality, configure the **allowed-locator** command in LISP site configuration mode. When the **allowed-locator** command is used, the Map-Register message from the ETR must contain the same locators that are listed in the Map-Server lisp site configuration. If the list in the Map-Register does not match the one configured on the Map-Server, the Map-Register message is not accepted and the ETR is not registered. Up to four IPv4 or IPv6 routing locators (total) may be configured.

✎

Note When **allowed-locators** is configured, **all** locators listed on the Map-Server within the lisp site configuration MUST also appear in the Map-Register message sent by the ETR for it to be accepted.

Examples

The following example configures the LISP site named 'Customer-1' and then configures the IPv4 address 172.16.1.1 and IPv6 address 2001:db8:bb::1 as allowable locators for the LISP site Customer-1.

```
Router(config-router-lisp)# site Customer-1
Router(config-router-lisp-site)# allowed-locator 172.16.1.1
Router(config-router-lisp-site)# allowed-locator 2001:db8:bb::1
```

Related Commands

Command	Description
site	Configure a LISP site and enter site configuration mode on a Map-Server

authentication-key

To configure the password used to create the SHA-1 HMAC hash for authenticating the Map-Register message sent by an ETR when registering to the Map-Server, use the **authentication-key** command in site configuration mode. To remove the password, use the **no** form of this command.

>   **[no] authentication-key** *key-type password*

Syntax Description

key-type	Specifies the key-type that the following SHA-1 password is encoded using. Type (0) indicates a cleartext password follows; Type (6) indicates an AES encrypted key follows.
password	The password used to create the SHA-1 HMAC hash when authenticating the Map-Register message sent by the ETR.

Defaults

By default, no LISP sites authentication key is configured.

Command Modes

LISP site configuration mode.

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

When a LISP ETR registers with a Map-Server, the Map-Server must already be configured with certain LISP site attributes matching those of the ETR in order for site registration to succeed. This includes a shared password that is used to create the SHA-1 HMAC hash that the Map-Server uses to validate the authentication data presented in the Map-Register message.

On an ETR, this password is configured with the **ip lisp etr map-server** or **ipv6 lisp etr map-server** command. On the Map-Server, the password is configured as part of the **lisp site** configuration process. To enter the lisp site password, configure the **authentication-key** command in LISP site configuration mode. The SHA-1 HMAC password may be entered in unencrypted (cleartext) form or in AES- or Cisco-encrypted form. To enter an unencrypted password, specify a *key-type* value of 0 (or no *key-type* at all). To enter an AES-encrypted password, specify a *key-type* value of 6. To enter a Cisco-encrypted password, specify a *key-type* value of 7.

⚠ **Caution** Map-Server authentication keys entered in cleartext form will remain in cleartext form and be displayed in the configuration in cleartext form unless the Cisco IOS Encrypted Preshared Key feature is enabled. The Encrypted Preshared Key feature allows you to securely store plain text passwords in type 6 (AES encryption) format in NVRAM. To enable this functionality, use the following commands:

```
key config-key password-encrypt <password>
password encryption aes
```

For additional information on the Encrypted Preshared Key feature and its usage see:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_ikevpn/configuration/15-1mt/Encrypted_Preshared_Key.html

⚠ **Caution** When the Encrypted Preshared Key feature is enabled and then removed, for security reasons all type 6 encrypted keys will immediately become unusable. This is a result of deleting the master key, which renders all currently configured keys in the router configuration useless (a warning message displays

that details this and confirms the master key deletion). Since the master key no longer exists, the type 6 passwords cannot be unencrypted and used by the router.

✎

Note The Map-Server and ETR must be configured with matching passwords for the Map-Registration process to successfully complete. When a LISP site successfully completes the Map-Registration process, its attributes will be displayed by the **show lisp site** command. If the Map-Registration process is unsuccessful, the site will not be display.

Examples

The following example configures the LISP site named 'Customer-1' and then enters the site command mode. The shared password *s0m3-s3cr3t-k3y* is then entered in cleartext form.

```
Router(config-router-lisp)# site Customer-1
Router(config-router-lisp-site)# authentication-key 0 s0m3-s3cr3t-k3y
```

Related Commands

Command	Description
lisp site	Configure a LISP site and enter site configuration mode on a Map-Server
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
show lisp site	Display registered LISP sites on a Map Server.

---

description

To configure a description to a LISP site configuration, use the **description** command in site configuration mode. To remove the reference to a LISP site, use the no form of this command.

[no] description *description*

Syntax Description

description	Description listed with the associated LISP site.

Defaults

By default, no LISP site description is defined.

Command Modes

LISP site configuration mode.

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

On the Map-Server, when the **site** command is entered, you are placed in the site sub-command mode. In this mode, a description to be associated with the referenced LISP site can be entered using the **description** command. This description will be displayed by the **show lisp site** command.

Examples

The following example configures the LISP site named 'Customer-1' and then enters the site command mode. The description string for Customer-1 is then entered.

```
Router(config-router-lisp)# site Customer-1
Router(config-router-lisp-site)# description Customer-1 Site Information
```

Related Commands

Command	Description
lisp site	Configure a LISP site and enter site configuration mode on a Map-Server
show lisp site	Display registered LISP sites on a Map Server.

---

eid-prefix

To configure a list of EID-prefixes that are allowed in a Map-Register message sent by an ETR when registering to the Map-Server, use the **eid-prefix** command in site configuration mode. To remove the EID-prefixes, use the **no** form of this command.

> **[no] eid-prefix [instance-id** *iid***]** {*EID-prefix* [**route-tag** *tag*]} [**accept-more-specifics**]

Syntax Description

instance-id *iid*	(Optional) EID instance-ID
EID-prefix	IPv4 or IPv6 EID prefix associated with the LISP site.
route-tag *tag*	(Optional) Route tag associated with this EID-prefix.
accept-more-specifics	(Optional) Route tag associated with this EID-prefix.

Defaults

By default, EID-prefixes are not defined for a LISP site.

Command Modes

LISP site configuration mode.

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.

Usage Guidelines

When a LISP ETR registers with a Map-Server, it sends a Map-Register message that contains, among other things, one or more EID-prefixes that the ETR is configured to use. On the ETR, EID-prefixes are configured using the **database-mapping** command. To configure these EID-prefixes on the Map-Server, use the **eid-prefix** command in lisp site configuration mode.

When the registering xTR enables a LISP instance-id by using the **eid-table** command, the Map-Server must also include this same instance-id within the EID-prefix configurations for this LISP site using the **instance-id** keyword and *iid* value as part of the **eid-prefix** command.

The same EID-prefix(es), and instance-id when applicable, must be configured on Map-Server and the ETR in order for the ETR to be registered, and for these EID-prefixes to be advertised by LISP. After verifying the

authentication data, the Map-Server compares the EID-prefixes within the Map-Register message against those configured on the Map-Server for the LISP site. If they agree, the Map-Register is accepted and the ETR registration is completed. If the EID-prefixes in the Map-Register message do not match those configured on the Map-Server, the Map-Register message is not accepted and the ETR is not registered.

> **Note** A Map-Register message sent by an ETR contains all of the EID prefixes that the ETR is authoritative for. All of these EID prefixes MUST be listed on the Map-Server within the lisp site configuration for the Map-Register message sent by the ETR to be accepted. If the list in the Map-Register does not match the one configured on the Map-Server, the Map-Register message is not accepted and the ETR is not registered.

When a LISP site successfully completes the Map-Registration process, its attributes will be displayed by the **show lisp site** command. If the Map-Registration process is unsuccessful, the site will not be display.

When **route-tag** is used, a tag value is associated with the EID-prefix being configured. This tag value may be useful for simplifying processes that populate the RIB. For example, a route-map policy can be defined to match this tag for BGP redistribution of these EID-prefixes into the VRF used by the LISP-ALT.

When the **accept-more-specifics** keyword is used, any EID-prefix that is more specific then the EID-prefix configured will be accepted and tracked. For example, if a (logical) LISP site includes several /24 EID-prefixes that all can be summarized as a /22, a single /22 EID-prefix entry can be used in the lisp site configuration, using the **accept-more-specifics** keyword, and each /24 prefix will be recognized during registration.

Examples

The following example configures the IPv4 EID-prefix 192.168.1.0/24 and the IPv6 EID-prefix 2001:db8:aa::/48, each with the route-tag 123, for the LISP site Customer-1.

```
Router(config-router-lisp)# site Customer-1
Router(config-router-lisp-site)# eid-prefix 192.168.1.0/24 route-tag 123
Router(config-router-lisp-site)# eid-prefix 2001:db8:aa::/48 route-tag 123
```

The following example configures the IPv4 EID-prefix 192.168.1.0/24 with the instance-id of 123 for the LISP site Customer-2. In this case, the ETR would also be required to use instance-id 123 as well.

```
Router(config-router-lisp)# site Customer-2
Router(config-router-lisp-site)# eid-prefix instance-id 123 192.168.1.0/24 route-tag 123
```

Related Commands

Command	Description
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
site	Configure a LISP site and enter site configuration mode on a Map-Server

LISP Show Commands

show ip lisp

To display the IPv4 LISP configuration status, use the **show ip lisp** command in privileged EXEC mode.

> **show ip lisp**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB2	This command was modified.
2.5.1XB	This command was modified.
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When used with no arguments or keywords, the **show ip lisp** command displays the IPv4 LISP configuration status for the local device.

Examples

The following sample output from the **show ip lisp** command displays information about the current IPv4 LISP configuration status. The output varies, depending on the LISP features configured.

```
Router# show ip lisp
Instance ID:                    0
  Ingress Tunnel Router (ITR):      enabled
  Egress Tunnel Router (ETR):       enabled
  Proxy-ITR Router (PITR):          disabled
  Proxy-ETR Router (PETR):          disabled
  Map Server (MS):                  disabled
  Map Resolver (MR):                disabled
  Map-Request source:               10.0.2.1
  ITR Map-Resolver:                 10.0.100.2
  ETR Map-Server(s):                10.0.100.2 (00:00:37)
  ITR Solicit Map Request (SMR):    accept and process
    Max SMRs per map-cache entry:   8 more specifics
    Multiple SMR suppression time:  60 secs
  ETR accept mapping data:          disabled, verify disabled
  ETR map-cache TTL:                1d00h
  Locator Status Algorithms:
    RLOC-probe algorithm:           disabled
  Static mappings configured:       0
  Map-cache size/limit:             1/1000
  Map-cache activity check period:  60 secs
  Map-database size:                1
  Persistent map-cache:             interval 00:10:00
    Earliest next store:            00:05:28
    Location:                       flash:LISP-MapCache-IPv4-00000000-00030
Router#
```

Table 1 describes the significant fields shown in the display.

Table 1 show ip lisp Field Descriptors

Field	Description
Ingress Tunnel Router (ITR)	This field indicates whether the router is configured as an ITR (see **ipv4 itr**)
Egress Tunnel Router (ETR)	This field indicates whether the router is configured as an ETR. (see **ipv4 etr**)
Proxy-ITR	This field indicates whether the router is configured as a PITR. (see **ipv4 proxy-itr**)
Proxy-ETR	This field indicates whether the router is configured as a PETR. (see **ipv4 proxy-etr**)
Map Server (MS)	This field indicates whether the router is configured as a Map Server. (see **ipv4 map-server**)
Map Resolver (MR)	This field indicates whether the router is configured as a Map Server. (see **ipv4 map-resolver**)
Map-Request source:	Identifies the IPv4 address used as the source in Map-Request messages
ITR Map-Resolver	Identifies the configured ITR Map-Resolver. (see **ipv4 itr map-resolver**).
ETR Map-Server(s)	Identifies the configured ETR Map-Server(s). (see **ipv4 etr map-server**).
ITR Solicit Map Request (SMR)	Indicates whether SMRs are accepted and processed, (see **ipv4 solicit-map-request**)
ETR accept mapping data	Indicates whether the ETR is configured to cache the mapping data contained in a Map-Request (see **ipv4 etr accept-map-request-mapping**)
ETR map-cache TTL	Identifies the current ETR map-cache TTL (see **ipv4 etr map-cache-ttl**)
Locator Status Algorithms	Indicates whether the locator reachability algorithm RLOC-probing is enabled (see **loc-reach-algorithm**)
Static mappings configured	Indicates the number of static cache-map entries are configured (see **map-cache**)
Map-cache size/limit	Indicates the number of entries currently in the map-cache, and the limit. (see **ipv4 map-cache-limit**).
Map-cache activity check period	Indicates how often the control plane checks the map-cache for outbound usage activity.
Map-database size	Indicates the number of entries currently in the map-database. (see **database-mapping**).
Persistent map-cache	Indicates the persistent map-cache timer interval, next use, and storage location. (see **ipv4 map-cache-persistent**)
ITR use proxy ETR RLOC configuration	When configured, indicates that the router uses PETR services, and lists the PETR locator. (see **ipv4 use-petr**).

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv4 etr	Configures the router to act as an IPv4 LISP Egress Tunnel Router (ETR)
ipv4 etr accept-map-request-mapping	Configure an ETR to cache IPv4 mapping data contained in a Map-Request message
ipv4 etr map-cache-ttl	Configures the TTL value inserted into a LISP Map-Reply message sent by an ETR in response to a Map-Request for an IPv4 EID-to-RLOC mapping.
ipv4 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv4 EID prefixes.
ipv4 itr	Configure the router to act as an IPv4 LISP Ingress Tunnel Router (ITR)
ipv4 itr map-resolver	Configured the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv4 Map-Request messages
ipv4 map-cache-limit	Configure the maximum number of IPv4 LISP map-cache entries allowed to be stored by the router.
ipv4 map-cache-persistent	Configure how often an ITR should save its dynamically learned IPv4 map-cache entries to a file in flash.
ipv4 map-resolver	Configure the router to act as a LISP Map Resolver.
ipv4 map-server	Configure the router to act as a LISP Map Server.
ipv4 solicit-map-request	Configure an ITR to ignore an IPv4 Map-Request message that has the solicit-map-request (SMR) bit set.

ipv4 source-locator	To configure a source locator to be used for an IPv4 LISP encapsulated packets
ipv4 proxy-etr	Configures the router to act as an IPv4 LISP Proxy Egress Tunnel Router (PETR)
ipv4 proxy-itr	Configures the router to act as an IPv4 LISP Proxy Ingress Tunnel Router (PITR)
ipv4 use-petr	Configures an ITR or PITR to use the PETR for traffic destined to non-LISP IPv4 destinations.
map-cache	Configures a static IPv4 EID-prefix to locator map-cache entry.

show ip lisp alt negative-prefix

To display the negative prefix hole in the LISP ALT for an IPv4 EID-prefix, use the **show ip lisp alt negative-prefix** command in privileged EXEC mode.

show ip lisp alt negative-prefix [*EID-prefix*]

Syntax Description

EID-prefix	IPv4 EID prefix for which the negative-prefix query is requested.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	This command was introduced.

Usage Guidelines

This command is used to display the prefix within the LISP ALT that covers the IPv4 EID prefix queried. If the ALT contains a LISP EID prefix that covers the one queried, it is displayed. If the ALT does not contain a LISP EID prefix that covers the one queried, it displays the longest negative-prefix that covers the one queried.

Examples

The following partial sample output from the **show ip route vrf lisp** command displays some of the entries in the example LISP ALT. Output from the **show ip lisp alt negative-prefix** command is then shown to illustrate its use in locating holes in the ALT prefixes.

```
Router# show ip route vrf lisp
---<skip>---
     10.0.0.0/8 is variably subnetted, 13 subnets, 2 masks
B       10.0.254.2/31 [20/0] via 10.0.254.18, 2d09h
B       10.0.254.4/31 [20/0] via 10.0.254.18, 2d09h
B       10.0.254.6/31 [20/0] via 10.0.254.18, 2d09h
B       10.0.254.8/31 [20/0] via 10.0.254.18, 2d09h

Router# show ip lisp alt negative-prefix 10.0.254.1
Negative ALT prefix 10.0.254.0/31
Router# show ip lisp alt negative-prefix 10.0.254.2
EID is covered by prefix 10.0.254.2/31
Router#
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

show ip lisp database

To display LISP ETR configured local IPv4 EID-prefixes and associated locator sets, use the **show ip lisp database** command in privileged EXEC mode.

> **show ip lisp database** [*EID-prefix*] | [**eid-table** {**default** | {**vrf** *vrf-name*}}] | [**instance-id** *iid*]

Syntax Description

EID-prefix	One of any IPv4 EID prefix configured using the **ip lisp database-mapping** command.
eid-table default	Select the default (global) routing table for association with the configured instance-id.
eid-table vrf *vrf-name*	Select the VRF named *vrf-name* for association with the configured instance-id.
instance-id *iid*	The instance-id associated with this eid-table (value between 0 and 16777215)

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.
15.1(4)XB5	The syntax of this command was modified.

Usage Guidelines

This command is used on LISP ETR devices to display the configured local IPv4 EID-prefixes and associated locator set(s).

Examples

The following sample output from the **show ip lisp database** command displays the configured IPv4 EID-prefix block(s) and associated locator set(s). As illustrated, the output of this command shows the configured IPv4 EID-to-RLOC database mappings.

```
Router# show run
...<skip>...
!
router lisp
 eid-table default instance-id 0
  database-mapping 192.168.1.0/24 10.0.0.2 priority 1 weight 1
  exit
 !

Router# show ip lisp database instance-id 0
LISP ETR IPv4 Mapping Database for EID-table default (IID 0), LSBs: 0x1, 1 entries

192.168.1.0/24
  Locator   Pri/Wgt  Source     State
  10.0.0.2   1/1     cfg-addr   site-self, reachable
Router#
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

show ip lisp forwarding

To display LISP IPv4 EID-prefix information, use the **show ip lisp forwarding** command in privileged EXEC mode.

>   **show ip lisp forwarding {eid {local | remote [detail]} | state}**

Syntax Description

eid	Display information related to EID-prefixes (local or remote)
local	Displays locally configured EID-prefix.
remote	Displays forwarding action and Locator status bits for dynamically learned EID-prefix blocks, and the number of packets and total bytes encapsulated
detail	(Optional) Only available for use with **remote** keyword, displays detailed information associated with each remote EID-prefix
state	Displays information about the LISP module forwarding state

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

This command is used to display information for either local or remote IPv4 EID-prefixes. Local IPv4 EID-prefixes are those for which the router is authoritative and added via the **ip lisp database-mapping** command. Remote IPv4 EID-prefixes are those for remote sites and learned dynamically through Map-Reply information or via Map-Request messages when the **ip lisp etr accept-map-request-mapping** command is configured.

Examples

The following sample output from the **show ip lisp forwarding eid local** command displays local IPv4 EID-prefix information.

```
Router# show ip lisp forwarding eid local
Prefix
192.168.1.0/24
192.168.100.0/24
Router#
```

The following sample output from the **show ip lisp forwarding eid remote** command displays summary remote IPv4 EID-prefix information when the keyword **detail** is not used. The display shows EID-prefix, associated locator status bits, and total encapsulated packets/bytes for each remote IPv4 EID-prefix.

```
Router# show ip lisp forwarding eid remote
Prefix              Fwd action  Locator status bits
0.0.0.0/0            signal      0x00000000
  packets/bytes     1/86
192.168.2.0/24       encap       0x00000003
  packets/bytes     4/344
192.168.3.0/24       encap       0x00000003
  packets/bytes     5/430
Router#
```

The following sample output from the **show ip lisp forwarding eid remote detail** command displays detailed remote IPv4 EID-prefix information by adding the **detail** keyword. The display shows EID-prefix, associated locator status bits, and total encapsulated packets/bytes for each remote IPv4 EID-prefix.

```
Router# show ip lisp forwarding eid remote detail
Prefix             Fwd action   Locator status bits
0.0.0.0/0          signal       0x00000000
  packets/bytes      1/86
  path list 060A4690, flags 0x49, 3 locks, per-destination
  ifnums:
   LISP0(14)
  1 path
    path 060A4DF0, path list 060A4690, share 1/1, type attached prefix, for IPv4
    attached to LISP0, adjacency glean for LISP0
  1 output chain
  chain[0]:  glean for LISP0
192.168.2.0/24     encap        0x00000003
  packets/bytes     19/1634
  path list 06BFA2B8, flags 0x49, 5 locks, per-destination
  ifnums:
   LISP0(14): 10.0.0.6
  1 path
    path 06E8C8C0, path list 06BFA2B8, share 100/100, type attached nexthop, for IPv4
    nexthop 10.0.0.6 LISP0, adjacency IP midchain out of LISP0, addr 10.0.0.6 073747B8
  1 output chain
Prefix             Fwd action   Locator status bits
  chain[0]:  IP midchain out of LISP0, addr 10.0.0.6 073747B8 IP adj out of Ethernet0/0, addr
10.0.0.2 0620D8A8
192.168.3.0/24     encap        0x00000003
Router#
```

The following sample output from the **show ip lisp forwarding state** command displays detailed information about the state of the LISP process forwarding state. (Both IPv4 and IPv6 information is presented).

```
Router# show ip lisp forwarding state
LISP forwarding state for EID table IPv4:Default
Instance ID          0
  EID VRF            Default (0x0)
    IPv4
      Configured roles     ITR|ETR
      Active roles         ITR|ETR
      EID table            IPv4:Default
      ALT table            <null>
      Locator status bits  0x00000001
    IPv6
      Configured roles     ITR|ETR
      Active roles         ITR|ETR
      EID table            IPv6:Default
      ALT table            <null>
      Locator status bits  0x00000001
    RLOC transport VRF     Default (0x0)
      IPv4 RLOC table      IPv4:Default
      IPv6 RLOC table      IPv6:Default
    LISP virtual interface  LISP0
Router#
```

Related Commands

Command	Description
show ip lisp map-cache	Display the current dynamic and static IPv4 EID-to-RLOC map-cache entries.

show ip lisp instance-id

To display the IPv4 LISP configuration status for a specific instance-id, use the **show ip lisp instance-id** command in privileged EXEC mode.

      show ip lisp instance-id *iid*

Syntax Description

instance-id *iid*	EID instance-id

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	The syntax of this command was added.

Usage Guidelines

This command is used to display the IPv4 LISP configuration status for a specific instance-id.

Examples

The following sample output from the **show ip lisp instance-id** command for the instance-id 345.

```
Router# show ip lisp instance-id 345
Instance ID:                    345
Ingress Tunnel Router (ITR):    enabled
  Egress Tunnel Router (ETR):     enabled
  Proxy-ITR Router (PITR):        disabled
  Proxy-ETR Router (PETR):        disabled
  Map Server (MS):                disabled
  Map Resolver (MR):              disabled
  Map-Request source:             172.16.8.2
  ITR Map-Resolver(s):            10.9.0.2
  ETR Map-Server(s):              10.9.0.2 (00:00:43)
  ITR Solicit Map Request (SMR):  accept and process
    Max SMRs per map-cache entry: 8 more specifics
    Multiple SMR suppression time: 60 secs
  ETR accept mapping data:        disabled, verify disabled
  ETR map-cache TTL:              1d00h
  Locator Status Algorithms:
    RLOC-probe algorithm:         disabled
  Static mappings configured:     0
  Map-cache size/limit:           1/1000
  Map-cache activity check period: 60 secs
  Map-database size:              1
  Persistent map-cache:           interval 00:10:00
    Earliest next store:          00:10:11
    Location:                     flash:LISP-MapCache-IPv4-00000001-00031
Router#
```

Related Commands

Command	Description
eid-prefix	Configure on a Map-Server as part of the LISP Site configuration process, the EID-prefix associated with a LISP site.
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table

show ip lisp map-cache

To display the current dynamic and static IPv4 EID-to-RLOC map-cache entries, use the **show ip lisp map-cache** command in privileged EXEC mode.

> **show ip lisp map-cache** {*destination-EID* | *destination-EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} | **detail**}

Syntax Description

destination-EID	(Optional) Destination EID for which to display mapping.
destination-EID-prefix	(Optional) Destination EID-prefix for which to display mapping.
eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.
detail	(Optional) Display detailed EID-to-RLOC cache mapping information

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

This command is used to display the current dynamic and static IPv4 EID-to-RLOC map-cache entries. When no IPv4 EID or IPv4 EID-prefix is specified, summary information is listed for all current dynamic and static IPv4 EID-to-RLOC map-cache entries. When an IPv4 EID or IPv4 EID-prefix is included, information is listed for the longest-match lookup in the cache. When the **detail** option is uses, detailed (rather than summary) information related to all current dynamic and static IPv4 EID-to-RLOC map-cache entries.

Examples

The following sample output from the **show ip lisp map-cache** command (without the use of an IPv4 EID or IPv4 EID-prefix) displays a summary list of current dynamic and static IPv4 EID-to-RLOC map-cache entries. The display shows IPv4 EID-prefix and associated information.

```
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 2 entries

0.0.0.0/0, uptime: 00:00:17, expires: never, via static
  Negative cache entry, action: send-map-request
192.168.2.0/24, uptime: 00:00:02, expires: 23:59:54, via map-reply, complete
  Locator   Uptime    State      Pri/Wgt
  10.0.0.6  00:00:02  up          1/100
  10.1.0.6  00:00:02  admin-down 255/0
Router#
```

The following sample output from the **show ip lisp map-cache detail** command displays a detailed list of current dynamic and static IPv4 EID-to-RLOC map-cache entries.

```
Router# show ip lisp map-cache detail
LISP IPv4 Mapping Cache, 2 entries

0.0.0.0/0, uptime: 00:00:41, expires: never, via static
  State: send-map-request, last modified: 00:00:41, map-source: local
  Idle, Packets out: 0
  Negative cache entry, action: send-map-request
192.168.2.0/24, uptime: 00:00:26, expires: 23:59:31, via map-reply, complete
```

```
     State: complete, last modified: 00:00:26, map-source: 10.0.0.6
     Active, Packets out: 0
     Locator   Uptime    State       Pri/Wgt
     10.0.0.6  00:00:26  up             1/100
       Last up-down state change:        never, state change count: 0
       Last priority / weight change:    never/never
       RLOC-probing loc-status algorithm:
         Last RLOC-probe sent:           never
     10.1.0.6  00:00:26  admin-down 255/0
       Last up-down state change:        never, state change count: 0
       Last priority / weight change:    never/never
       RLOC-probing loc-status algorithm:
         Last RLOC-probe sent:           never
Router#
```

The following sample output from the **show ip lisp map-cache** command with a specific IPv4 EID-prefix displays detailed information associated with that IPv4 EID prefix entry.

```
Router# show ip lisp map-cache 192.168.2.0/24
LISP IPv4 Mapping Cache, 2 entries

192.168.2.0/24, uptime: 00:01:01, expires: 23:58:56, via map-reply, complete
  State: complete, last modified: 00:01:01, map-source: 10.0.0.6
  Active, Packets out: 0
  Locator   Uptime    State       Pri/Wgt
  10.0.0.6  00:01:01  up             1/100
    Last up-down state change:        never, state change count: 0
    Last priority / weight change:    never/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:           never
  10.1.0.6  00:01:01  admin-down 255/0
    Last up-down state change:        never, state change count: 0
    Last priority / weight change:    never/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:           never
Router#
```

The following sample output from the **show ip lisp map-cache** command with a specific instance-id.

```
Router# show ip lisp map-cache instance-id 123
LISP IPv4 Mapping Cache for EID-table vrf green (IID 123), 2 entries

0.0.0.0/0, uptime: 02:24:43, expires: never, via static
  Negative cache entry, action: send-map-request
10.2.0.0/24, uptime: 00:10:10, expires: 23:49:42, via map-reply, complete
  Locator   Uptime    State       Pri/Wgt
  172.2.0.2 00:10:10  up             1/100
Router#
```

Related Commands

Command	Description
show ip lisp forwarding	Display LISP local or remote IPv4 EID-prefix information.

show ip lisp route-import

To display the current IPv4 RIB routes imported into LISP, use the **show ip lisp route-import** command in privileged EXEC mode.

> **show ip lisp route-import** {*destination-EID* | *destination-EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} }

Syntax Description

destination-EID	(Optional) Destination EID for which to display mapping.
destination-EID-prefix	(Optional) Destination EID-prefix for which to display mapping.
eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was added.

Usage Guidelines

This command is used to display the current IPv4 RIB routes imported into LISP. A non-ALT-connected PITR uses this information for signaling the LISP control plane process (Map-Request generation) for populating the PITR IPv4 LISP map cache. IPv4 RIB routes may be imported into LISP using the **ipv4 route-import** command.

To restrict the display output to a specific EID/EID-prefix, add *EID* or *EID-prefix* to the command. To restrict the display output to a specific eid-table, add **eid-table vrf** *vrf-name* to the command. To restrict the display output to a specific LISP instance-id, add **instance-id** *iid* to the command

Examples

The following sample output from the **show ip lisp route-import** command shows the IPv4 routes imported into LISP for use in signaling the LISP control plane to send Map-Requests when populating its map-cache.

```
PITR(config)# route-map static-lisp permit 10
PITR(config-route-map)# match tag 123
PITR(config-route-map)# exit
PITR(config)# ip route 10.0.1.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.2.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.3.0 255.255.255.0 null0 tag 123
PITR(config)# ip route 10.0.4.0 255.255.255.0 null0 tag 456
PITR(config)# route lisp
PITR(config-router-lisp)# eid-table default instance-id 0
PITR(config-router-lisp-eid-table)# ipv4 route-import map-cache static route-map static-lisp
PITR(config-router-lisp-eid-table)# Ctrl-Z
PITR#
PITR# show ip lisp route-import
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 3
Prefix                       Uptime    Source  Map-cache    State
10.0.1.0/24                  00:05:31  static  installed
10.0.2.0/24                  00:05:31  static  installed
10.0.3.0/24                  00:05:31  static  installed
PITR#
```

In the above output it can be seen that three static routes matching the tag 123 have been **installed**. The source of the routes is listed as **static**. Possible entries for Source include **static** and **bgp**. Possible entries for Map-cache State include:

none – the router is not attempting to install the map-cache map-request entry (e.g. PITR is not enabled)

installed – the router has created the matching map-cache map-request entry

got-bumped – another source of map-cache entry (e.g. static or a received mapping) replaced the route-import entry

hit-limit – the router was not able to create the matching map-cache map-request entry because the configured map-cache entry limit was hit

Related Commands

Command	Description
clear ipv4 route-import	Clear the table and force a re-evaluation of all imported routes.
debug lisp control-plane rib-route-import	Turn on LISP control plane debugging messages related to the RIB route import functionality.

show ip lisp statistics

To display LISP IPv4 address-family packet count statistics, use the **show ip lisp statistics** command in privileged EXEC mode.

>   **show ip lisp statistics** {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} }

Syntax Description

eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB5	The syntax of this command was modified.

Usage Guidelines

This command is used to display IPv4 LISP statistics related to packet encapsulations, de-encapsulations, map-requests, map-replies, map-registers, and other LISP-related packets.

Examples

The following sample output from the **show ip lisp statistics** command displays the current LISP IPv4 address family statistics. The output varies, depending on the LISP features configured and the state of various LISP components.

```
Router# show ip lisp statistics
LISP Statistics - last cleared: never
Control Packets:
  Map-Requests in/out:                    539/284
    Encapsulated Map-Requests in/out:     6/17
    RLOC-probe Map-Requests in/out:       533/267
    SMR-based Map-Requests in/out:        0/0
    Map-Resolver Map-Requests forwarded:  0
    Map-Server Map-Requests forwarded:    0
  Map-Reply records in/out:               276/272
    Authoritative records in/out:         276/272
    Non-authoritative records in/out:     0/0
    Negative records in/out:              2/0
    RLOC-probe records in/out:            267/266
    Map-Server Proxy-Reply records out:   0
  Map-Register records in/out:            0/242
    Authentication failures:              0
  Map-Notify records in/out:              0/0
    Authentication failures:              0
  Errors:
```

```
   Map-Request format errors:                0
   Map-Reply format errors:                  0
   Map-Reply spoof alerts:                   0
   Mapping record TTL alerts:                0
 Cache Related:
   Cache entries created/deleted:            21/18
   Number of EID-prefixes in map-cache:      3
   Number of negative entries in map-cache:  1
   Total number of RLOCs in map-cache:       2
   Average RLOCs per EID-prefix:             1
 Forwarding:
   Number of data signals processed:         3 (+ dropped 0)
   Number of reachability reports:           0 (+ dropped 0)
 ITR Map-Resolvers:
   Map-Resolver        LastReply  Metric ReqsSent Positive Negative No-Reply
   10.0.0.10           01:36:34       18       17        7        2        2
 Router#
```

Related Commands

Command	Description
show ip lisp	Display the IPv4 LISP configuration status for the local device.

---

show ipv6 lisp

To display the LISP IPv6 configuration status, use the **show ipv6 lisp** command in privileged EXEC mode.

> **show ipv6 lisp**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(1)XB2	This command was modified.
2.5.1XB	This command was modified.
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

When used with no arguments or keywords, the **show ipv6 lisp** command displays the IPv6 LISP configuration status for the local device.

Examples

The following sample output from the **show ipv6 lisp** command displays information about the current IPv6 LISP configuration status. The output varies, depending on the LISP features configured.

```
Router# show ipv6 lisp
  Ingress Tunnel Router (ITR):     enabled
  Egress Tunnel Router (ETR):      enabled
```

```
Proxy-ITR Router (PITR):        disabled
Proxy-ETR Router (PETR):        disabled
Map Server (MS):                disabled
Map Resolver (MR):              disabled
Map-Request source:             2001:DB8:A:2::1
ITR Map-Resolver:               10.0.100.2
ETR Map-Server(s):              10.0.100.2 (00:00:07)
ITR Solicit Map Request (SMR):  accept and process
  Max SMRs per map-cache entry: 8 more specifics
  Multiple SMR suppression time: 60 secs
ETR accept mapping data:        disabled, verify disabled
ETR map-cache TTL:              1d00h
Locator Status Algorithms:
  RLOC-probe algorithm:         disabled
Static mappings configured:     0
Map-cache size/limit:           1/1000
Map-cache activity check period: 60 secsRouter#
Map-database size:              1
Persistent map-cache:          interval 00:10:00
  Earliest next store:         00:05:28
  Location:                    flash:LISP-MapCache-IPv6-00000000-00030
```

Table 2 describes the significant fields shown in the display.

Table 2 show ipv6 lisp Field Descriptors

Field	Description
Ingress Tunnel Router (ITR)	This field indicates whether the router is configured as an ITR (see **ipv6 itr**)
Egress Tunnel Router (ETR)	This field indicates whether the router is configured as an ETR. (see **ipv6 etr**)
Proxy-ITR	This field indicates whether the router is configured as a PITR. (see **ipv6 proxy-itr**)
Proxy-ETR	This field indicates whether the router is configured as a PETR. (see **ipv6 proxy-etr**)
Map Server (MS)	This field indicates whether the router is configured as a Map Server. (see **ipv6 map-server**)
Map Resolver (MR)	This field indicates whether the router is configured as a Map Server. (see **ipv6 map-resolver**)
Map-Request source:	Identifies the IPv6 address used as the source in Map-Request messages
ITR Map-Resolver	Identifies the configured ITR Map-Resolver. (see **ipv6 itr map-resolver**).
ETR Map-Server(s)	Identifies the configured ETR Map-Server(s). (see **ipv6 etr map-server**).
ITR Solicit Map Request (SMR)	Indicates whether SMRs are accepted and processed, (see **ipv6 solicit-map-request**)
ETR accept mapping data	Indicates whether the ETR is configured to cache the mapping data contained in a Map-Request (see **ipv6 etr accept-map-request-mapping**)
ETR map-cache TTL	Identifies the current ETR map-cache TTL (see **ipv6 etr map-cache-ttl**)
RLOC-probe algorithm	Indicates whether the locator reachability algorithm RLOC-probing is enabled (see **loc-reach-algorithm**)
Static mappings configured	Indicates the number of static cache-map entries are configured (see **map-cache**)
Map-cache size/limit	Indicates the number of entries currently in the map-cache, and the limit. (see **ipv6 map-cache-limit**).
Map-cache activity check period	Indicates how often the control plane checks the map-cache for outbound usage activity.
Map-database size	Indicates the number of entries currently in the map-database. (see **database-mapping**).
Persistent map-cache	Indicates the persistent map-cache timer interval, next use, and storage location. (see **ipv6 map-cache-persistent**)
ITR use proxy ETR RLOC configuration	When configured, indicates that the router uses PETR services, and lists the PETR locator. (see **ipv6 use-petr**).

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

ipv6 etr	Configures the router to act as an IPv6 LISP Egress Tunnel Router (ETR)
ipv6 etr accept-map-request-mapping	Configure an ETR to cache IPv6 mapping data contained in a Map-Request message
ipv6 etr map-cache-ttl	Configures the TTL value inserted into a LISP Map-Reply message sent by an ETR in response to a Map-Request for an IPv6 EID-to-RLOC mapping.
ipv6 etr map-server	Configured the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
ipv6 itr	Configure the router to act as an IPv6 LISP Ingress Tunnel Router (ITR)
ipv6 itr map-resolver	Configured the IPv4 or IPv6 locator address of the LISP Map-Resolver to which the ITR sends IPv6 Map-Request messages
ipv6 map-cache-limit	Configure the maximum number of IPv6 LISP map-cache entries allowed to be stored by the router.
ipv6 map-cache-persistent	Configure how often an ITR should save its dynamically learned IPv6 map-cache entries to a file in flash.
ipv6 map-resolver	Configure the router to act as a LISP Map Resolver.
ipv6 map-server	Configure the router to act as a LISP Map Server.
ipv6 solicit-map-request	Configure an ITR to ignore an IPv6 Map-Request message that has the solicit-map-request (SMR) bit set.
ipv6 source- locator	To configure a source locator to be used for an IPv6 LISP encapsulated packets
ipv6 proxy-etr	Configures the router to act as an IPv6 LISP Proxy Egress Tunnel Router (PETR)
ipv6 proxy-itr	Configures the router to act as an IPv6 LISP Proxy Ingress Tunnel Router (PITR)
ipv6 use-petr	Configures an ITR or PITR to use the PETR for traffic destined to non-LISP IPv6 destinations.
map-cache	Configures a static IPv6 EID-prefix to locator map-cache entry.

show ip lisp alt negative-prefix

To display the negative prefix hole in the LISP ALT for an IPv6 EID-prefix, use the **show ipv6 lisp alt negative-prefix** command in privileged EXEC mode.

> **show ipv6 lisp alt negative-prefix [*EID-prefix*]**

Syntax Description

EID-prefix	IPv6 EID prefix for which the negative-prefix query is requested.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	This command was introduced.

Usage Guidelines

This command is used to display the prefix within the LISP ALT that covers the IPv6 EID prefix queried. If the ALT contains a LISP EID prefix that covers the one queried, it is displayed. If the ALT does not contain a LISP EID prefix that covers the one queried, it displays the longest negative-prefix that covers the one queried.

Examples

The following partial sample output from the **show ipv6 route vrf lisp** command displays some of the entries in the example LISP ALT. Output from the **show ipv6 lisp alt negative-prefix** command is then shown to illustrate its use in locating holes in the ALT prefixes.

```
Router# show ipv6 route vrf lisp
---<skip>---
B    2001:DB8:208C:10::/64 [20/0]
     via FE80::21F:6DFF:FE8F:7018, Tunnel18
B    2001:DB8:5:600::/56 [20/0]
     via FE80::21F:6DFF:FE8F:7018, Tunnel18

Router# show ipv6 lisp alt negative-prefix 2001:DB8:208C:10::1
EID is covered by prefix 2001:DB8:208C:10::/64
Router# show ipv6 lisp alt negative-prefix 2001:DB8:208C:11::1
Negative ALT prefix 2001:DB8:208C:11::/64
Router#
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

---

show ipv6 lisp database

To display LISP ETR configured local IPv6 EID-prefixes and associated locator sets, use the **show ipv6 lisp database** command in privileged EXEC mode.

   show ipv6 lisp database [*EID-prefix*] | [**eid-table** {**default** | {**vrf** *vrf-name*}}] | [**instance-id** *iid*]

Syntax Description

EID-prefix	One of any IPv6 EID prefix configured using the **ipv6 lisp database-mapping** command.
eid-table default	Select the default (global) routing table for association with the configured instance-id.
eid-table vrf *vrf-name*	Select the VRF named *vrf-name* for association with the configured instance-id.
instance-id *iid*	The instance-id associated with this eid-table (value between 0 and 16777215)

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.
15.1(4)XB5	The syntax of this command was modified.

Usage Guidelines

This command is used on LISP ETR devices to display the configured local IPv6 EID-prefixes and associated locator set(s).

Examples

The following sample output from the **show ipv6 lisp database** command displays the configured IPv6 EID-prefix block(s) and associated locator set(s). As illustrated, the output of this command shows the configured IPv6 EID-to-RLOC database mappings.

```
Router# show run
...<skip>...
```

```
 !
router lisp
 eid-table default instance-id 0
  database-mapping 2001:DB8:A::/48 10.0.0.2 priority 1 weight 1
  exit
 !

Router# show ipv6 lisp database instance-id 0
LISP ETR IPv6 Mapping Database for EID-table default (IID 0), LSBs: 0x1, 1 entries

2001:DB8:A::/48
  Locator    Pri/Wgt  Source     State
  10.0.0.2   1/1      cfg-addr   site-self, reachable
Router#
```

Related Commands

Command	Description
database-mapping	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

---

show ipv6 lisp forwarding

To display LISP IPv6 EID-prefix information, use the **show ipv6 lisp forwarding** command in privileged EXEC mode.

> **show ipv6 lisp forwarding {eid {local | remote [detail]} | state}**

Syntax Description

eid	Display information related to EID-prefixes (local or remote)
local	Displays locally configured EID-prefix.
remote	Displays forwarding action and Locator status bits for dynamically learned EID-prefix blocks, and the number of packets and total bytes encapsulated
detail	(Optional) Only available for use with **remote** keyword, displays detailed information associated with each remote EID-prefix
state	Displays information about the LISP module forwarding state

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

This command is used to display information for either local or remote IPv6 EID-prefixes. Local IPv6 EID-prefixes are those for which the router is authoritative and added via the **database-mapping** command. Remote IPv6 EID-prefixes are those for remote sites and learned dynamically through Map-Reply information or via Map-Request messages when the **ipv6 etr accept-map-request-mapping** command is configured.

Examples

The following sample output from the **show ipv6 lisp forwarding eid local** command displays local IPv6 EID-prefix information.

```
Router# show ipv6 lisp forwarding eid local
```

```
Prefix
2001:DB8:AA::/48
2001:DB8:BB::/48
Router#
```

The following sample output from the **show ipv6 lisp forwarding eid remote** command displays summary remote IPv6 EID-prefix information. Summary information is displayed when the keyword **detail** is not used. The display shows EID-prefix, associated locator status bits, and total encapsulated packets/bytes for each remote IPv6 EID-prefix.

```
Router# show ipv6 lisp forwarding eid remote
Prefix                  Fwd action  Locator status bits
::/0                    signal      0x00000000
  packets/bytes         0/0
2001:DB8:AB::/48        encap       0x00000001
  packets/bytes         25/2150
Router#
```

The following sample output from the **show ipv6 lisp forwarding eid remote detail** command displays detailed remote IPv6 EID-prefix information by adding the **detail** keyword. The display shows EID-prefix, associated locator status bits, and total encapsulated packets/bytes for each remote IPv6 EID-prefix.

```
Router# show ipv6 lisp forwarding eid remote detail
Prefix                  Fwd action  Locator status bits
::/0                    signal      0x00000000
  packets/bytes         0/0
  path list 0729CE78, flags 0x49, 3 locks, per-destination
  ifnums:
   LISP0(14)
  1 path
    path 0729D4E0, path list 0729CE78, share 1/1, type attached prefix, for IPv6
    attached to LISP0, adjacency glean for LISP0
  1 output chain
  chain[0]:  glean for LISP0
2001:DB8:AB::/48        encap       0x00000001
  packets/bytes         25/2150
  path list 06BFA050, flags 0x49, 3 locks, per-destination
  ifnums:
   LISP0(14): 10.0.0.6
  1 path
    path 06E8C5B0, path list 06BFA050, share 100/100, type attached nexthop, for IPv6
    nexthop 10.0.0.6 LISP0, adjacency IPV6 midchain out of LISP0, addr 10.0.0.6 07374688
  1 output chain
Prefix                  Fwd action  Locator status bits
  chain[0]:  IPV6 midchain out of LISP0, addr 10.0.0.6 07374688 IP adj out of Ethernet0/0,
addr 10.0.0.2 0620D8A8
Router#
```

The following sample output from the **show ipv6 lisp forwarding state** command displays detailed information about the state of the LISP process forwarding state. (Both IPv4 and IPv6 information is presented).

```
Router# show ipv6 lisp forwarding state
LISP forwarding state for EID table IPv4:Default
Instance ID             0
  EID VRF               Default (0x0)
    IPv4
      Configured roles      ITR|ETR
      Active roles          ITR|ETR
      EID table             IPv4:Default
      ALT table             <null>
      Locator status bits   0x00000001
    IPv6
      Configured roles      ITR|ETR
      Active roles          ITR|ETR
      EID table             IPv6:Default
      ALT table             <null>
      Locator status bits   0x00000001
  RLOC transport VRF      Default (0x0)
      IPv4 RLOC table       IPv4:Default
```

```
      IPv6 RLOC table         IPv6:Default
   LISP virtual interface  LISP0
Router#
```

Related Commands

Command	Description
show ipv6 lisp map-cache	Display the dynamic and static IPv6 EID-to-RLOC map-cache entries.

---

show ipv6 lisp instance-id

To display the IPv4 LISP configuration status for a specific instance-id, use the **show ipv6 lisp instance-id** command in privileged EXEC mode.

> **show ipv6 lisp instance-id** *iid*

Syntax Description

instance-id *iid*	EID instance-id

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	This command was introduced.

Usage Guidelines

This command is used to display the IPv6 LISP configuration status for a specific instance-id.

Examples

The following sample output from the **show ipv6 lisp instance-id** command for the instance-id 123.

```
Router# show ipv6 lisp instance-id 123
Instance ID:                    123
  Ingress Tunnel Router (ITR):      enabled
  Egress Tunnel Router (ETR):       enabled
  Proxy-ITR Router (PITR):          disabled
  Proxy-ETR Router (PETR):          disabled
  Map Server (MS):                  disabled
  Map Resolver (MR):                disabled
  Map-Request source:               2001:DB8:B::1
  ITR Solicit Map Request (SMR):    accept and process
    Max SMRs per map-cache entry:   8 more specifics
    Multiple SMR suppression time:  60 secs
  ETR accept mapping data:          disabled, verify disabled
  ETR map-cache TTL:                1d00h
  Locator Status Algorithms:
    RLOC-probe algorithm:           disabled
  Static mappings configured:       0
  Map-cache size/limit:             1/1000
  Map-cache activity check period:  60 secs
  Map-database size:                1
  Persistent map-cache:             interval 00:10:00
    Earliest next store:            00:06:10
    Location:                       flash:LISP-MapCache-IPv6-00000345-00004 (idle)
Router#
```

Related Commands

Command	Description
eid-prefix	Configure on a Map-Server as part of the LISP Site configuration process, the EID-prefix associated with a LISP site.
eid-table	Configure a LISP instance-id for association with a virtual routing and forwarding (vrf) table or default table

---

show ipv6 lisp map-cache

To display the current dynamic and static IPv6 EID-to-RLOC map-cache entries, use the **show ipv6 lisp map-cache** command in privileged EXEC mode.

> **show ipv6 lisp map-cache** {*destination-EID* | *destination-EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} | **detail**}

Syntax Description

destination-EID	(Optional) Destination EID for which to display mapping.
destination-EID-prefix	(Optional) Destination EID-prefix for which to display mapping.
eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.
detail	(Optional) Display detailed EID-to-RLOC cache mapping information

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

This command is used to display the current dynamic and static IPv6 EID-to-RLOC map-cache entries. When no IPv6 EID or IPv6 EID-prefix is specified, summary information is listed for all current dynamic and static IPv6 EID-to-RLOC map-cache entries. When an IPv6 EID or IPv6 EID-prefix is included, information is listed for the longest-match lookup in the cache. When the **detail** option is uses, detailed (rather than summary) information related to all current dynamic and static IPv4 EID-to-RLOC map-cache entries.

Examples

The following sample output from the **show ipv6 lisp map-cache** command (without the use of an IPv6 EID or IPv6 EID-prefix) displays a summary list of current dynamic and static IPv6 EID-to-RLOC map-cache entries. The display shows IPv6 EID-prefix and associated information.

```
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 2 entries

::/0, uptime: 00:00:26, expires: never, via static
  Negative cache entry, action: send-map-request
2001:DB8:AB::/48, uptime: 00:00:04, expires: 23:59:53, via map-reply, complete
  Locator    Uptime    State      Pri/Wgt
  10.0.0.6  00:00:04  up         1/100
Router#
```

The following sample output from the **show ipv6 lisp map-cache detail** command displays a detailed list of current dynamic and static IPv4 EID-to-RLOC map-cache entries.

```
Router# show ipv6 lisp map-cache detail
LISP IPv6 Mapping Cache, 2 entries

::/0, uptime: 00:00:52, expires: never, via static
  State: send-map-request, last modified: 00:00:52, map-source: local
  Idle, Packets out: 0
  Negative cache entry, action: send-map-request
2001:DB8:AB::/48, uptime: 00:00:30, expires: 23:59:27, via map-reply, complete
  State: complete, last modified: 00:00:30, map-source: 10.0.0.6
  Active, Packets out: 0
  Locator   Uptime   State      Pri/Wgt
  10.0.0.6  00:00:30  up          1/100
    Last up-down state change:         never, state change count: 0
    Last priority / weight change:     never/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:            never
Router#
```

The following sample output from the **show ipv6 lisp map-cache** command with a specific IPv6 EID-prefix displays detailed information associated with that IPv6 EID prefix entry.

```
Router# show ipv6 lisp map-cache 2001:DB8:AB::/48
LISP IPv6 Mapping Cache, 2 entries

2001:DB8:AB::/48, uptime: 00:01:02, expires: 23:58:54, via map-reply, complete
  State: complete, last modified: 00:01:02, map-source: 10.0.0.6
  Active, Packets out: 0
  Locator   Uptime   State      Pri/Wgt
  10.0.0.6  00:01:02  up          1/100
    Last up-down state change:         never, state change count: 0
    Last priority / weight change:     never/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:            never
Router#
```

Related Commands

Command	Description
show ipv6 lisp forwarding	Display LISP local or remote IPv6 EID-prefix information.

---

show ipv6 lisp route-import

To display the current IPv6 RIB routes imported into LISP, use the **show ipv6 lisp route-import** command in privileged EXEC mode.

> **show ipv6 lisp route-import** {*destination-EID* | *destination-EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} }

Syntax Description

destination-EID	(Optional) Destination EID for which to display mapping.
destination-EID-prefix	(Optional) Destination EID-prefix for which to display mapping.
eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was added.

Usage Guidelines

This command is used to display the current IPv6 RIB routes imported into LISP. A non-ALT-connected PITR uses this information for signaling the LISP control plane process (Map-Request generation) for populating the PITR IPv6 LISP map cache. IPv6 RIB routes may be imported into LISP using the **ipv6 route-import** command.

To restrict the display output to a specific EID/EID-prefix, add *EID* or *EID-prefix* to the command. To restrict the display output to a specific eid-table, add **eid-table vrf** *vrf-name* to the command. To restrict the display output to a specific LISP instance-id, add **instance-id** *iid* to the command

Examples

The following sample output from the **show ipv6 lisp route-import** command shows the IPv6 routes imported into LISP for use in signaling the LISP control plane to send Map-Requests when populating its map-cache.

```
PITR(config)# route-map static-lisp permit 10
PITR(config-route-map)# match tag 123
PITR(config-route-map)# exit
PITR(config)# ipv6 route 2001:db8:a::/48 null0 tag 123
PITR(config)# ipv6 route 2001:db8:b::/48 null0 tag 123
PITR(config)# ipv6 route 2001:db8:c::/48 null0 tag 123
PITR(config)# ipv6 route 2001:db8:d::/48 null0 tag 456
PITR(config)# route lisp
PITR(config-router-lisp)# eid-table default instance-id 0
PITR(config-router-lisp-eid-table)# ipv6 route-import map-cache static route-map static-lisp
PITR(config-router-lisp-eid-table)# Ctrl-Z
PITR#
PITR# show ipv6 lisp route-import
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 3
Prefix                      Uptime      Source  Map-cache    State
2001:DB8:A::/48             00:02:35    static  installed
2001:DB8:B::/48             00:02:35    static  installed
2001:DB8:C::/48             00:02:35    static  installed
PITR#
```

In the above output it can be seen that three static routes matching the tag 123 have been **installed**. The source of the routes is listed as **static**. Possible entries for Source include **static** and **bgp**. Possible entries for Map-cache State include:

none – the router is not attempting to install the map-cache map-request entry (e.g. PITR is not enabled)

installed – the router has created the matching map-cache map-request entry

got-bumped – another source of map-cache entry (e.g. static or a received mapping) replaced the route-import entry

hit-limit – the router was not able to create the matching map-cache map-request entry because the configured map-cache entry limit was hit

Related Commands

Command	Description
clear ipv6 route-import	Clear the table and force a re-evaluation of all imported routes.
debug lisp control-plane rib-route-import	Turn on LISP control plane debugging messages related to the RIB route import functionality.

show ipv6 lisp statistics

To display LISP IPv6 address-family statistics, use the **show ipv6 lisp statistics** command in privileged EXEC mode.

> **show ipv6 lisp statistics** {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*} }

Syntax Description

eid-table vrf *vrfname*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB5	The syntax of this command was modified.

Usage Guidelines

This command is used to display IPv6 LISP statistics related to packet encapsulations, de-encapsulations, map-requests, map-replies, map-registers, and other LISP-related packets.

Examples

The following sample output from the **show ipv6 lisp statistics** command displays the current LISP IPv6 address family statistics. The output varies, depending on the LISP features configured and the state of various LISP components.

```
Router# show ipv6 lisp statistics
LISP Statistics - last cleared: never
Control Packets:
  Map-Requests in/out:                 1/269
    Encapsulated Map-Requests in/out:  1/2
    RLOC-probe Map-Requests in/out:    0/267
    SMR-based Map-Requests in/out:     0/0
    Map-Resolver Map-Requests forwarded: 0
    Map-Server Map-Requests forwarded: 0
  Map-Reply records in/out:            269/268
    Authoritative records in/out:      269/268
    Non-authoritative records in/out:  0/0
    Negative records in/out:           0/0
    RLOC-probe records in/out:         267/267
    Map-Server Proxy-Reply records out: 0
  Map-Register records in/out:         0/243
    Authentication failures:           0
  Map-Notify records in/out:           0/0
    Authentication failures:           0
Errors:
  Map-Request format errors:           0
  Map-Reply format errors:             0
  Map-Reply spoof alerts:              0
  Mapping record TTL alerts:           0
Cache Related:
  Cache entries created/deleted:       7/5
  Number of EID-prefixes in map-cache: 2
  Number of negative entries in map-cache: 1
  Total number of RLOCs in map-cache:  1
  Average RLOCs per EID-prefix:        1
Forwarding:
```

```
   Number of data signals processed:        1 (+ dropped 0)
   Number of reachability reports:          0 (+ dropped 0)
ITR Map-Resolvers:
  Map-Resolver          LastReply  Metric ReqsSent Positive Negative No-Reply
  10.0.0.10             00:14:12        0        2        2        0        0
Router#
```

Related Commands

Command	Description
show ipv6 lisp	Display the IPv6 LISP configuration status for the local device.

---

show lisp site

To display configured LISP sites and their status on a LISP Map-Server, use the **show lisp site** command in privileged EXEC mode.

> **show lisp site** [*IPv4-dest-EID*|*IPv4-dest-EID-prefix*|*IPv6-dest-EID*|*IPv6-dest-EID-prefix*] | [**eid-table vrf** *vrf-name*] | [**instance-id** *iid*] | [**name** *site-name*] | [summary] | [**detai**l]

Syntax Description

IPv4-dest-EID	(Optional) Display LISP site information matching this destination EID.
IPv4-dest-EID-prefix	(Optional) Display LISP site information matching this destination EID-prefix.
IPv6-dest-EID	(Optional) Display LISP site information matching this destination EID.
IPv6-dest-EID-prefix	(Optional) Display LISP site information matching this destination EID-prefix.
eid-table vrf *vrf-name*	(Optional) Limit the output of the command to the referenced eid-table.
instance-id *iid*	(Optional) Limit the output of the command to the referenced instance-id.
name *site-name*	(Optional) Display LISP site information matching this site-name.
summary	(Optional) Display LISP site summary information.
detail	(Optional) Increase the detail of all displayed LISP site information when no other parameters are used.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced into Cisco IOS 15.1(1)XB2
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(1)XB3	This command was modified.
2.5.1XC	This command was modified.
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

This command is used on a LISP Map-Server to display information related to configured LISP sites. The displayed output indicates, among other things, whether a site is actively registered.

When the base form of the command is used (show lisp site), summary information related to all configured LISP sites is displayed. When the *IPv4-dest-EID* form is used, a longest-match is done to return the site with the best matching EID-prefix and the displayed information applies specifically to that LISP site. When the *IPv4-dest-EID-prefix* form is used, exact-match is done to return the site configured with the EID-prefix and the displayed information applies specifically to that LISP site. When the *site-name* form is used, the displayed information contains all EID-prefixes configured for the named LISP site. When the **detail** keyword is added, all available details for the specific command form are presented.

Examples

The following sample output from the **show lisp site** command displays summary information related to all configured LISP sites.

```
Map-Server# show lisp site
LISP Site Registration Information

Site Name     Last      Up  Who Last            EID Prefix
              Register      Registered
Site-A        00:00:55  yes 10.0.0.2           123    192.168.1.0/24
              00:00:55  yes 10.0.0.2           123    2001:DB8:A::/48
Site-B        00:00:57  yes 10.0.0.6           123    192.168.2.0/24
              00:00:00  yes 10.0.0.6           123    2001:DB8:B::/48
Map-Server#
```

The following sample output from the **show lisp site name Site-A** command displays detailed information related specifically to the LISP site Site-A.

```
Map-Server# lisp site name Site-A
Site name: Site-A
Description: LISP Site A
Allowed configured locators: any
Allowed EID-prefixes:
  EID-prefix: 192.168.1.0/24 instance-id 123
    First registered:     00:04:07
    Routing table tag:    0x0
    Origin:               Configuration
    Registration errors:
      Authentication failures:   0
      Allowed locators mismatch: 0
    ETR 10.0.0.2, last registered 00:00:09, no proxy-reply, no map-notify
              TTL 1d00h
      Locator    Local  State      Pri/Wgt
      10.0.0.2   yes    up          1/1
  EID-prefix: 2001:DB8:A::/48 instance-id 123
    First registered:     00:04:07
    Routing table tag:    0x0
    Origin:               Configuration
    Registration errors:
      Authentication failures:   0
      Allowed locators mismatch: 0
    ETR 10.0.0.2, last registered 00:00:11, no proxy-reply, no map-notify
              TTL 1d00h
      Locator    Local  State      Pri/Wgt
      10.0.0.2   yes    up          1/1
Map-Server#
```

The following sample output from the **show lisp site summary** command displays summary information related specifically to all LISP sites registered to this Map Server.

```
Map-Server# show lisp site summary
                ----------- IPv4 ----------- ----------- IPv6 -----------
Site name       Configured Registered Incons Configured Registered Incons
Site-A                   1          1      0          1          1      0
Site-B                   1          1      0          1          1      0

Number of configured sites:              2
Number of registered sites:              2
Sites with inconsistent registrations:   0
IPv4
  Number of configured EID prefixes:     2
  Number of registered EID prefixes:     2
IPv6
  Number of configured EID prefixes:     2
  Number of registered EID prefixes:     2
Map-Server#
```

The following sample output from the **show lisp site instance-id 123** command displays detailed information related specifically to instance-id 123.

```
Map-Server# show lisp site instance-id 123
```

```
LISP Site Registration Information

Site Name      Last       Up   Who Last           Inst    EID Prefix
               Register        Registered         ID
Site-1         00:00:25   yes  12.1.0.2           123     10.1.0.0/24
               00:00:25   yes  12.1.0.2           123     10.1.1.0/24
               00:00:25   yes  12.1.0.2           123     10.1.2.0/24
Site-2         00:00:00   yes  12.2.0.2           123     10.2.0.0/24
               00:00:00   yes  12.2.0.2           123     10.2.1.0/24
               00:00:00   yes  12.2.0.2           123     10.2.2.0/24
Site-3         00:00:08   yes  12.3.0.2           123     10.3.0.0/24
               00:00:08   yes  12.3.0.2           123     10.3.1.0/24
               00:00:08   yes  12.3.0.2           123     10.3.2.0/24
Map-Server#
```

Related Commands

Command	Description
show ip lisp	Display the IPv4 LISP configuration status for the local device.
show ipv6 lisp	Display the IPv6 LISP configuration status for the local device.

LISP Debug Commands

debug lisp control-plane all

To turn on all possible debugging messages related to the LISP control plane, use the **debug lisp control-plane all** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane all**
> **no debug lisp control-plane all**

✎

Note Refer to the other forms of the **debug lisp control-plane** command to enable specific debug output selectively.

⚠

Caution Because the **debug lisp control-plane all** command can generate many messages and alter timing in the network node, use it only when instructed by authorized support personnel.

⚠

Caution Debugging output takes priority over other network traffic. The **debug lisp control-plane all** command generates more output than any other **debug lisp control-plane** command and can alter timing in the network node. This command can severely diminish router performance or even render it unusable. In virtually all cases, it is best to use specific **debug lisp control-plane** commands.

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane all** command displays all possible debugging messages for the LISP control plane. This may be useful to help troubleshoot various LISP issues.

Examples

The following is sample output from the **debug lisp control-plane all** command. In this example, the **lig self** command is used to query the mapping system for a remote EID that is not currently in the local map-cache as a test of the LISP control-plane.

```
Router# debug lisp control-plane all
*Nov  2 13:43:26.219: LISP RIB_RWATCH: Debugging is ON
Router# lig self
Mapping information for EID 192.168.1.0 from 10.0.0.2 with RTT 8 msecs
192.168.1.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, self
  Locator    Uptime    State       Pri/Wgt
  10.0.0.2   00:00:00  up, self     1/1
Router#
*Nov  2 13:43:30.603: LISP: LIG Request for IPv4, EIDs self, count 3.
```

```
*Nov  2 13:43:30.603: LISP: Remote EID prefix 192.168.1.0/32, Change state to incomplete
(method: LIG, state: unknown, rlocs: 0, local).
*Nov  2 13:43:30.603: LISP: Remote EID prefix 192.168.1.0/32, Scheduling map requests
(incomplete) (method: LIG, state: incomplete, rlocs: 0, local).
*Nov  2 13:43:30.631: LISP: Send map request for EID prefix 192.168.1.0/32
*Nov  2 13:43:30.631: LISP: Remote EID prefix 192.168.1.0/32, Send map request (1) (method:
LIG, state: incomplete, rlocs: 0, local).
*Nov  2 13:43:30.631: LISP: LIG 192.168.1.0 Overriding map request parameters.
*Nov  2 13:43:30.631: LISP: AF IPv4, Sending map-request from 192.168.1.255 to 192.168.1.0
for EID 192.168.1.0/32, ITR-RLOCs 1, nonce 0xBA213ACC-0x8D012AC9 (encap src 10.0.0.2, dst
10.0.0.10).
*Nov  2 13:43:30.631: LISP: Processing received Encap-Control message from 10.0.0.10 to
10.0.0.2
*Nov  2 13:43:30.631: LISP: Processing received Map-Request message from 192.168.1.255 to
192.168.1.0
*Nov  2 13:43:30.631: LISP: Received map request, source_eid UNSPEC, ITR-RLOCs: 10.0.0.2,
records 1, nonce 0xBA213ACC-0x8D012AC9
*Nov  2 13:43:30.631: LISP: Processing map request record for EID prefix 192.168.1.0/32
*Nov  2 13:43:30.631: LISP: Sending map-reply from 10.0.0.2 to 10.0.0.2.
*Nov  2 13:43:30.639: LISP: Processing received Map-Reply message from 10.0.0.2 to 10.0.0.2
*Nov  2 13:43:30.639: LISP: Received map reply nonce 0xBA213ACC-0x8D012AC9, records 1
*Nov  2 13:43:30.639: LISP: Map Request prefix 192.168.1.0/32 remote EID prefix, Received
reply with rtt 8ms.
*Nov  2 13:43:30.639: LISP: Processing mapping information for EID prefix 192.168.1.0/24
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/24, Change state to complete
(method: map-reply, state: unknown, rlocs: 0, local).
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/24, Starting idle timer (method:
map-reply, state: complete, rlocs: 0, local).
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/32, Change state to deleted
(method: LIG, state: incomplete, rlocs: 0, local).
*Nov  2 13:43:30.639: LISP: LIG 192.168.1.0 Moving info block from mapping entry
192.168.1.0/32 to 192.168.1.0/24.
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/24, Recalculated RLOC status bits
from 0x0 to 0x1 (method: map-reply, state: complete, rlocs: 1, local).
*Nov  2 13:43:30.639: LISP RIB_RWATCH: (default:ipv4:base) T 10.0.0.2/32 EVENT Track start
*Nov  2 13:43:30.639: LISP RIB_RWATCH: (default:ipv4:base) N 10.0.0.2/32 Adding track
*Nov  2 13:43:30.639: LISP RIB_RWATCH: Adding to client notification queue
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/24 locator 10.0.0.2 priority 1
weight 1, Added locator (method: map-reply, state: complete, rlocs: 1, local).
*Nov  2 13:43:30.639: LISP RIB_RWATCH: (default:ipv4:base) W 10.0.0.2/32 c=0x7290510 Client
notified reachable
*Nov  2 13:43:30.639: LISP: Remote EID prefix 192.168.1.0/24 locator 10.0.0.2 priority 1
weight 1, Reachability notification, up local* (method: map-reply, state: complete, rlocs: 1,
local).
*Nov  2 13:43:31.111: LISP: LIG 192.168.1.0 Checking for mapping updates.
*Nov  2 13:43:31.111: LISP: LIG 192.168.1.0 Displaying info.
*Nov  2 13:43:41.519: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
*Nov  2 13:43:43.755: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
Router# no debug lisp control-plane all
*Nov  2 13:45:58.703: LISP RIB_RWATCH: Debugging is OFF
Router#
```

Related Commands

Command	Description
debug lisp control-plane alt-routes	Display LISP control plane ALT route debug messages
debug lisp control-plane clear	Display LISP control plane clear debug messages
debug lisp control-plane configuration	Display LISP control plane configuration debug messages
debug lisp control-plane etr-map-notify	Display LISP control plane ETR map notify debug messages
debug lisp control-plane etr-map-server	Display LISP control plane ETR map server debug messages
debug lisp control-plane events	Display LISP control plane event debug messages
debug lisp control-plane exceptions	Display LISP control plane exception condition debug messages.
debug lisp control-plane forward-api-events	Display LISP control plane API forwarding event debug messages
debug lisp control-plane interface-address-watch	Display LISP control plane interface-address watch debug messages

debug lisp control-plane lig	Display LISP Internet Groper control plane debug messages
debug lisp control-plane local-eid-database	Display LISP control plane local EID database debug messages
debug lisp control-plane local-rloc	Display LISP control plane local rloc debug messages
debug lisp control-plane map-request	Display LISP control plane debug messages related to map-requests
debug lisp control-plane map-resolver	Display LISP control plane debug messages related to map-resolver functions.
debug lisp control-plane map-server	Display LISP control plane debug messages related to map-server functions.
debug lisp control-plane map-server-map-notify	Display LISP control plane debug messages related to map-server-map-notify functions.
debug lisp control-plane map-server-map-request	Display LISP control plane debug messages related to map-server map-request functions.
debug lisp control-plane map-server-registration	Display LISP control plane debug messages related to map-server registration functions.
debug lisp control-plane map-server-registration-errors	Display LISP control plane debug messages related to map-server registration errors.
debug lisp control-plane map-server-merge	Display LISP control plane debug messages related to map-server merge functions.
debug lisp control-plane messages	Display LISP control plane message packet debug messages
debug lisp control-plane negative-map-reply	Display LISP control plane debug messages related to negative-map-reply functions.
debug lisp control-plane nsf	Display LISP control plane NSF debug messages
debug lisp control-plane other-xtr-probe	Display LISP control plane debug messages related to other-xtr-probe functions.
debug lisp control-plane remote-eid-cache	Display LISP control plane remote EID cache debug messages
debug lisp control-plane remote-eid-persistent	Display LISP control plane remote EID persistent cache debug messages
debug lisp control-plane remote-rloc-watch	Display LISP control plane remote RLOC watch debug messages
debug lisp control-plane rib-rloc-watch	Display LISP control plane RIB RLOC watch debug messages
debug lisp control-plane rib-route-import	Display LISP control plane RIB route import debug messages
debug lisp control-plane solicit-map-request	Display LISP control plane solicit-map-request debug messages
debug lisp control-plane static-mapping	Display LISP control plane static remote EID mapping debug messages

debug lisp control-plane alt-routes

To display LISP control plane activities related to LISP ALT processing, use the **debug lisp control-plane alt-routes** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane alt-routes**
> **no debug lisp control-plane alt-routes**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane alt-routes** command displays events related to related to LISP ALT processing on ALT-connected devices.

Examples

The following is sample output from the **debug lisp control-plane alt-routes** command for an ALT-connected Map-Server. In this example, the LISP ALT summary-route is created.

```
MapServer#debug lisp control-plane alt-routes
LISP control plane ALT route debugging is on
MapServer#conf t
MapServer(config-router-lisp)#alt summary-route 172.16.0.0/20
*Jun 28 00:31:16.027: LISP: Processing 'alt-summary' ConfigReq, IID 0 afi=IPv4 sense=1
default=0 under_eid_table=0
*Jun 28 00:31:16.027: LISP: ALTsum prefix 172.16.0.0/20 created.
*Jun 28 00:31:16.027: LISP: ALTroute prefix 172.16.0.0/20 <-> created.
*Jun 28 00:31:16.027: LISP: ALTroute prefix 172.16.0.0/20 <-> add source ALTsum.
*Jun 28 00:31:16.027: LISP: ALTroute prefix 172.16.0.0/20 <ALTsum> RIB route create. Router#
MapServer# no debug lisp control-plane alt-routes
LISP control plane ALT route debugging is off
MapServer#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane clear

To display LISP control plane activities when any clear command affecting the LISP control plane is entered, use the **debug lisp control-plane clear** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane clear**
>
> **no debug lisp control-plane clear**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane clear** command displays events related to LISP control plane activities when any clear command affecting the LISP control plane is entered.

Examples

The following is sample output from the **debug lisp control-plane clear** command. In this example, the LISP ETR map-cache TTL is modified.

```
PITR# debug lisp control-plane clear
LISP control plane clear debugging is on
PITR#clear ip lisp route-import
*Jun 28 00:05:57.095: LISP: Processed 1 clear requests.
PITR# no debug lisp control-plane clear
LISP control plane clear debugging is off
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane configuration

To display LISP control plane configuration activities, use the **debug lisp control-plane configuration** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane configuration**
> **no debug lisp control-plane configuration**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane configuration** command displays events related to LISP control plane configuration.

Examples

The following is sample output from the **debug lisp control-plane configuration** command. In this example, the LISP ETR map-cache TTL is modified.

```
Router# debug lisp control-plane configuration
LISP control plane configuration debugging is on
Router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# router lisp
Router(config-router-lisp)#
*Jan 19 18:36:13.275: LISP: Config: router lisp .
Router(config-router-lisp)# ipv4 etr map-cache-ttl 123
Router(config-router-lisp)#
*Jan 19 18:36:27.275: LISP: Config: ipv4 etr map-cache-ttl 123.
Router(config-router-lisp)#^Z
*Jan 19 18:36:31.563: %SYS-5-CONFIG_I: Configured from console by console
Router# no debug lisp control-plane configuration
LISP control plane configuration debugging is off
```

```
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane etr-map-notify

To display LISP control plane activities related to Map-Notify messages, use the **debug lisp control-plane etr-map-notify** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane etr-map-notify**
>
> **no debug lisp control-plane etr-map-notify**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane etr-map-notify** command displays events related to Map-Notify messages.

Examples

In the following a LISP site has two xTRs: xTR-B20 and xTR-B21. A sample output from the **debug lisp control-plane etr-map-notify** command is shown indicating at a Map-Notify was received on xTR-B20 when xTR-B21 was configured with the **database-mapping auto-discover-rlocs** command.

On xTR-B21:

```
xTR-B21(config-router-lisp)#database-mapping 10.2.2.0/24 10.10.7.7 priority 1 weight 1
xTR-B21(config-router-lisp)#database-mapping 10.2.2.0/24 auto-discover-rlocs
xTR-B21(config-router-lisp)#
```

On xTR-B20:

```
xTR-B20#debug lisp control-plane etr-map-notify
LISP control plane etr-map-notify debugging is on
xTR-B20#
*Jun 28 02:19:21.995: LISP: Processing received Map-Notify message from 10.10.6.6 to
10.10.7.7
*Jun 28 02:19:21.995: LISP: Processing Map-Notify 1 record, nonce 0x0C4A5DFE-0x5E81F0B1, key-
id 1, auth-data-len 20
*Jun 28 02:19:21.995: LISP: Processing Map-Notify mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, not authoritative, 2 locators
    10.10.6.6 pri/wei=1/1 lpr
    10.10.7.7 pri/wei=1/1 lpR
*Jun 28 02:19:21.995: LISP: Local EID prefix 10.2.2.0/24, Received map notify (rlocs: 1/1).
*Jun 28 02:19:21.995: LISP: Local EID prefix 10.2.2.0/24 RLOC 10.10.6.6 pri/wei=1/1, Map-
Notify added locator (rlocs: 1/2).
*Jun 28 02:19:22.035: LISP: Processing received Map-Notify message from 10.10.6.6 to
10.10.7.7
```

```
*Jun 28 02:19:22.035: LISP: Processing Map-Notify 1 record, nonce 0xDBD40486-0xCC15D946, key-
id 1, auth-data-len 20
*Jun 28 02:19:22.035: LISP: Processing Map-Notify mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, not authoritative, 2 locators
     10.10.6.6 pri/wei=1/1 lpr
     10.10.7.7 pri/wei=1/1 lpR
*Jun 28 02:19:22.035: LISP: Local EID prefix 10.2.2.0/24, Received map notify (rlocs: 1/2).
xTR-B20#no debug lisp control-plane etr-map-notify
LISP control plane etr-map-notify debugging is off
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane etr-map-server

To display messages related to LISP ETR Map-Server registration, use the **debug lisp control-plane etr-map-server** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane configuration etr-map-server**
>
> **no debug lisp control-plane configuration etr-map-server**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane configuration etr-map-server** command displays messages related to LISP ETR map-server registration events. This includes both initial registration, as well as periodic Map-Server registration updates. This command can be useful for troubleshooting ETR map-server registration issues.

Examples

The following is sample output from the **debug lisp control-plane etr-map-server** command. In this example, periodic LISP map-register messages are displayed.

```
Router# debug lisp control-plane configuration etr-map-server
LISP control plane ETR map server debugging is on
Router#
*Nov  2 13:48:36.499: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
*Nov  2 13:48:40.259: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
*Nov  2 13:49:35.475: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
*Nov  2 13:49:38.623: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
*Nov  2 13:50:34.839: LISP: Map Server 10.0.0.10, Sending map-register (src_rloc 10.0.0.2).
Router# no debug lisp control-plane configuration etr-map-server
LISP control plane ETR map server debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane events

To display messages related to high-level LISP ETR control-plane events, use the **debug lisp control-plane events** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane configuration events**
>
> **no debug lisp control-plane configuration events**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane events** command displays high level messages related to LISP control-plane activities. These include activities such as clearing the lisp map-cache. This command can be useful for troubleshooting LISP control plane issues. This command is especially useful when used in conjunction with the **debug lisp detail** command.

Examples

The following is sample output from the **debug lisp control-plane events** command. In this example the command **clear ip lisp map-cache** is used to clear the map-cache.

```
Router# debug lisp control-plane events
LISP control plane event debugging is on
Router# clear ip lisp map-cache
*Nov  2 13:54:11.803: LISP: AF IPv4, Completed remote EID clear processing.
*Nov  2 13:54:11.803: LISP: AF IPv4, Static mapping re-create request while idle.
Router# no debug lisp control-plane events
LISP control plane event debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane
debug lisp detail	Display increased the output verbosity of other LISP debug commands.

---

debug lisp control-plane exceptions

To display LISP control plane exceptions activities, use the **debug lisp control-plane exceptions** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp control-plane exceptions

no debug lisp control-plane exceptions

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane exceptions** command is a catch-all to display all activities related to LISP control-plane exceptions not covered by other specific **debug lisp control-plane** commands. This debug command should only be triggered under error conditions. This command is useful for diagnosing many LISP control plane issues.

Examples

The following is sample output from the **debug lisp control-plane exceptions** command. In this example, the ETR is configured to register with a Map Server prior to the configuration of any local EID prefixes, resulting in an exception condition.

```
Router# debug lisp control-plane exceptions
LISP control plane exception condition debugging is on
Router# config t
Router(config)# router lisp
Router(config-router-lisp)#
Router(config-router-lisp)# ipv4 etr map-server 10.0.0.10 key 6 ###########
Dec 18 15:40:12.504 PST: LISP: Map Server 10.0.0.10, Cannot send map register, no locally
configured EID prefixes.
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane exceptions
LISP control plane exception condition debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Enable all LISP control plane debug categories

debug lisp control-plane forward-api-events

To display LISP control plane messages related to the CEF process, use the **debug lisp control-plane forward-api-events** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp control-plane forward-api-events
no debug lisp control-plane forward-api-events

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane forward-api-events** command displays messages related to CEF process related to the LISP control-plane. This includes, for example, signals for new remote EID prefixes for which data packets and LSB reports are seen. This command can be useful for troubleshooting many LISP control plane issues. This command is best used in conjunction with the **debug lisp detail** command.

Examples

The following is sample output from the **debug lisp control-plane forward-api-events** command. In this example, LISP ITR functionality is enabled on the router.

```
Router# debug lisp detail
Router# debug lisp control-plane forward-api-events
LISP control plane API forwarding event debugging is on
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# router lisp
Router(config-router-lisp)# ipv4 itr
Router(config-router-lisp)#
*Dec 18 16:41:57.831: LISP: AF IPv4, Update of forwarding role to NONE.
*Dec 18 16:41:57.839: LISP: AF IPv4, Update of forwarding role to ITR.
*Dec 18 16:41:58.839: %LINEPROTO-5-UPDOWN: Line protocol on Interface LISP0, changed state to
up
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane forward-api-events
LISP control plane API forwarding event debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane
debug lisp detail	Display increased output verbosity of other LISP debug commands.

debug lisp control-plane interface-address-watch

To display LISP control plane messages related to RLOC interface tracking when ip|ipv6 lisp database-mapping command specifies an interface instead of an address (e.g. when DHCP is used), use the **debug lisp control-plane interface-address-watch** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane interface-address-watch**
>
> **no debug lisp control-plane interface-address-watch**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane interface-address-watch** command displays LISP control plane messages related to RLOC interface tracking when ip|ipv6 lisp database-mapping command specifies an interface instead This command can be useful for troubleshooting many LISP control plane issues.

Examples

The following is sample output from the **debug lisp control-plane interface-address-watch** command. In this example, LISP ITR functionality is enabled on the router.

```
Router# debug lisp control-plane interface-address-watch
LISP control plane interface address watch debugging is on
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# router lisp
Router(config-router-lisp)# database-mapping 192.168.1.0/24 IPv4-interface Ethernet 0/0
priority 1 weight 1
Router(config)#
*Nov  2 13:58:57.111: LISP: IfAddrWatchIf Ethernet0/0, address 10.0.0.2
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane interface-address-watch
LISP control plane interface address watch debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane
debug lisp detail	Display increased output verbosity of other LISP debug commands.

debug lisp control-plane lig

To display messages related to LISP Internet Groper (LIG) activites, use the **debug lisp control-plane lig** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp control-plane configuration lig

no debug lisp control-plane configuration lig

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane lig** command displays control-plane related to LISP Internet Groper (LIG) activities. These include activities such as sending map-request messages and updating the map-cache database. This command can be useful for troubleshooting remote EID reachability issues when LIG is used as a diagnostic tool.

Examples

The following is sample output from the **debug lisp control-plane lig** command. In this example the command **lig self** command is used to generate LISP control-plane lig events.

```
Router# debug lisp control-plane lig
LISP control plane Internet Groper debugging is on
Router# lig self
Mapping information for EID 192.168.1.0 from 10.0.0.2 with RTT 12 msecs
192.168.1.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, self
  Locator   Uptime    State      Pri/Wgt
  10.0.0.2  00:00:00  up, self     1/1
*Nov  2 14:03:08.519: LISP: LIG Request for IPv4, EIDs self, count 3.
*Nov  2 14:03:08.575: LISP: Send map request for EID prefix 192.168.1.0/32
*Nov  2 14:03:08.575: LISP: LIG 192.168.1.0 Overriding map request parameters.
*Nov  2 14:03:08.587: LISP: Processing received Map-Reply message from 10.0.0.2 to 10.0.0.2
*Nov  2 14:03:08.587: LISP: Received map reply nonce 0xF48B3D3F-0x834B56E2, records 1
*Nov  2 14:03:08.587: LISP: Processing mapping information for EID prefix 192.168.1.0/24
*Nov  2 14:03:08.587: LISP: LIG 192.168.1.0 Moving info block from mapping entry
192.168.1.0/32 to 192.168.1.0/24.
*Nov  2 14:03:09.027: LISP: LIG 192.168.1.0 Checking for mapping updates.
Router#
*Nov  2 14:03:09.027: LISP: LIG 192.168.1.0 Displaying info.
```

In this example, the **lig** command is used to verify reachability and locator information for a remote EID.

```
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.0.6 with RTT 4 msecs
192.168.2.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, complete
  Locator   Uptime    State      Pri/Wgt
  10.0.0.6  00:00:00  up           1/1
Router#
*Nov  2 14:04:01.351: LISP: LIG Request for IPv4, EIDs 192.168.2.1, count 3.
*Nov  2 14:04:01.411: LISP: Send map request for EID prefix 192.168.2.1/32
*Nov  2 14:04:01.411: LISP: LIG 192.168.2.1 Overriding map request parameters.
*Nov  2 14:04:01.415: LISP: Processing received Map-Reply message from 10.0.0.6 to 10.0.0.2
```

```
*Nov  2 14:04:01.415: LISP: Received map reply nonce 0x7861B836-0x906AAEF9, records 1
*Nov  2 14:04:01.415: LISP: Processing mapping information for EID prefix 192.168.2.0/24
*Nov  2 14:04:01.415: LISP: LIG 192.168.2.1 Moving info block from mapping entry
192.168.2.1/32 to 192.168.2.0/24.
Router#
*Nov  2 14:04:01.851: LISP: LIG 192.168.2.1 Checking for mapping updates.
*Nov  2 14:04:01.851: LISP: LIG 192.168.2.1 Displaying info.
```

In this example, the **lig** command is used to verify reachability and locator information for a remote EID that is not reachable (LIG fails to return a valid mapping entry).

```
Router# lig 172.16.1.1
Mapping information for EID 172.16.1.1 from 10.0.0.10 with RTT 4 msecs
128.0.0.0/2, uptime: 00:00:00, expires: 00:14:52, via map-reply, forward-native
  Negative cache entry, action: forward-native
Router#
*Nov  2 14:05:37.763: LISP: LIG Request for IPv4, EIDs 172.16.1.1, count 3.
*Nov  2 14:05:37.815: LISP: Send map request for EID prefix 172.16.1.1/32
*Nov  2 14:05:37.815: LISP: LIG 172.16.1.1 Overriding map request parameters.
*Nov  2 14:05:37.819: LISP: Processing received Map-Reply message from 10.0.0.10 to 10.0.0.2
*Nov  2 14:05:37.819: LISP: Received map reply nonce 0x2FB7AA7C-0x97A35FC2, records 1
*Nov  2 14:05:37.819: LISP: Processing mapping information for EID prefix 128.0.0.0/2
*Nov  2 14:05:37.819: LISP: LIG 172.16.1.1 Moving info block from mapping entry 172.16.1.1/32
to 128.0.0.0/2.
*Nov  2 14:05:38.267: LISP: LIG 172.16.1.1 Checking for mapping updates.
Router#
*Nov  2 14:05:38.267: LISP: LIG 172.16.1.1 Displaying info.
Router#
```

In this example, the **lig** command is used to verify reachability and locator information for a remote IPv6 EID that is reachable over an IPv4 RLOC.

```
Router# lig 2001:db8:b:2::2
Mapping information for EID 2001:DB8:B:2::2 from 10.0.0.6 with RTT 4 msecs
2001:DB8:B::/48, uptime: 00:34:04, expires: 23:59:52, via map-reply, complete
  Locator    Uptime    State       Pri/Wgt
  10.0.0.6   00:34:04  up             1/1
Router#
*Nov  2 14:07:01.703: LISP: LIG Request for IPv6, EIDs 2001:DB8:B:2::2, count 3.
*Nov  2 14:07:01.755: LISP: Send map request for EID prefix 2001:DB8:B:2::2/128
*Nov  2 14:07:01.755: LISP: LIG 2001:DB8:B:2::2 Overriding map request parameters.
*Nov  2 14:07:01.759: LISP: Processing received Map-Reply message from 10.0.0.6 to 10.0.0.2
*Nov  2 14:07:01.759: LISP: Received map reply nonce 0x43480F70-0xB53906F1, records 1
*Nov  2 14:07:01.759: LISP: Processing mapping information for EID prefix 2001:DB8:B::/48
*Nov  2 14:07:01.759: LISP: LIG 2001:DB8:B:2::2 Moving info block from mapping entry
2001:DB8:B:2::2/128 to 2001:DB8:B::/48.
Router#
*Nov  2 14:07:02.203: LISP: LIG 2001:DB8:B:2::2 Checking for mapping updates.
*Nov  2 14:07:02.203: LISP: LIG 2001:DB8:B:2::2 Displaying info
Router# no debug lisp control-plane lig
LISP control plane Internet Groper debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane
lig	Initiate a LISP Internet Groper (**lig**) operation for a destination EID or to test the routers' local EID prefix(es)

debug lisp control-plane local-eid-database

To display LISP map-cache database mapping activities related to the addition or removal of local EID-prefixes using the **ip lisp database-mapping** command, use the **debug lisp control-plane local-eid-database** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

>   **debug lisp control-plane local-eid-database**
>   **no debug lisp control-plane local-eid-database**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane local-eid-database** command display LISP map-cache database mapping activities related to the addition or removal of local EID-prefixes using the **ip lisp database-mapping** command. This command can be useful for troubleshooting issues related to the LISP map-cache and local EID-prefixes.

Examples

The following is sample output from the **debug lisp control-plane local-eid-database** command. In this example, a new local EID-prefix is added using the **ip lisp database-mapping** command.

```
Router# debug lisp control-plane local-eid-database
LISP control plane local EID database debugging is on
Router# conf t
Router(config)# router lisp
Router(config-router-lisp)# database-mapping 192.168.1.0/24 10.0.0.2 priority 1 weight 1
*Nov  2 14:10:13.087: LISP: Local EID prefix 192.168.1.0/24, found RIB route 192.168.1.1/32
to EID prefix (rlocs: 0/0).
*Nov  2 14:10:13.087: LISP: AF IPv4, found route to local EID prefixes, switching local RLOCs
to reachable.
*Nov  2 14:10:13.087: LISP: Local EID prefix 192.168.1.0/24, Created (rlocs: 0/0).
*Nov  2 14:10:13.087: LISP: Local EID prefix 192.168.1.0/24 locator 10.0.0.2 priority 1
weight 1, Created locator (rlocs: 1/1).
*Nov  2 14:10:13.087: LISP: Local EID prefix 192.168.1.0/24 locator 10.0.0.2 priority 1
weight 1, Added locator (rlocs: 1/1).
*Nov  2 14:10:13.087: LISP: Local EID prefix 192.168.1.0/24, found RIB route 192.168.1.1/32
to EID prefix (rlocs: 1/1).
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane local-eid-database
LISP control plane local EID database debugging is off
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane
ip lisp database-mapping	Configure an IPv4 EID-to-RLOC mapping relationship and its associated traffic policy.
ipv6 lisp database-mapping	Configure an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

debug lisp control-plane local-rloc

To display LISP database activities related to local RLOC(s), use the **debug lisp control-plane local-rloc** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane local-rloc**
>
> **no debug lisp control-plane local-rloc**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced.
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

The **debug lisp control-plane local-rloc** command displays LISP database activities related to rloc-probing. This command can be useful for troubleshooting issues related to local locators.

Examples

The following is sample output from the **debug lisp control-plane local-rloc** command.

```
Router# debug lisp control-plane local-rloc
LISP control plane local RLOC debugging is on
Router#
*Jun 25 19:31:39.755: LISP: Send map request for EID prefix 192.168.1.0/24.
*Jun 25 19:31:39.755: LISP: Local RLOC Addr 10.0.3.1, send local site RLOC probe.
Router# no debug lisp control-plane local-rloc
LISP control plane local RLOC debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-request

To display LISP control plane activities related to map-requests, use the **debug lisp control-plane map-request** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-request**
>
> **no debug lisp control-plane map-request**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced.
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

The **debug lisp control-plane map-request** command display LISP control plane activities related to sending map-requests. This command can be useful for troubleshooting issues related to the LISP map-cache.

Examples

The following is sample output from the **debug lisp control-plane map-request** command.

```
Router# debug lisp control-plane map-request
LISP control plane map-request debugging is on
Router# lig self
Mapping information for EID 192.168.1.0 from 10.0.2.1 with RTT 12 msecs
192.168.1.0/24, uptime: 01:15:23, expires: 23:59:57, via map-reply, self
  Locator    Uptime     State       Pri/Wgt
  10.0.2.1   01:15:23   up, self     1/50
  10.0.3.1   01:15:23   up           1/50
*Jun 25 19:53:25.727: LISP: Send map request for EID prefix 192.168.1.0/32.
*Jun 25 19:53:25.727: LISP: AF IPv4, Sending map-request from 10.0.2.1 to 192.168.1.0 for EID
192.168.1.0/32, ITR-RLOCs 1, nonce 0x56017D8F-0x975FDE4B (encap src 10.0.2.1, dst 10.0.100.2).
Router# no deb lisp control-plane map-request
LISP control plane map-request debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-resolver

On a device configured as a LISP Map Resolver (MR), to display LISP control plane activities related MR message processing, use the **debug lisp control-plane map-resolver** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp control-plane map-resolver

no debug lisp control-plane map-resolver

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced.
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

The **debug lisp control-plane map-resolver** command displays LISP control plane activities related to map-resolver functions. This command can be useful for troubleshooting issues related to EID-to-RLOC mapping functions.

Examples

The following is sample output from the **debug lisp control-plane map-resolver** command. In this example, the **lig** command is used to query the EID-to-RLOC mapping for 192.168.2.1, but since no entry exists, the Map-Resolver returns a negative-map-reply.

First, on the Map-Resolver:

```
MR-MS# debug lisp control-plane map-resolver
LISP control plane map-resolver debugging is on
```

Next, on some ITR:

```
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.100.2 with RTT 4 msecs
192.168.2.0/23, uptime: 00:04:38, expires: 00:14:57, via map-reply, forward-native
  Negative cache entry, action: forward-native
Router#
```

Then, on the Map-Resolver:

```
MR-MS #
*Jun 25 20:00:21.879: LISP: Processing received Encap-Control message from 10.0.2.1 to
10.0.100.2.
*Jun 25 20:00:21.879: LISP: Processing received Map-Request message from 10.0.2.1 to
192.168.2.1.
*Jun 25 20:00:21.879: LISP: AF IPv4, Sending negative map-reply from 10.0.100.2 to 10.0.2.1
for 192.168.2.0/23.
MR-MS # no debug lisp control-plane map-resolver
LISP control plane map-resolver debugging is off
MR-MS #
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server

On a device configured as a LISP Map Server (MS), to display LISP control plane activities related to MS message processing use the **debug lisp control-plane map-server** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-server**
>
> **no debug lisp control-plane map-server**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced.
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB

Usage Guidelines

The **debug lisp control-plane map-server** command displays LISP control plane activities related to map-server functions, such as registration and the processing or Encapsulated Control Messages. This command can be useful for troubleshooting issues related to Map-Server functions.

Examples

The following is sample output from the **debug lisp control-plane map-server** command.

```
Router# debug lisp control-plane map-server
LISP control plane map-server debugging is on
*Jun 25 20:10:14.783: LISP: Processing received Map-Register message from 10.0.10.1 to
10.0.100.2.
*Jun 25 20:10:14.783: LISP: MS registration prefix 2001:DB8:B::/48 10.0.10.1 site site2-xtr,
Updating.
*Jun 25 20:10:15.615: LISP: Processing received Map-Register message from 10.0.9.1 to
10.0.100.2.
*Jun 25 20:10:15.615: LISP: MS registration prefix 192.168.11.0/24 10.0.9.1 site site2-xtr,
Updating.
Router# no debug lisp control-plane map-server
LISP control plane map-server debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server-map-notify

On a device configured as a LISP Map Server (MS), to display LISP control plane activities related to MS map-notify message processing, use the **debug lisp control-plane map-server-map-notify** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-server-map-notify**
>
> **no debug lisp control-plane map-server-map-notify**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane map-server-map-notify** command displays LISP control plane activities related to map-server map-notify message processing, which is part of LISP VM-Mobility. This command only reports output when the xTR is an NX-OS device. This command can be useful for troubleshooting issues related to Map-Server functions.

Examples

The following is sample output from the **debug lisp control-plane map-server** command.

No example output is available for this command.

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server-map-request

On a device configured as a LISP Map Server (MS), to display LISP control plane activities related to MS map-request message processing, use the **debug lisp control-plane map-server-map-request** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

>**debug lisp control-plane map-server-map-request**
>**no debug lisp control-plane map-server-map-request**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane map-server-map-request** command displays LISP control plane activities related to MS map-request message processing, such as registration and the processing or Encapsulated Control Messages. This command can be useful for troubleshooting issues related to Map-Server functions.

Examples

The following is sample output from the **debug lisp control-plane map-server-map-request** command.

```
Router# debug lisp control-plane map-server-map-request
LISP control plane map-server-map-request debugging is on
*Nov  2 16:22:42.339: LISP: Processing received Encap-Control message from 10.0.0.2 to
10.0.0.10
*Nov  2 16:22:42.339: LISP: Processing received Map-Request message from 192.168.1.255 to
192.168.2.1
*Nov  2 16:22:42.339: LISP: Received map request, source_eid UNSPEC, ITR-RLOCs: 10.0.0.2,
records 1, nonce 0xD4BDC3DE-0xFEDB32F8
```

```
*Nov  2 16:22:42.339: LISP: MS registration IID 123 prefix 192.168.2.0/24 10.0.0.6 site Site-
B, Forwarding map request to ETR 10.0.0.6.
Router# no debug lisp control-plane map-server-map-request
LISP control plane map-server-map-request debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server-registration

On a device configured as a LISP Map Server (MS), to display LISP control plane activities related to MS map-registration message processing, use the **debug lisp control-plane map-server-registration** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-server-registration**
> **no debug lisp control-plane map-server-registration**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane map-server-registration** command displays LISP control plane activities related to MS map-registration message processing. This command can be useful for troubleshooting issues related to Map-Server functions.

Examples

The following is sample output from the **debug lisp control-plane map-server-registration** command.

```
Router# debug lisp control-plane map-server-registration
LISP control plane map-server-registration debugging is on
*Nov  2 16:32:25.135: LISP: Processing received Map-Register message from 10.0.0.6 to
10.0.0.10
*Nov  2 16:32:25.135: LISP: Processing Map-Register, no proxy, do not want map-notify, 1
record, nonce 0xF52E06B6-0xBFEC2A80, key-id 1, auth-data-len 20
*Nov  2 16:32:25.135: LISP: Processing Map-Register mapping record for IID 123 192.168.2.0/24,
ttl 1440, state complete, authoritative, 1 locator
*Nov  2 16:32:25.135: LISP: MS registration IID 123 prefix 192.168.2.0/24 10.0.0.6 site Site-
B, Updating.
*Nov  2 16:32:30.095: LISP: Processing received Map-Register message from 10.0.0.6 to
10.0.0.10
*Nov  2 16:32:30.095: LISP: Processing Map-Register, no proxy, do not want map-notify, 1
record, nonce 0x114FC470-0x3E243D88, key-id 1, auth-data-len 20
*Nov  2 16:32:30.095: LISP: Processing Map-Register mapping record for IID 123
2001:DB8:B::/48, ttl 1440, state complete, authoritative, 1 locator
```

```
*Nov  2 16:32:30.095: LISP: MS registration IID 123 prefix 2001:DB8:B::/48 10.0.0.6 site
Site-B, Updating.
Router# no debug lisp control-plane map-server-registration
LISP control plane map-server-registration debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server-registration-errors

On a device configured as a LISP Map Server (MS), to display LISP control plane activities related to MS map-registration message processing, use the **debug lisp control-plane map-server-registration** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-server-registration-errors**
>
> **no debug lisp control-plane map-server-registration-errors**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane map-server-registration-errors** command displays LISP control plane activities related to MS map-registration message processing. This command can be useful for troubleshooting issues related to Map-Server functions.

Examples

The following is sample output from the **debug lisp control-plane map-server-registration-errors** command. In this case, the xTR has been configured with a mismatching key.

```
Router# debug lisp control-plane map-server-registration-errors
LISP control plane map-server-registration-errors debugging is on
*Nov  2 16:40:39.199: LISP: Processing received Map-Register message from 10.0.0.2 to
10.0.0.10
*Nov  2 16:40:39.199: LISP: Processing Map-Register, no proxy, do not want map-notify, 1
record, nonce 0x386E25EF-0x867941C6, key-id 1, auth-data-len 20
*Nov  2 16:40:39.199: LISP: Processing Map-Register mapping record for IID 123 192.168.1.0/24,
ttl 1440, state complete, authoritative, 1 locator
*Nov  2 16:40:39.199: LISP: MS EID IID 123 prefix 192.168.1.0/24 site Site-A, Registration
failed authentication.
Router# no debug lisp control-plane map-server-registration-errors
LISP control plane map-server-registration-errors debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane map-server-registration-merge

To display LISP control plane configuration activities related to Map-Server locator merges, use the **debug lisp control-plane map-server-merge** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane map-server-merge**
>
> **no debug lisp control-plane map-server-merge**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane map-server-merge** command displays events related to LISP control plane configuration.

Examples

In the following a LISP site has two xTRs: xTR-B20 and xTR-B21. Both xTRs are registering to Map-Server named MRMS. A sample output from the **debug lisp control-plane other-xtr-probe** command is shown. When a LISP site has multiple xTRs, each xTR sends RLOC probes to assess the status of the locators (RLOCs) associated with other xTRs within the site.

On the Map-Sever: enable **debug lisp control-plane map-server-registration-merge**.

```
MRMS#debug lisp control-plane map-server-registration-merge
LISP control plane map-server-registration-merge debugging is on
MRMS#show lisp site
LISP Site Registration Information

Site Name       Last      Up   Who Last            Inst    EID Prefix
                Register        Registered         ID
foo2            never     no   --                          10.2.2.0/24
MRMS#
*Jun 28 02:44:57.247: LISP: Processing received Map-Register message from 10.10.7.7 to
10.10.6.6
*Jun 28 02:44:57.247: LISP: Processing Map-Register no proxy, map-notify, merge, no mobile-
node, 1 record, nonce 0xDBD40486-0xCC15D946, key-id 1, auth-data-len 20
*Jun 28 02:44:57.247: LISP: Processing Map-Register mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, authoritative, 1 locator
    10.10.7.7 pri/wei=1/1 LpR
*Jun 28 02:44:57.247: LISP: MS MergeRLOC prefix 10.2.2.0/24 10.10.7.7 site foo2, add,
contributed by 10.10.7.7.
*Jun 28 02:45:01.375: LISP: Processing received Map-Register message from 10.10.6.6 to
10.10.6.6
*Jun 28 02:45:01.375: LISP: Processing Map-Register no proxy, map-notify, merge, no mobile-
node, 1 record, nonce 0x9E07F3E3-0xA90299A5, key-id 1, auth-data-len 20
```

```
*Jun 28 02:45:01.375: LISP: Processing Map-Register mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, authoritative, 1 locator
     10.10.6.6 pri/wei=1/1 LpR
*Jun 28 02:45:01.375: LISP: MS MergeRLOC prefix 10.2.2.0/24 10.10.6.6 site foo2, add,
contributed by 10.10.6.6.
MRMS#show lisp site
LISP Site Registration Information

Site Name       Last      Up   Who Last           Inst     EID Prefix
                Register       Registered         ID
foo2            00:00:47  yes  10.10.7.7                   10.2.2.0/24
MRMS#no debug lisp control-plane map-server-registration-merge
LISP control plane map-server-registration-merge debugging is off
MRMS#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane messages

To display LISP control plane messages sent and received by the router, use the **debug lisp control-plane messages** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane messages**
> **no debug lisp control-plane messages**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane messages** command displays all LISP control messages sent and received by the router, including map-register, map-request, and map-reply messages. This command can be useful for troubleshooting issues related to the LISP control-plane.

Examples

The following is sample output from the **debug lisp control-plane messages** command. In this example, the **lig** command is used to generate LISP control-plane messages.

```
Router# debug lisp control-plane messages
LISP control plane message packet debugging is on
Router# lig self
Mapping information for EID 192.168.1.0 from 10.0.0.2 with RTT 12 msecs
192.168.1.0/24, uptime: 00:30:37, expires: 23:59:52, via map-reply, self
  Locator   Uptime    State      Pri/Wgt
  10.0.0.2  00:30:37  up, self     1/1
*Nov  2 16:42:52.563: LISP: Send map request for EID prefix 192.168.1.0/32
```

```
*Nov  2 16:42:52.563: LISP: AF IPv4, Sending map-request from 192.168.1.255 to 192.168.1.0
for EID 192.168.1.0/32, ITR-RLOCs 1, nonce 0x9113FF0A-0xB4D05771 (encap src 10.0.0.2, dst
10.0.0.10).
*Nov  2 16:42:52.567: LISP: Processing received Encap-Control message from 10.0.0.10 to
10.0.0.2
*Nov  2 16:42:52.567: LISP: Processing received Map-Request message from 192.168.1.255 to
192.168.1.0
*Nov  2 16:42:52.567: LISP: Received map request, source_eid UNSPEC, ITR-RLOCs: 10.0.0.2,
records 1, nonce 0x9113FF0A-0xB4D05771
*Nov  2 16:42:52.567: LISP: Processing map request record for EID prefix 192.168.1.0/32
*Nov  2 16:42:52.567: LISP: Sending map-reply from 10.0.0.2 to 10.0.0.2.
*Nov  2 16:42:52.575: LISP: Processing received Map-Reply message from 10.0.0.2 to 10.0.0.2
*Nov  2 16:42:52.575: LISP: Received map reply nonce 0x9113FF0A-0xB4D05771, records 1
*Nov  2 16:42:52.575: LISP: Map Request prefix 192.168.1.0/32 remote EID prefix, Received
reply with rtt 12ms.
Router#
```

In this example, an ETR is processing a Map Request received from the MS as a LISP Encapsulated Control
Messages.

```
Router#
*Nov  2 16:45:14.123: LISP: Processing received Encap-Control message from 10.0.0.10 to
10.0.0.2
*Nov  2 16:45:14.123: LISP: Processing received Map-Request message from 10.0.0.6 to
192.168.1.1
*Nov  2 16:45:14.123: LISP: Received map request, source_eid UNSPEC, ITR-RLOCs: 10.0.0.6,
records 1, nonce 0x951DC058-0xB1106DB5
*Nov  2 16:45:14.123: LISP: Processing map request record for EID prefix 192.168.1.1/32
*Nov  2 16:45:14.123: LISP: Sending map-reply from 10.0.0.2 to 10.0.0.6.
Router# no debug lisp control-plane configuration
LISP control plane message packet debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane negative-map-reply

To display LISP control plane configuration activities related to Negative Map-Reply messages, use the **debug lisp control-plane negative-map-reply** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane negative-map-reply**
>
> **no debug lisp control-plane negative-map-reply**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane negative-map-reply** command displays events related to LISP related to Negative Map-Reply messages.

Examples

The following is sample output from the **debug lisp control-plane negative-map-reply** command. In this example, the **lig** command is used to query a non-existent prefix.

On an xTR: lig for an EID that is not existent, resulting in a Negative Map-Reply with a TTL of 15 minutes.

```
xTR-11#lig 172.16.3.1
Mapping information for EID 172.16.3.1 from 10.0.0.14 with RTT 4 msecs
172.16.3.0/24, uptime: 00:00:33, expires: 00:14:52, via map-reply, forward-native
  Negative cache entry, action: forward-native
xTR-1#
```

On the Map-Sever: enable **debug lisp control-plane negative-map-reply**.

```
MapServer#debug lisp control-plane negative-map-reply
LISP control plane negative map-reply debugging is on
MapServer#
*Jun 28 00:38:20.771: LISP: Processing received Map-Request message from 172.16.1.1 to
172.16.3.1
*Jun 28 00:38:20.771: LISP: AF IPv4, Sending negative map-reply from 10.0.0.14 to 10.0.0.2
for 172.16.3.0/24.
*Jun 28 00:38:53.495: LISP: Processing received Map-Request message from 172.16.1.1 to
172.16.3.1
*Jun 28 00:38:53.495: LISP: AF IPv4, Sending negative map-reply from 10.0.0.14 to 10.0.0.2
for 172.16.3.0/24.
MapServer#no debug lisp control-plane negative-map-reply
LISP control plane negative map-reply debugging is off
MapServer#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane nsf

To display LISP control plane activities related to non-stop forwarding, use the **debug lisp control-plane nsf** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane nsf**
>
> **no debug lisp control-plane nsf**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
2.5.1XA	This command was introduced.

Usage Guidelines

The **debug lisp control-plane nsf** command displays activities related to LISP control plane activities during nonstop forwarding (NSF) events.

Examples

The following is sample output from the **debug lisp control-plane nsf** command. In this example, the **debug lisp control-plane nsf** command is executed and the output is displayed on the standby router.

```
Router-standby# debug lisp control-plane messages
LISP control plane NSF debugging is on
Router-standby#
Mar  6 18:05:04.059 PST: %REDUNDANCY-3-SWITCHOVER: RP switchover (PEER_DOWN_INTERRUPT)
Mar  6 18:05:04.307 PST: LISP: AF IPv4, NSF start processing.
Mar  6 18:05:04.307 PST: LISP: AF IPv4, NSF control set state to hold.
Mar  6 18:05:04.419 PST: LISP: AF IPv4, NSF remote EID replay walk done.
Mar  6 18:05:10.731 PST: %HA-6-MODE: Operating RP redundancy mode is SSO
Router#
Mar  6 18:05:32.523 PST: LISP: AF IPv4, NSF control set state to ready.
Router#
Mar  6 18:05:39.539 PST: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
Mar  6 18:05:39.547 PST: %HA-6-STANDBY_READY: Standby RP in slot 7 is operational in SSO mode
Router#
Mar  6 18:05:39.551 PST: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
Router#
Mar  6 18:05:42.795 PST: LISP: AF IPv4, NSF RIB converged.
Router # no debug lisp control-plane messages
LISP control plane NSF debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane other-xtr-probe

To display LISP control plane configuration activities related to local RLOC probes, use the **debug lisp control-plane other-xtr-probe** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane other-xtr-probe**
>
> **no debug lisp control-plane other-xtr-probe**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane other-xtr-probe** command displays events related to local RLOC probes.

Examples

In the following a LISP site has two xTRs: xTR-B20 and xTR-B21. A sample output from the **debug lisp control-plane other-xtr-probe** command is shown. When a LISP site has multiple xTRs, each xTR sends RLOC probes to assess the status of the locators (RLOCs) associated with other xTRs within the site.

On xTR-B21:

```
xTR-B21#debug lisp control-plane other-xtr-probe
LISP control plane other XTR RLOC probe debugging is on
*Jun 28 02:38:11.591: LISP: Send map request type local EID RLOC
*Jun 28 02:38:11.591: LISP: Send map request for EID prefix IID 0 10.2.2.0/24
*Jun 28 02:38:11.591: LISP: AF IPv4, Sending probe map-request from 10.10.6.6 to 10.10.7.7
for EID 10.2.2.0/24, ITR-RLOCs 1, nonce 0xB796C774-0x89AD47FE.
*Jun 28 02:38:11.591: LISP: Processing received Map-Reply message from 10.10.7.7 to 10.10.6.6
*Jun 28 02:38:11.591: LISP: Received map reply nonce 0xB796C774-0x89AD47FE, records 1, probe
*Jun 28 02:38:11.591: LISP: Processing Map-Reply mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, authoritative, 2 locators
      10.10.6.6 pri/wei=1/1 lpR
      10.10.7.7 pri/wei=1/1 LPR
*Jun 28 02:38:11.591: LISP: Map Request prefix 10.2.2.0/24 10.10.7.7 local EID RLOC[LL],
Received reply with rtt 0ms.
xTR-B21#undebug lisp control-plane other-xtr-probe
LISP control plane other XTR RLOC probe debugging is off
xTR-B21#
```

On xTR-B20:

```
xTR-B20#debug lisp control-plane other-xtr-probe
LISP control plane other XTR RLOC probe debugging is on
*Jun 28 02:30:37.547: LISP: Send map request type local EID RLOC
*Jun 28 02:30:37.547: LISP: Send map request for EID prefix IID 0 10.2.2.0/24
*Jun 28 02:30:37.547: LISP: AF IPv4, Sending probe map-request from 10.10.7.7 to 10.10.6.6
for EID 10.2.2.0/24, ITR-RLOCs 1, nonce 0x9194C251-0xD9EB8322.
*Jun 28 02:30:37.551: LISP: Processing received Map-Reply message from 10.10.6.6 to 10.10.7.7
*Jun 28 02:30:37.551: LISP: Received map reply nonce 0x9194C251-0xD9EB8322, records 1, probe
*Jun 28 02:30:37.551: LISP: Processing Map-Reply mapping record for IID 0 10.2.2.0/24, ttl
1440, state complete, authoritative, 2 locators
      10.10.6.6 pri/wei=1/1 LPR
      10.10.7.7 pri/wei=1/1 lpR
*Jun 28 02:30:37.551: LISP: Map Request prefix 10.2.2.0/24 10.10.6.6 local EID RLOC[LL],
Received reply with rtt 0ms.
xTR-B20# undebug lisp control-plane other-xtr-probe
LISP control plane other XTR RLOC probe debugging is off
xTR-B20#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane remote-eid-cache

To display messages alerting to modifications to the LISP mapping cache, use the **debug lisp control-plane remote-eid-cache** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane remote-eid-cache**
>
> **no debug lisp control-plane remote-eid-cache**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane remote-eid-cache** command displays messages alerting to modifications to the LISP mapping cache. This command can be useful for troubleshooting EID reachability issues for example.

Examples

The following is sample output from the **debug lisp control-plane remote-eid-cache** command. In this example, the **lig** command is used to modify the LISP map-cache.

```
Router# debug lisp control-plane remote-eid-cache
LISP control plane remote EID cache debugging is on
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.0.6 with RTT 4 msecs
192.168.2.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, complete
  Locator    Uptime    State      Pri/Wgt
  10.0.0.6   00:00:00  up          1/1
*Nov  2 16:48:16.295: LISP: Remote EID prefix 192.168.2.1/32, Change state to incomplete
(method: LIG, state: unknown, rlocs: 0).
*Nov  2 16:48:16.295: LISP: Remote EID prefix 192.168.2.1/32, Scheduling map requests
(incomplete) (method: LIG, state: incomplete, rlocs: 0).
*Nov  2 16:48:16.339: LISP: Send map request for EID prefix 192.168.2.1/32
*Nov  2 16:48:16.339: LISP: Remote EID prefix 192.168.2.1/32, Send map request (1) (method:
LIG, state: incomplete, rlocs: 0).
*Nov  2 16:48:16.343: LISP: Processing received Map-Reply message from 10.0.0.6 to 10.0.0.2
*Nov  2 16:48:16.343: LISP: Received map reply nonce 0xAE70110C-0x8C0EDFF6, records 1
*Nov  2 16:48:16.343: LISP: Map Request prefix 192.168.2.1/32 remote EID prefix, Received
reply with rtt 0ms.
*Nov  2 16:48:16.343: LISP: Processing mapping information for EID prefix 192.168.2.0/24
*Nov  2 16:48:16.343: LISP: Remote EID prefix 192.168.2.0/24, Updating existing entry
(method: map-reply, state: complete, rlocs: 1).
*Nov  2 16:48:16.343: LISP: Remote EID prefix 192.168.2.1/32, Change state to deleted
(method: LIG, state: incomplete, rlocs: 0).
*Nov  2 16:48:16.343: LISP: Remote EID prefix 192.168.2.0/24 locator 10.0.0.6 priority 1
weight 1, No change in locator (method: map-reply, state: complete, rlocs: 1).
Router#
```

In this example, the LISP map-cache is cleared using the **clear ip lisp map-cache** command.

```
Router# clear ip lisp map-cache
*Nov  2 16:49:46.015: LISP: Remote EID prefix 0.0.0.0/0, Change state to deleted (method:
static, state: send-map-request, rlocs: 0).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.1.0/24, Change state to deleted
(method: map-reply, state: complete, rlocs: 1, local).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.1.0/24 locator 10.0.0.2 priority 1
weight 1, Deleting locator (method: map-reply, state: complete, rlocs: 1, local).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.1.0/24, Recalculated RLOC status bits
from 0x1 to 0x0 (method: map-reply, state: complete, rlocs: 0, local).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.2.0/24, Change state to deleted
(method: map-reply, state: complete, rlocs: 1).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.2.0/24 locator 10.0.0.6 priority 1
weight 1, Deleting locator (method: map-reply, state: complete, rlocs: 1).
*Nov  2 16:49:46.015: LISP: Remote EID prefix 192.168.2.0/24, Recalculated RLOC status bits
from 0x1 to 0x0 (method: map-reply, state: complete, rlocs: 0).
*Nov  2 16:49:46.015: LISP: AF IPv4, Completed remote EID clear processing.
*Nov  2 16:49:46.015: LISP: Remote EID prefix 0.0.0.0/0, Change state to send-map-request
(method: static, state: unknown, rlocs: 0).
Router# no debug lisp control-plane remote-eid-cache
LISP control plane remote EID cache debugging is off
```

```
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp control-plane remote-eid-persistent

The **debug lisp control-plane remote-eid-persistent** command displays messages alerting to modifications to the LISP mapping cache for remote EIDs. This command can be useful for troubleshooting remote EID reachability issues for example.

> **debug lisp control-plane remote-eid-persistent**
> **no debug lisp control-plane remote-eid-persistent**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XC	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane remote-eid-persistent** command displays messages alerting to modifications to the LISP mapping cache for remote EIDs. . This command can be useful for troubleshooting issues EID reachability for example.

Examples

The following is sample output from the **debug lisp control-plane remote-eid-persistent** command. In this example, the **lig** command is used to modify the LISP map-cache.

```
Router# debug lisp control-plane remote-eid-persistent
LISP control plane remote EID mapping persistent debugging is on
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.0.6 with RTT 4 msecs
192.168.2.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, complete
  Locator    Uptime    State      Pri/Wgt
  10.0.0.6  00:00:00   up          1/1
*Nov  2 16:52:50.591: LISP: AF IPv4, Persistent db: opened unix:LISP-MapCache-IPv4-00000123-
00030.tmp for writing.
*Nov  2 16:52:50.591: LISP: AF IPv4, Persistent db: wrote 1 prefixes to unix:LISP-MapCache-
IPv4-00000123-00030.tmp.
*Nov  2 16:52:50.599: LISP: AF IPv4, Persistent db: deleted unix:LISP-MapCache-IPv4-00000123-
00030 prior to rename.
*Nov  2 16:52:50.599: LISP: AF IPv4, Persistent db: renamed unix:LISP-MapCache-IPv4-00000123-
00030.tmp to unix:LISP-MapCache-IPv4-00000123-00030.
Router# no debug lisp control-plane remote-eid-cache
LISP control plane remote EID mapping persistent debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane remote-rloc-watch

To display messages related to rloc-probes from other xTRs, use the **debug lisp control-plane remote-rloc-watch** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane remote-rloc-watch**
> **no debug lisp control-plane remote-rloc-watch**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane remote-rloc-watch** command displays messages related to rloc-probes from other xTRs. This command can be useful for troubleshooting local EID-to-RLOC mapping issues.

Examples

No example output is available for this command.

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane rib-rloc-watch

To display messages related to the up/down local/remote status of local locators in the routing information base (RIB), use the **debug lisp control-plane rib-rloc-watch** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane rib-rloc-watch**
> **no debug lisp control-plane rib-rloc-watch**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1xa

Usage Guidelines

The **debug lisp control-plane rib-rloc-watch** command displays messages related to the up/down local/remote status of local locators in the routing information base (RIB). This command can be useful for troubleshooting local EID-to-RLOC mapping issues.

Examples

The following is sample output from the **debug lisp control-plane rib-rloc-watch** command. In this example, the EID-RLOC mapping is removed using the no **database-mapping** command and then added back using the . **database-mapping** command.

```
Router# debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is on
*Nov  2 17:11:39.575: LISP RIB_RWATCH: Debugging is ON
Router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# router lisp
Router(config-router-lisp)# no database-mapping 192.168.1.0/24 10.0.0.2 priority 1 weight 1
*Nov  2 17:13:12.291: LISP RIB_RWATCH: (default:ipv4:base) W 192.168.1.1/32 c=0x5F35208 EVENT
Track stop
*Nov  2 17:13:12.291: LISP RIB_RWATCH: (default:ipv4:base) W 192.168.1.1/32 c=0x5F35208
Removing
*Nov  2 17:13:12.291: LISP RIB_RWATCH: (default:ipv4:base) R 192.168.1.1/32  d=110 p=1 ->
Et0/1 172.16.1.1 11 Scheduled to check for deletion
*Nov  2 17:13:12.291: LISP RIB_RWATCH: (default:ipv4:base) R 192.168.1.1/32  d=110 p=1 ->
Et0/1 172.16.1.1 11 Deleting
Router(config-router-lisp)# database-mapping 192.168.1.0/24 10.0.0.2 priority 1 weight 1
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) T 192.168.1.1/32 EVENT Track start
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) N 192.168.1.1/32 Adding track
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) N 192.168.1.1/32 QP Schedule query
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) T 192.168.1.1/32 EVENT Query found
route
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) N 192.168.1.1/32 Adding route
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) R 0.0.0.0/0  d=1 p=1 -> 10.0.0.1
(base) 0 Scheduled to check for deletion
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) R 192.168.1.1/32  d=0 p=0 ->
Updating
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) R 192.168.1.1/32  d=110 p=1 ->
Et0/1 172.16.1.1 11 Notifying
*Nov  2 17:13:18.243: LISP RIB_RWATCH: Adding to client notification queue
*Nov  2 17:13:18.243: LISP RIB_RWATCH: (default:ipv4:base) W 192.168.1.1/32 c=0x5F35208
Client notified reachable
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is off
*Nov  2 17:13:24.935: LISP RIB_RWATCH: Debugging is OFF
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane rib-route-import

To display LISP control plane activities related to the ipv4 route-import or ipv6 route-import features, use the **debug lisp control-plane rib-route-import** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane rib-route-import**
> **no debug lisp control-plane rib-route-import**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **debug lisp control-plane rib-route-import** command displays events related to LISP control plane configuration.

Examples

The following is sample output from the **debug lisp control-plane rib-route-import** command. In this example, when **clear ip lisp route-import** is entered, all route-import routes marked stale, re-evaluated, and remaining stale routes removed as indicated by the debug output.

```
PITR# debug lisp control-plane rib-route-import
LISP control plane RIB route import debugging is on
PITR#clear ip lisp route-import
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval marking stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval walking rib.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval delete stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval done.
PITR#show ip lisp route-import
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 4
Prefix                    Uptime      Source  Map-cache   State
10.0.1.0/24               00:08:20    static  installed
10.0.2.0/24               00:08:20    static  installed
10.0.3.0/24               00:08:20    static  installed
10.0.4.0/24               00:08:20    static  installed
PITR# no debug lisp control-plane rib-route-import
LISP control plane RIB route import debugging is off
PITR#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane solicit-map-request

To display messages related to LISP Solicit-Map-Request messages, use the **debug lisp control-plane solicit-map-request** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane solicit-map-request**
> **no debug lisp control-plane solicit-map-request**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was introduced.

Usage Guidelines

The **debug lisp control-plane solicit-map-request** command displays messages related to related to LISP Solicit-Map-Request (SMR) messages. An SMR is sent when EID-to-RLOC mapping information changes. This command can be useful for troubleshooting static EID-to-RLOC mapping issues.

Examples

The following is sample output from the **debug lisp control-plane solicit-map-request** command. In this example, the **priority** value is changed in a LISP EID-to-RLOC mapping.

```
Router# debug lisp control-plane solicit-map-request
LISP control plane solicit-map-request debugging is on
Router# conf t
Router(config)# router lisp
Router(config-router-lisp)# database-mapping 192.168.1.0/24 10.0.0.2 priority 2 weight 1
*Nov  2 17:44:31.943: LISP: Send map request for EID prefix 192.168.2.0/24
*Nov  2 17:44:31.943: LISP: AF IPv4, Sending probe map-request from 10.0.0.2 to 10.0.0.6 for
EID 192.168.2.0/24, ITR-RLOCs 1, nonce 0x5E2340D9-0x8E15E34A, SMR 192.168.1.0.
*Nov  2 17:44:33.243: %SYS-5-CONFIG_I: Configured from console by console
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane solicit-map-request
LISP control plane solicit-map-request debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp control-plane static-mapping

To display messages related to the creation or removal of LISP static map-cache entries via the **ip lisp map-cache** command, use the **debug lisp control-plane static-mapping** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp control-plane static-mapping**
>
> **no debug lisp control-plane static-mapping**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane static-mapping** command displays messages related to the creation or removal of LISP static map-cache entries via the **ip lisp map-cache** command. This command can be useful for troubleshooting static EID-to-RLOC mapping issues.

Examples

The following is sample output from the **debug lisp control-plane static-mapping** command. In this example, a LISP static map-cache entry is created using the **ip lisp map-cache** command.

```
Router# debug lisp control-plane static-mapping
LISP control plane static remote EID mapping debugging is on
Router# conf t
Router(config)# router lisp
Router(config-router-lisp)# map-cache 10.1.1.0/24 172.16.1.1 priority 1 weight 100
Dec 18 09:43:13.982 PST: LISP: Static Mapping prefix 10.1.1.0/24 locator 172.16.1.1 priority
1 weight 100, Created (state: complete).
Router(config-router-lisp)#^Z
Router# no debug lisp control-plane static-mapping
LISP control plane static remote EID mapping debugging is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp detail

To enable the display of additional detailed information, when available, by LISP debug commands, use the **debug lisp detail** command in privileged EXEC mode prior to issuing any other LISP debug command. To turn off detailed debugging for LISP debug commands, use the **no** form of this command.

debug lisp detail

no debug lisp detail

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp control-plane detail** command enables the display of detailed information, when available, by certain LISP debug commands. This command can be useful for troubleshooting many LISP related issue by causing the display of more detailed debugging output.

Examples

The following is sample output from the **debug lisp detail** command. In this example, the command **clear ip lisp map-cache** is first issued with the debug command **debug lisp control-plane events** enabled. The command **clear ip lisp map-cache** is then repeated after enabling the debug command **debug lisp detail** for comparison.

```
Router# debug lisp control-plane events
LISP control plane event debugging is on
Router# clear ip lisp map-cache
Dec 18 09:47:28.386 PST: LISP: AF IPv4, Completed remote EID clear processing.
Dec 18 09:47:28.386 PST: LISP: AF IPv4, Static mapping re-create request while idle.
Router# debug lisp detail
Router# clear ip lisp map-cache
Dec 18 09:47:48.229 PST: LISP: AF IPv4, Completed remote EID clear processing.
Dec 18 09:47:48.229 PST: LISP: AF IPv4, Static mapping re-create request while idle.
Dec 18 09:47:48.233 PST: LISP: AF IPv4, Updated 2 remote EID entries in forwarding table.
Dec 18 09:47:48.233 PST: LISP: AF IPv4, Re-creting default static map.
Dec 18 09:47:48.233 PST: LISP: AF IPv4, Re-created 0 static mappings.
Dec 18 09:47:48.233 PST: LISP: AF IPv4, Updated 1 remote EID entries in forwarding table.
Router# no debug lisp detail
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp filter eid

The restrict the output of LISP debug-related commands by filtering on a specific EID-prefix, use the **debug lisp filter eid** command in privileged EXEC mode prior to issuing other LISP debug commands. To remove debug filtering restrictions for LISP debug commands, use the **no** form of this command.

debug lisp filter {**eid** {*EID-prefix/prefix-length* | **ipv4** | **ipv6**} | {**rloc** *locator*}}

no debug lisp filter {**eid** {*EID-prefix/prefix-length* | **ipv4** | **ipv6**} | {**rloc** *locator*}}

Syntax Description

eid	Indicate that filtering should be based on the following EID-prefix
EID-prefix/prefix-length	IPv4 or IPv6 EID-prefix to filter debug output against.
ipv4	Enable debugging of all IPv4 EID prefixes
ipv6	Enable debugging of all IPv6 EID prefixes

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

In many cases, the amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging does not match solely the packets of interest. The **debug lisp filter eid** command provides a mechanism for reducing the output of the various LISP-related debug commands by matching only on the specified EID-prefix. This command can be useful for troubleshooting any LISP related issue.

Examples

The following is sample output from the **debug lisp filter eid** command. In this example, a debug lisp filter is set for the EID 192.168.1.1/32, and then the debug command **debug lisp control-plane lig** is enabled. The **lig** command is used for the EID 192.168.1.1, and then repeated for the EID 192.168.2.1, which does not match the filter, for comparison.

```
Router# debug lisp filter 192.168.1.1/32
LISP control debug EID filtering is on
Router# debug lisp control-plane lig
Router# lig 192.168.1.1
Mapping information for EID 192.168.1.1 from 10.0.0.2 with RTT 8 msecs
192.168.1.0/24, uptime: 00:00:36, expires: 23:59:52, via map-reply, self
  Locator   Uptime   State     Pri/Wgt
  10.0.0.2  00:00:36 up, self   1/1
*Nov  2 17:53:48.215: LISP: LIG Request for IPv4, EIDs 192.168.1.1, count 3.
*Nov  2 17:53:48.231: LISP: Send map request for EID prefix 192.168.1.1/32
*Nov  2 17:53:48.231: LISP: LIG 192.168.1.1 Overriding map request parameters.
*Nov  2 17:53:48.239: LISP: Processing received Map-Reply message from 10.0.0.2 to 10.0.0.2
*Nov  2 17:53:48.239: LISP: Received map reply nonce 0x4376B9EE-0xC0DBB1E6, records 1
*Nov  2 17:53:48.239: LISP: Processing mapping information for EID prefix 192.168.1.0/24
*Nov  2 17:53:48.239: LISP: LIG 192.168.1.1 Moving info block from mapping entry
192.168.1.1/32 to 192.168.1.0/24.
*Nov  2 17:53:48.719: LISP: LIG 192.168.1.1 Checking for mapping updates.
*Nov  2 17:53:48.719: LISP: LIG 192.168.1.1 Displaying info.
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.0.6 with RTT 4 msecs
192.168.2.0/24, uptime: 00:12:23, expires: 23:59:52, via map-reply, complete
  Locator   Uptime   State     Pri/Wgt
  10.0.0.6  00:12:23 up        1/1
*Nov  2 17:55:16.895: LISP: LIG Request for IPv4, EIDs 192.168.2.1, count 3.
Router# no debug lisp filter
LISP control debug EID filtering is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp filter eid-table

The restrict the output of LISP debug-related commands by filtering on a specific eid-table (VRF), use the **debug lisp filter eid-table** command in privileged EXEC mode prior to issuing any other LISP debug command. To remove debug filtering restrictions for LISP debug commands, use the **no** form of this command.

> **debug lisp filter eid-table vrf** *vrf-name*

> **no debug lisp filter eid-table vrf** *vrf-name*

Syntax Description

vrf	Indicates that filtering should be based on the following vrf-name.
vrf-name	The name of the VRF to restrict filtering to.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	This command was introduced.

Usage Guidelines

On any LISP device, the amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging does not match solely the packets of interest. The **debug lisp filter eid-table** command provides a mechanism for reducing the output of the various LISP-related debug commands by matching only on the specified eid-table (VRF). This command can be useful for troubleshooting any LISP related issue.

Examples

The following is sample output from the **debug lisp filter eid-table** command when enabled on a LISP Map-Server. In this example, a debug lisp filter is set for the **vrf** name *blue*. Note that the debug command automatically converts this to the LISP instance-id 1, which is what the vrf blue is bound to. Debugging actually is filtered on the instance-id (since this is what is seen in the packets). The command **debug lisp control-plane map-server-registration** is enabled to generate output.

```
MSMR# debug lisp filter eid-table vrf blue
LISP control debug instance ID filtering is on
MSMR# debug lisp control-plane map-server-registration
LISP control plane map-server-registration debugging is on
*Jun 28 16:08:41.959: LISP: Processing received Map-Register message from 172.2.0.2 to
172.2.0.2
*Jun 28 16:08:41.959: LISP: Processing Map-Register no proxy, no map-notify, no merge, no
mobile-node, 1 record, nonce 0xCD8C421C-0x67A6C29D, key-id 1, auth-data-len 20
*Jun 28 16:08:41.959: LISP: Processing Map-Register mapping record for IID 1 10.1.2.0/24, ttl
1440, state complete, authoritative, 1 locator
    172.2.0.2 pri/wei=1/1 LpR
*Jun 28 16:08:41.959: LISP: MS registration IID 1 prefix 10.1.2.0/24 172.2.0.2 site All-Sites,
Updating.
MSMR# no debug lisp filter eid-table vrf blue
LISP control debug instance ID filtering is off
MSMR#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp filter instance-id

The restrict the output of LISP debug-related commands by filtering on a specific instance-id, use the **debug lisp filter instance-id** command in privileged EXEC mode prior to issuing any other LISP debug command. To remove debug filtering restrictions for LISP debug commands, use the **no** form of this command.

    debug lisp filter instance-id *iid*
    no debug lisp filter instance-id *iid*

Syntax Description

instance-id	Indicate that filtering should be based on the following instance-id.
iid	The instance-id to restrict filtering to.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB4	This command was introduced.

Usage Guidelines

On any LISP device, the amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging does not match solely the packets of interest. The **debug lisp filter instance-id** command provides a mechanism for reducing the output of the various LISP-related debug commands by matching only on the specified instance-id. This command can be useful for troubleshooting any LISP related issue.

Examples

The following is sample output from the **debug lisp filter instance-id** command when enabled on a LISP Map-Server. In this example, a debug lisp filter is set for the instance-id 123, and then the debug command **debug lisp control-plane map-server-registration** is enabled.

```
Router# debug lisp filter instance-id 123
LISP control debug instance ID filtering is on
Router# debug lisp control-plane map-server-registration
LISP control plane map-server-registration debugging is on
Router#
*Nov  2 19:11:21.627: LISP: Processing received Map-Register message from 10.0.0.6 to
10.0.0.10
*Nov  2 19:11:21.627: LISP: Processing Map-Register, no proxy, do not want map-notify, 1
record, nonce 0xA7AE6234-0xB3D2261C, key-id 1, auth-data-len 20
*Nov  2 19:11:21.627: LISP: Processing Map-Register mapping record for IID 123 192.168.2.0/24,
ttl 1440, state complete, authoritative, 1 locator
*Nov  2 19:11:21.627: LISP: MS registration IID 123 prefix 192.168.2.0/24 10.0.0.6 site Site-
B, Updating.
*Nov  2 19:11:22.683: LISP: Processing received Map-Register message from 10.0.0.6 to
10.0.0.10
*Nov  2 19:11:22.683: LISP: Processing Map-Register, no proxy, do not want map-notify, 1
record, nonce 0x886A371D-0x7EAA1576, key-id 1, auth-data-len 20
*Nov  2 19:11:22.683: LISP: Processing Map-Register mapping record for IID 123
2001:DB8:B::/48, ttl 1440, state complete, authoritative, 1 locator
Router# no debug lisp filter instance-id 123
LISP control debug instance ID filtering is off
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp filter rloc

The restrict the output of LISP debug-related commands by filtering on a specific locator address, use the **debug lisp filter rloc** command in privileged EXEC mode prior to issuing any other LISP debug command. To remove debug filtering restrictions for LISP debug commands, use the **no** form of this command.

> **debug lisp filter rloc** *locator*
>
> **no debug lisp filter rloc** *locator*

Syntax Description

rloc	Indicate that filtering should be based on the following locator address
locator	IPv4 or IPv6 locator address to filter debug output against

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

In many cases, the amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging does not match solely the packets of interest. The **debug lisp filter rloc** command provides a mechanism for reducing the output of the various LISP-related debug commands by matching only on the specified locator address. This command can be useful for troubleshooting any LISP related issue.

Examples

The following is sample output from the **debug lisp filter rloc** command. In this example, a debug lisp filter is set for the locator 10.0.0.2, and then the debug command **debug lisp control-plane lig** is enabled. The **lig** command is used for the EID 192.168.1.1 - which is mapped to the locator 10.0.0.2 and matches the locator filter, and then repeated for the EID 192.168.2.1 – for which the locator does not match the locator filter, for comparison.

```
Router# debug lisp filter rloc 10.0.0.2
LISP control debug RLOC filtering is on
Router# debug lisp control-plane lig
LISP control plane Internet Groper debugging is on
Router# lig 192.168.1.1
Mapping information for EID 192.168.1.1 from 10.0.0.2 with RTT 12 msecs
192.168.1.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, self
  Locator   Uptime    State     Pri/Wgt
  10.0.0.2  00:00:00  up, self    1/1
*Nov  2 19:21:21.475: LISP: LIG Request for IPv4, EIDs 192.168.1.1, count 3.
*Nov  2 19:21:21.519: LISP: Send map request for EID prefix 192.168.1.1/32
*Nov  2 19:21:21.519: LISP: LIG 192.168.1.1 Overriding map request parameters.
*Nov  2 19:21:21.531: LISP: Processing received Map-Reply message from 10.0.0.2 to 10.0.0.2
*Nov  2 19:21:21.531: LISP: Received map reply nonce 0x1649AE40-0xD226CA2C, records 1
*Nov  2 19:21:21.531: LISP: Processing mapping information for EID prefix 192.168.1.0/24
```

```
*Nov  2 19:21:21.531: LISP: LIG 192.168.1.1 Moving info block from mapping entry
192.168.1.1/32 to 192.168.1.0/24.
*Nov  2 19:21:21.979: LISP: LIG 192.168.1.1 Checking for mapping updates.
*Nov  2 19:21:21.979: LISP: LIG 192.168.1.1 Displaying info.
Router# lig 192.168.2.1
Mapping information for EID 192.168.2.1 from 10.0.0.6 with RTT 4 msecs
192.168.2.0/24, uptime: 00:11:46, expires: 23:59:52, via map-reply, complete
  Locator   Uptime   State     Pri/Wgt
  10.0.0.6  00:11:46 up          1/1
Router# no debug lisp filter rloc 10.0.0.2
Router#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

---

debug lisp forwarding adjacency

To display messages related to LISP forwarding adjacency activities, use the **debug lisp forwarding adjacency** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding adjacency**
>
> **no debug lisp forwarding adjacency**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding adjacency** command displays events related to LISP forwarding adjacency activities including when an adjacency is re-evaluated, a new next-hop is used, or when an adjacency MTU is updated as the result of PMTUD. This command can be useful for troubleshooting LISP forwarding issues.

Examples

The following is sample output from the **debug lisp forwarding adjacency** command. In this example, a static EID-to-RLOC map entry is configured using the **ip lisp map-cache** command, resulting in the addition of a new map-cache forwarding entry.

```
Router# debug lisp forwarding adjacency
LISP adjacency debugging is on
Router#conf t
Router(config)# router lisp
Router(config-router-lisp)# map-cache 192.168.3.0/24 10.0.0.2 priority 1 weight 1
*Nov  2 19:25:47.391: LISPadj: IP adj out of LISP0, addr 10.0.0.2 (incomplete) adding LISP
source
*Nov  2 19:25:47.391: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) Skip
reeval, adj not sourced
```

```
*Nov  2 19:25:47.391: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) no encap,
state is not initialized, not active
*Nov  2 19:25:47.391: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) no
terminal adj, set state to no terminal adj found
*Nov  2 19:25:47.391: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) no encap,
state is no terminal adj found, not active
*Nov  2 19:25:47.391: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) no
terminal adj, set state to no terminal adj found
*Nov  2 19:25:47.395: LISPadj: IP midchain out of LISP0, addr 10.0.0.2 (incomplete) no
terminal adj, set state to no terminal adj found
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 output chain skipping
LISP eligibility check 0x73850B8 for IPv4:Default, 1 lock next is IP adj out of Ethernet0/0,
addr 10.0.0.1 0627CBD8
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 output chain picked IP
adj out of Ethernet0/0, addr 10.0.0.1 0627CBD8 for via_fib 0.0.0.0/0
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 found terminal adj IP
adj out of Ethernet0/0, addr 10.0.0.1 MTU 1500 pre adj encap 0
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 pick source RLOC
10.0.0.2 MTU 1464
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 output chain skipping
LISP eligibility check 0x73850B8 for IPv4:Default, 1 lock next is IP adj out of Ethernet0/0,
addr 10.0.0.1 0627CBD8
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 output chain picked IP
adj out of Ethernet0/0, addr 10.0.0.1 0627CBD8 for via_fib 0.0.0.0/0
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 found terminal adj IP
adj out of Ethernet0/0, addr 10.0.0.1 MTU 1500 pre adj encap 0
*Nov  2 19:25:47.531: LISPadj: IP midchain out of LISP0, addr 10.0.0.6 pick source RLOC
10.0.0.2 MTU 1464
Router(config-router-lisp)#^Z
Router# no debug lisp forwarding adjacency
LISP adjacency debugging is off
Router#
```

Related Commands

debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-map-request	Display LISP data driven map request debug messages
debug lisp forwarding data-signal-status-bits	Display LISP data driven locator status bits change debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding remote-eid-prefix	Display LISP remote eid prefix events in forwarding module debug messages
debug lisp forwarding state	Display debug messages related to LISP forwarding module state
debug lisp forwarding virtual-interface-address	LISP virtual interface address selection debugs

debug lisp forwarding alt-prefix

To display messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF, use the **debug lisp forwarding alt-prefix** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding alt-prefix**
>
> **no debug lisp forwarding alt-prefix**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding alt-prefix** command displays messages related to merging of prefixes from the ALT VRF into the main table, used only when running as PITR.

This command can be useful for troubleshooting LISP forwarding issues when a LISP ITR or PITR uses the ALT directly for IPv4 EID-to-RLOC mapping resolution.

Examples

The following is sample output from the **debug lisp forwarding alt-prefix** command. In this example, **ip lisp proxy-itr** and **ip lisp alt-vrf** functions are enabled.

```
Router# debug lisp forwarding alt-prefix
LISP ALT prefix events in forwarding module debugging is on
Router# conf t
Router(config)# router lisp
Router(config-router-lisp)# ipv4 proxy-itr
Router(config-router-lisp)# ipv4 alt-vrf lisp
*Nov  2 19:29:51.807: LISPalt: IPv4:Default repopulate end
*Nov  2 19:29:51.807: LISPalt: IPv4:Default repopulate end
Router(config-router-lisp)#^Z
Router# no debug lisp forwarding alt-prefix
LISP ALT prefix events in forwarding module debugging is off
Router#
```

Related Commands

ip lisp proxy-itr	Configures the router to act as an IPv4 LISP Proxy Ingress Tunnel Router (PITR)
ipv6 lisp proxy-itr	Configures the router to act as an IPv6 LISP Proxy Ingress Tunnel Router (PITR)

---

debug lisp forwarding data-signal-map-request

To display LISP control plane signaling information resulting from packets hitting map-cache entries requiring Map Request message generation, use the **debug lisp forwarding data-signal-map-request** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding data-signal-map-request**
> **no debug lisp forwarding data-signal-map-request**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding data-signal-map-request** command enables the display of LISP control plane signaling information caused by packets hitting map-cache entries that require the generation of Map Request messages. This command can be useful for troubleshooting LISP forwarding-related issues.

Examples

The following is sample output from the **debug lisp forwarding data-signal-map-request** command. In this example, the ping command is used to generate a map-request for a remote EID.

```
Router# debug lisp forwarding data-signal-map-request
LISP data driven map requests debugging is on
Router# ping 192.168.2.1 source 192.168.1.255

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.1.255

.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/4 ms

*Nov  2 19:32:35.595: LISPdata-signal: sending signal for 192.168.1.255->192.168.2.1 on in
IPv4:Default
*Nov  2 19:32:35.659: LISPdata-signal: got reply for 192.168.2.1 in IPv4:Default
Router# no debug lisp forwarding data-signal-map-request
LISP data driven map requests debugging is off
Router#
```

Related Commands

debug lisp forwarding adjacency	Display LISP debug messages related to forwarding adjacency activities
debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-status-bits	Display LISP data driven locsator status bits change debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding remote-eid-prefix	Display LISP remote eid prefix events in forwarding module debug messages
debug lisp forwarding state	Display debug messages related to LISP forwarding module state
debug lisp forwarding virtual-interface-address	LISP virtual interface address selection debugs

---

debug lisp forwarding data-signal-status-bits

To display LISP control plane signaling information resulting when the locator status bits (LSBs) of decapsulated packets do not match those of the map-cache entry for the remote EID-prefix, use the **debug lisp forwarding**

data-signal-status-bits command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

>   **debug lisp forwarding data-signal-status-bits**
>   **no debug lisp forwarding data-signal- status-bits**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding data-signal- status-bits** command enables the display of LISP control plane signaling information resulting when the locator status bits (LSBs) of decapsulated packets do not match those of the map-cache entry for the remote EID-prefix. This command can be useful for troubleshooting LISP forwarding-related issues.

Examples

The following is sample output from the **debug lisp forwarding data-signal-status-bits** command. In this example, the ETR database-mapping is modified, resulting in a change to the map-cache LSB for that EID entry on the ITR when the EID is pinged.

ETR (Router-1):
```
Router-1# show run | include database-mapping
---<skip>---
database-mapping 192.168.1.0/24 10.0.0.2 priority 1 weight 1
Router-1(config)# router lisp
Router-1(config-router-lisp)# database-mapping 192.168.1.0/24 10.0.0.2 priority 2 weight 1
```

ITR (Router-2):
```
Router-2# debug lisp forwarding data-signal-status-bits
LISP data driven locator status bits change debugging is on
Router-2# show ip lisp map-cache 192.168.1.1
LISP IPv4 Mapping Cache, 2 entries

192.168.1.0/24, uptime: 00:35:26, expires: 23:59:40, via map-reply, complete
  State: complete, last modified: 00:00:12, map-source: 10.0.0.2
  Active, Packets out: 17 (~ 00:01:50 ago)
  Locator   Uptime     State      Pri/Wgt
  10.0.0.2  00:35:26   up             1/1
    Last up-down state change:        00:35:26, state change count: 1
    Last route reachability change:   never, state change count: 0
    Last priority / weight change:    00:00:12/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:           never
Router-2# ping 192.168.1.1 source 192.168.2.255

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.2.255
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
*Nov  2 19:38:39.655: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
*Nov  2 19:38:39.655: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
*Nov  2 19:38:39.659: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
*Nov  2 19:38:39.659: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
*Nov  2 19:38:39.663: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
*Nov  2 19:38:39.663: LISPdata-signal: 10.0.0.2 sent status bits 0x00000001 for
192.168.1.0/24, matching what we got 0x00000001
 Router-2# show ip lisp map-cache 192.168.1.1
LISP IPv4 Mapping Cache, 2 entries

192.168.1.0/24, uptime: 00:33:53, expires: 23:58:46, via map-reply, complete
  State: complete, last modified: 00:01:07, map-source: 10.0.0.2
  Active, Packets out: 17 (~ 00:00:18 ago)
  Locator   Uptime    State      Pri/Wgt
  10.0.0.2  00:33:53  up           2/1
    Last up-down state change:        00:33:53, state change count: 1
    Last route reachability change:   never, state change count: 0
    Last priority / weight change:    00:01:07/never
    RLOC-probing loc-status algorithm:
      Last RLOC-probe sent:           never
Router-2# no debug lisp forwarding data-signal-status-bits
LISP data driven locator status bits change debugging is off
Router-2#
```

Related Commands

debug lisp forwarding adjacency	Display LISP debug messages related to forwarding adjacency activities
debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-map-request	Display LISP data driven map request debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding remote-eid-prefix	Display LISP remote eid prefix events in forwarding module debug messages
debug lisp forwarding state	Display debug messages related to LISP forwarding module state
debug lisp forwarding virtual-interface-address	LISP virtual interface address selection debugs

debug lisp forwarding eligibility-process-switching

To display LISP control plane activities for local packet LISP eligibility processing, use the **debug lisp forwarding eligibility-process-switching** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding eligibility-process-switching**
> **no debug lisp forwarding eligibility-process-switching**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

When a packet sourced from an ITR or PITR itself is destined for a remote LISP site, the packet is assessed for LISP encapsulation eligibility. The **debug lisp forwarding eligibility-process-switching** command displays events related to local packet LISP eligibility processing activities.

Examples

The following is sample output from the **debug lisp forwarding eligibility-process-switching** command. In this example, the **ping** command is used to test the reachability of a remote LISP site with EID 172.16.2.1 from a local EID source on this ITR (xTR-1) of 172.16.1.1.

```
xTR-1# debug lisp forwarding eligibility-process-switching
LISP forwarding module eligibility-process-switching debugging is on
xTR-1# ping 172.16.2.1 source 172.16.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.2.1, timeout is 2 seconds:
Packet sent with a source address of 172.16.1.1

*Jun 28 19:44:05.783: LISPelig-proc: 172.16.1.1 -> 172.16.2.1: eligible, 172.16.1.1 is local
EID, act encap
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
*Jun 28 19:44:07.783: LISPelig-proc: 172.16.1.1 -> 172.16.2.1: eligible, 172.16.1.1 is local
EID, act encap
*Jun 28 19:44:07.783: LISPelig-proc: 172.16.1.1 -> 172.16.2.1: eligible, 172.16.1.1 is local
EID, act encap
*Jun 28 19:44:07.787: LISPelig-proc: 172.16.1.1 -> 172.16.2.1: eligible, 172.16.1.1 is local
EID, act encap
*Jun 28 19:44:07.787: LISPelig-proc: 172.16.1.1 -> 172.16.2.1: eligible, 172.16.1.1 is local
EID, act encap
xTR-1# no debug lisp forwarding eligibility-process-switching
LISP forwarding module eligibility-process-switching debugging is off
xTR-1#
```

Related Commands

Command	Description
debug lisp control-plane all	Display all possible debugging messages for the LISP control plane

debug lisp forwarding ipv4-traceroute

To display information on events related to caching IPv4 traceroute headers in an ITR, use the **debug lisp forwarding ipv4-traceroute** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp forwarding ipv4-traceroute

no debug lisp forwarding ipv4-traceroute

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The information displayed by the **debug lisp forwarding ipv4-traceroute** command includes events related to caching IPv4 traceroute headers in an ITR, ITR modifications to ICMP Time Exceeded messages, and ICMP messages returned to the ITR and forwarded back to the traceroute source.

Examples

The following is sample output from the **debug lisp forwarding ipv4-traceroute** command. In this example, a **traceroute** command is issued from a host within the LISP site (not from the router itself) to a remote host.

```
Router# debug lisp forwarding ipv4-traceroute
LISP IPv4 traceroute debugging is on
Router#
```

Then from a host within the LISP EID namespace:

```
Host$ traceroute 192.168.2.1 source 192.168.1.1 probe 1

Router#
*Nov  2 20:02:50.031: LISPipv4_tr: added pkt 192.168.1.1 -> 192.168.2.1 encap udp port 5632
entry 0x7384720 payload udp 49154/33434
*Nov  2 20:02:50.031: LISPipv4_tr: proxy pkt 10.0.0.1 -> 192.168.1.1 for entry 0x7384720
payload udp 49154/33435
*Nov  2 20:02:53.039: LISPipv4_tr: proxy pkt 10.0.0.6 -> 192.168.1.1 for entry 0x7384720
payload udp 49154/33436
Router# no debug lisp forwarding ipv4-traceroute
LISP IPv4 traceroute debugging is off
Router#
```

Related Commands

Command	Description
debug lisp forwarding adjacency	LISP adjacency debugs

---

debug lisp forwarding ipv6-traceroute

To display information on events related to caching IPv6 traceroute headers in an ITR, use the **debug lisp forwarding ipv6-traceroute** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding ipv6-traceroute**
> **no debug lisp forwarding ipv6-traceroute**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The information displayed by the **debug lisp forwarding ipv6-traceroute** command includes events related to caching IPv6 traceroute headers in an ITR, ITR modifications to ICMP Time Exceeded messages, and ICMP messages returned to the ITR and forwarded back to the traceroute source.

Examples

No example output is available for this command.

Related Commands

Command	Description
debug lisp forwarding adjacency	LISP adjacency debugs

---

debug lisp forwarding remote-eid-prefix

To display LISP control plane signaling information related to updates about a remote EID-prefix, use the **debug lisp forwarding remote-eid-prefix** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp forwarding remote-eid-prefix

no debug lisp forwarding remote-eid-prefix

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding remote-eid-prefix** command enables the display of LISP control plane signaling information related to updates about a remote EID-prefix. This command can be useful for troubleshooting LISP forwarding-related issues.

Examples

The following is sample output from the **debug lisp forwarding remote-eid-prefix** command. In this example, the **ping** command is used to test the reachability of a remote EID for which a map-cache entry does not currently exist.

```
Router# debug lisp forwarding remote-eid-prefix
LISP remote eid prefix events in forwarding module debugging is on
Router# clear ip lisp map-cache
```

```
*Nov  2 20:05:57.179: LISPreid: 0.0.0.0/0 Removed LISP src, success
*Nov  2 20:05:57.179: LISPreid: 0.0.0.0/0 Removed LISP IPL src
*Nov  2 20:05:57.179: LISPreid: 192.168.2.0/24 Removed LISP src, success
*Nov  2 20:05:57.179: LISPreid: 192.168.2.0/24 Removed LISP IPL src
*Nov  2 20:05:57.179: LISPreid: 0.0.0.0/0 Added LISP IPL src, ok
*Nov  2 20:05:57.179: LISPreid: 0.0.0.0/0 Created pco 0x60CE738 linked to glean for LISP0
*Nov  2 20:05:57.179: LISPreid: 0.0.0.0/0 Added LISP src, success
*Nov  2 20:05:57.291: LISPreid: 192.168.2.0/24 Removed LISP subtree, success
Router# ping 192.168.2.1 source 192.168.1.255

Type escape sequence to abort.
Packet sent with a source address of 192.168.1.255

*Nov  2 20:06:45.907: LISPreid: 192.168.2.1/32 Added LISP IPL src, ok
*Nov  2 20:06:45.907: LISPreid: 192.168.2.1/32 Created pco 0x6AD8108 linked to drop
*Nov  2 20:06:45.907: LISPreid: 192.168.2.1/32 Added LISP src, success
*Nov  2 20:06:45.959: LISPreid: 192.168.2.1/32 Null modify of pco 0x6AD8108 linked to drop
*Nov  2 20:06:45.959: LISPreid: 192.168.2.0/24 Added LISP IPL src, ok
*Nov  2 20:06:45.959: LISPreid: 192.168.2.0/24 Created pco 0x6AD8078 linked to IP midchain
out of LISP0, addr 10.0.0.6 06104718
*Nov  2 20:06:45.959: LISPreid: 192.168.2.0/24 Added LISP src, success
*Nov  2 20:06:45.959: LISPreid: 192.168.2.1/32 Removed LISP src, success
*Nov  2 20:06:45.959: LISPreid: 192.168.2.0/24 Null modify of pco 0x6AD8078 linked to IP
midchain out of LISP0, addr 10.0.0.6 06104718
*Nov  2 20:06:45.959: LISPreid: 192.168.2.1/32 Removed LISP IPL src
*Nov  2 20:06:46.055: LISPreid: 192.168.2.0/24 Added LISP subtree, success
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/4 ms
Router# no debug lisp forwarding remote-eid-prefix
LISP remote eid prefix events in forwarding module debugging is off
Router#
```

Related Commands

debug lisp forwarding adjacency	Display LISP debug messages related to forwarding adjacency activities
debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-map-request	Display LISP data driven map request debug messages
debug lisp forwarding data-signal-status-bits	Display LISP data driven locator status bits change debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding state	Display debug messages related to LISP forwarding module state
debug lisp forwarding virtual-interface-address	LISP virtual interface address selection debugs

debug lisp forwarding state

To display messages related to LISP forwarding state, use the **debug lisp forwarding state** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

> **debug lisp forwarding state**
>
> **no debug lisp forwarding state**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **debug lisp forwarding alt-prefix** command displays messages related to LISP forwarding module state. LISP forwarding state is dependent on the things like: the device role (ITR, Proxy-ITR, etc.), locator status bits (LSB) changes, RLOC changes, ALT-VRF configuration, and other similar functions. This command can be useful for troubleshooting LISP forwarding issues.

Examples

The following is sample output from the **debug lisp forwarding state** command. In this example, an RLOC is removed, and then added back for a site EID simply to illustrate the output of this debug command.

```
Router# debug lisp forwarding state
LISP forwarding module state debugging is on
Router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config-router-lisp)# no database-mapping 192.168.1.0/24 10.0.0.1 priority 1 weight 100
*Feb 24 21:32:17.055: LISPstate: IPv4:Default set LSB to 0x00000000
Router(config-router-lisp)# database-mapping 192.168.1.0/24 10.0.0.1 priority 1 weight 100
*Feb 24 21:32:36.371: LISPstate: IPv4:Default set LSB to 0x00000001
Router(config-router-lisp)#^Z
Router# no debug lisp forwarding state
LISP forwarding module state debugging is off
Router#
```

Related Commands

debug lisp forwarding adjacency	Display LISP debug messages related to forwarding adjacency activities
debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-map-request	Display LISP data driven map request debug messages
debug lisp forwarding data-signal-status-bits	Display LISP data driven locator status bits change debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding remote-eid-prefix	Display LISP remote eid prefix events in forwarding module debug messages
debug lisp forwarding virtual-interface-address	LISP virtual interface address selection debugs

debug lisp forwarding virtual-interface-address

To display LISP information related to the process of selecting an interface with a local EID address for association with the virtual interface LISP0, use the **debug lisp forwarding virtual-interface-address** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug lisp forwarding virtual-interface-address
no debug lisp forwarding virtual-interface-address

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The virtual interface LISP0 uses an internal IP address in order to encapsulate packets at the process level. The **debug lisp forwarding virtual-interface-address** command displays information related to the selection of this interface. This command can be useful for troubleshooting LISP forwarding-related issues.

Examples

The following is sample output from the **debug lisp forwarding virtual-interface-address** command. In this example, the IP address of the LISP site (EID) interface is changed from 153.16.21.1/32 to 153.16.21.2/32.

```
Router# debug lisp forwarding virtual-interface-address
LISP virtual interface address selection debugging is on
Router# show interface Lisp0
LISP0 is up, line protocol is up
  Hardware is LISP
  Interface is unnumbered. Using address of Loopback0 (192.168.1.255)
 ---<skip>---
Router# conf t
Router(config)# interface Loopback0
Router(config-if)# ip address 192.168.1.254 255.255.255.255
*Nov  2 20:10:15.263: LISPvif-addr: Start timer with delay of 1 seconds
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 start walk to check
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 Checking if Ethernet0/1 addr 172.16.1.2/24
against local EID 192.168.1.0/24, no match
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 Checking if Ethernet0/0 addr 10.0.0.2/30
against local EID 192.168.1.0/24, no match
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 Skipping if LISP0 no address configured
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 Checking if Loopback0 addr 192.168.1.254/32
against local EID 192.168.1.0/24, match
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 Skipping if Null0 no address configured
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 walk ended, found address 192.168.1.254 on
Loopback0
*Nov  2 20:10:16.323: LISPvif-addr: IPv4 LISP0 already unnumbered to Loopback0, no change
*Nov  2 20:10:16.323: LISPvif-addr: IPv6 LISP0 start walk to check
*Nov  2 20:10:16.323: LISPvif-addr: IPv6 LISP0 Checking if Loopback0 addr 2001:DB8:A::2/128
against local EID 2001:DB8:A::/48, match
*Nov  2 20:10:16.323: LISPvif-addr: IPv6 LISP0 Skipping if Ethernet0/1 not loopback
*Nov  2 20:10:16.323: LISPvif-addr: IPv6 LISP0 walk ended, found address 2001:DB8:A::2 on
Loopback0
*Nov  2 20:10:16.323: LISPvif-addr: IPv6 LISP0 already unnumbered to Loopback0, no change
*Nov  2 20:10:16.323: LISPvif-addr: All interfaces are unnumbered request timer to be stopped
Router(config-if)# ^Z
Router# no debug lisp forwarding virtual-interface-address
LISP virtual interface address selection debugging is off
Router#
```

Related Commands

debug lisp forwarding adjacency	Display LISP debug messages related to forwarding adjacency activities
debug lisp forwarding alt-prefix	Display debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF
debug lisp forwarding data-signal-map-request	Display LISP data driven map request debug messages
debug lisp forwarding data-signal-status-bits	Display LISP data driven locator status bits change debug messages
debug lisp forwarding ipv4-traceroute	Display debug messages on events related to caching IPv4 traceroute headers in an ITR.
debug lisp forwarding ipv6-traceroute	Display information on events related to caching IPv6 traceroute headers in an ITR
debug lisp forwarding remote-eid-prefix	Display LISP remote eid prefix events in forwarding module debug messages
debug lisp forwarding state	Display debug messages related to LISP forwarding module state

LISP Clear Commands

clear ip lisp map-cache

To clear the LISP map-cache, use the **clear ip lisp map-cache** command in privilege EXEC mode.

   clear ip lisp map-cache [*EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*}]

Syntax Description

EID-prefix/prefix-length	(Optional) Destination IPv4 EID-prefix to clear.
eid-table vrf *vrfname*	(Optional) Clear the referenced eid-table.
instance-id *iid*	(Optional) Clear the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

The **clear ip lisp map-cache** command removes all IPv4 dynamic LISP map-cache entries stored by the router when used by itself, or when an optional IPv4 EID-prefix is added, only that IPv4 EID-prefix is cleared from the LISP map-cache.

Examples

The following example shows all LISP map-cache entries, and then clears the LISP map-cache.

```
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 2 entries

0.0.0.0/0, uptime: 00:06:23, expires: never, via static
  Negative cache entry, action: send-map-request
192.168.2.0/24, uptime: 00:05:34, expires: 23:54:18, via map-reply, complete
  Locator    Uptime    State       Pri/Wgt
  10.0.0.6   00:05:34  up             1/1
Router# clear ip lisp map-cache
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 1 entries

0.0.0.0/0, uptime: 00:00:02, expires: never, via static
  Negative cache entry, action: send-map-request
 Router#
```

The following example shows LISP map-cache entries for the **eid-table** *green*, and then clears these entries.

```
Router# show ip lisp map-cache eid-table vrf green
LISP IPv4 Mapping Cache for EID-table vrf green (IID 123), 3 entries

0.0.0.0/0, uptime: 01:41:43, expires: never, via static
  Negative cache entry, action: send-map-request
10.2.0.0/24, uptime: 01:36:29, expires: 22:23:23, via map-reply, complete
  Locator    Uptime    State       Pri/Wgt
  172.2.0.2  01:36:29  up             1/100
10.3.0.0/24, uptime: 01:36:12, expires: 22:23:40, via map-reply, complete
  Locator    Uptime    State       Pri/Wgt
  172.3.0.2  01:36:12  up             1/100
Router# clear ip lisp map-cache eid-table vrf green
Router# show ip lisp map-cache eid-table vrf green
```

```
LISP IPv4 Mapping Cache for EID-table vrf green (IID 123), 1 entries

0.0.0.0/0, uptime: 00:00:01, expires: never, via static
  Negative cache entry, action: send-map-request
Router#
```

Related Commands

Command	Description
show ip lisp map-cache	Display current dynamic and static IPv4 EID-to-RLOC map-cache entries

---

clear ip lisp route-import

To clear the current IPv4 RIB routes imported into LISP, use the **clear ip lisp route-import** command in privilege EXEC mode.

    clear ip lisp route-import [{**eid-table vrf** *vrf-name*} | {**instance-id** *iid*}]

Syntax Description

eid-table vrf *vrfname*	(Optional) Clear the referenced eid-table.
instance-id *iid*	(Optional) Clear the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **clear ip lisp route-import** command operates somewhat differently than other **clear** commands. Most clear commands remove the respective entries or counters. For example, the **clear ip lisp map-cache** command removes all IPv4 LISP map-cache entries stored by the router.

The **clear ip lisp route-import** command does not simply remove all routes imported by the **ip lisp route-import** command. When entered, the **clear ip lisp route-import** is entered, all route-import routes are marked stale, then re-evaluated according to the **ip lisp route-import** command, and remaining stale routes removed. Thus, entering **clear ip lisp route-import** command may or may not result in changes to the imported routes. The **show ip lisp route-import** command always provides a listing of the current route imports.

To restrict the clear functions to a specific eid-table, add **eid-table vrf** *vrf-name* to the command. To restrict the clear functions to a specific LISP instance-id, add **instance-id** *iid* to the command.

Examples

The following example shows all IPv4 LISP route-import entries using the **show ip lisp route-import** command, and then clears the IPv4 LISP route-import entries. The **debug lisp control-plane rib-rloc-watch** command is enabled to indicate the affect of using the **clear ip lisp route-import** command.

```
PITR# debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is on
PITR# show ip lisp route-import
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 4
Prefix                    Uptime     Source Map-cache   State
10.0.1.0/24               00:07:49   static installed
10.0.2.0/24               00:07:49   static installed
```

```
10.0.3.0/24                      00:07:49   static  installed
10.0.4.0/24                      00:07:49   static  installed
PITR# clear ip lisp route-import
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval marking stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval walking rib.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval delete stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtimp re-eval done.
PITR# show ip lisp route-import
LISP IPv4 imported routes for EID-table default (IID 0)
Config: 1, Entries: 4
Prefix                           Uptime     Source  Map-cache   State
10.0.1.0/24                      00:08:20   static  installed
10.0.2.0/24                      00:08:20   static  installed
10.0.3.0/24                      00:08:20   static  installed
10.0.4.0/24                      00:08:20   static  installed
PITR#
```

In the above output it can be seen when **clear ip lisp route-import** was entered, all route-import routes marked stale, re-evaluated, and remaining stale routes removed, as shown in the debug output.

Related Commands

Command	Description
show ip lisp route-import	Display current dynamic and static IPv4 EID-to-RLOC map-cache entries

---

clear ip lisp statistics

To clear the LISP ITR and ETR IPv4 address-family packet count statistics, use the **clear ip lisp statistics** command in privilege EXEC mode.

> **clear ip lisp statistics**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **clear ip lisp statistics** command clears all of the LISP ITR and ETR IPv4 address-family packet count statistics. IPv4 address family packet count statistics are maintained for all LISP control plane packets. These packet counters are displayed using the **show ip lisp statistics** command.

Examples

The following example shows all IPv4 LISP control plane statistics (packet counters), and then clears these statistics.

```
Router# show ip lisp statistics
LISP Statistics - last cleared: never
Control Packets:
  Map-Requests in/out:                 1/2
    Encapsulated Map-Requests in/out:  0/1
    RLOC-probe Map-Requests in/out:    1/1
---<skip>---
```

```
Router# clear ip lisp statistics
Router# show ip lisp statistics
LISP Statistics - last cleared: 00:00:06
Control Packets:
  Map-Requests in/out:                   0/0
    Encapsulated Map-Requests in/out:    0/0
    RLOC-probe Map-Requests in/out:      0/0
---<skip>---
Router#
```

Related Commands

Command	Description
show ip lisp statistics	Display LISP IPv4 address-family statistics.

---

clear ipv6 lisp map-cache

To clear the LISP map-cache, use the **clear ipv6 lisp map-cache** command in privilege EXEC mode.

clear ipv6 lisp map-cache [*EID-prefix/prefix-length* | {**eid-table vrf** *vrf-name*} | {**instance-id** *iid*}]

Syntax Description

EID-prefix	(Optional) Destination IPv6 EID-prefix to clear.
eid-table vrf *vrfname*	(Optional) Clear the referenced eid-table.
instance-id *iid*	(Optional) Clear the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
15.1(4)XB4	The syntax of this command was modified.

Usage Guidelines

The **clear ipv6 lisp map-cache** command removes all IPv6 dynamic LISP map-cache entries stored by the router when used by itself, or when an optional IPv6 EID-prefix is added, only that IPv6 EID-prefix is cleared from the LISP map-cache.

Examples

The following example shows all LISP map-cache entries, and then clears the LISP map-cache for the IPv6 EID-prefix 2610:D0:2104::/48.

```
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 3 entries

::/0, uptime: 00:33:19, expires: never, via static
  Negative cache entry, action: send-map-request
2001:DB8:A::/48, uptime: 00:33:19, expires: 23:26:33, via map-reply, self
  Locator   Uptime    State       Pri/Wgt
  10.0.0.2  00:33:19  up, self     1/1
2001:DB8:B::/48, uptime: 00:33:18, expires: 23:26:34, via map-reply, complete
  Locator   Uptime    State       Pri/Wgt
  10.0.0.6  00:33:19  up           1/1
Router# clear ipv6 lisp map-cache 2001:DB8:AB::/48
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 1 entries
```

```
::/0, uptime: 00:00:02, expires: never, via static
  Negative cache entry, action: send-map-request
 Router#
```

The following example shows all LISP map-cache entries, and then clears the LISP map-cache for the **eid-table** named *blue*.

```
Router# show ipv6 lisp map-cache eid-table vrf blue
LISP IPv6 Mapping Cache for EID-table vrf blue (IID 345), 2 entries

::/0, uptime: 00:00:02, expires: never, via static
  Negative cache entry, action: send-map-request
2001:DB8:A::/48, uptime: 00:33:19, expires: 23:26:33, via map-reply, self
  Locator    Uptime    State     Pri/Wgt
  10.0.0.2  00:33:19  up, self    1/1
Router# clear ipv6 lisp map-cache eid-table vrf blue
Router# show ipv6 lisp map-cache eid-table vrf blue
LISP IPv6 Mapping Cache for EID-table vrf blue (IID 345), 1 entries

::/0, uptime: 00:00:02, expires: never, via static
  Negative cache entry, action: send-map-request
Router#
```

Related Commands

Command	Description
show ipv6 lisp map-cache	Display the current dynamic and static IPv6 EID-to-RLOC map-cache entries.

---

clear ipv6 lisp route-import

To clear the current IPv6 RIB routes imported into LISP, use the **clear ip lisp route-import** command in privilege EXEC mode.

> **clear ipv6 lisp route-import** [{**eid-table vrf** *vrf-name*} | {**instance-id** *iid*}]

Syntax Description

eid-table vrf *vrfname*	(Optional) Clear the referenced eid-table.
instance-id *iid*	(Optional) Clear the referenced instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(4)XB5	This command was introduced.

Usage Guidelines

The **clear ipv6 lisp route-import** command operates somewhat differently than other **clear** commands. Most clear commands remove the respective entries or counters. For example, the **clear ipv6 lisp map-cache** command removes all IPv6 LISP map-cache entries stored by the router.

The **clear ipv6 lisp route-import** command does not simply remove all routes imported by the **ipv6 lisp route-import** command. When entered, the **clear ipv6 lisp route-import** is entered, all route-import routes are marked stale, then re-evaluated according to the **ipv6 lisp route-import** command, and remaining stale routes removed. Thus, entering **clear ipv6 lisp route-import** command may or may not result in changes to the imported routes. The **show ipv6 lisp route-import** command always provides a listing of the current route imports.

To restrict the clear functions to a specific eid-table, add **eid-table vrf** *vrf-name* to the command. To restrict the clear functions to a specific LISP instance-id, add **instance-id** *iid* to the command.

Examples

The following example shows all IPv6 LISP route-import entries using the **show ipv6 lisp route-import** command, and then clears the IPv6 LISP route-import entries. The **debug lisp control-plane rib-rloc-watch** command is enabled to indicate the affect of using the **clear ipv6 lisp route-import** command.

```
PITR# debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is on
PITR# show ipv6 lisp route-import
LISP IPv6 imported routes for EID-table default (IID 0)
Config: 1, Entries: 2
Prefix                        Uptime     Source  Map-cache   State
2001:DB8:B::/48               02:13:53   static  installed
2001:DB8:C::/48               02:13:53   static  installed
PITR# clear ipv6 lisp route-import
*Jun 27 23:50:02.911: LISP: AF IPv6, rtimp re-eval marking stale.
*Jun 27 23:50:02.911: LISP: AF IPv6, rtimp re-eval walking rib.
*Jun 27 23:50:02.911: LISP: AF IPv6, rtimp re-eval delete stale.
*Jun 27 23:50:02.911: LISP: AF IPv6, rtimp re-eval done.
PITR# show ipv6 lisp route-import
LISP IPv6 imported routes for EID-table default (IID 0)
Config: 1, Entries: 2
Prefix                        Uptime     Source  Map-cache   State
2001:DB8:B::/48               02:14:05   static  installed
2001:DB8:C::/48               02:14:05   static  installed
PITR#
```

In the above output it can be seen when **clear ipv6 lisp route-import** was entered, all route-import routes marked stale, re-evaluated, and remaining stale routes removed, as shown in the debug output.

Related Commands

Command	Description
show ipv6 lisp route-import	Display current dynamic and static IPv4 EID-to-RLOC map-cache entries

---

clear ipv6 lisp statistics

To clear the LISP ITR and ETR IPv6 address-family packet count statistics, use the **clear ipv6 lisp statistics** command in privilege EXEC mode.

> **clear ipv6 lisp statistics**

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB1	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **clear ipv6 lisp statistics** command clears all of the LISP ITR and ETR IPv6 address-family packet count statistics. IPv6 address family packet count statistics are maintained for all LISP control plane packets. These packet counters are displayed using the **show ipv6 lisp statistics** command.

Examples

The following example shows all IPv6 LISP control plane statistics (packet counters), and then clears these statistics.

```
Router# show ipv6 lisp statistics
LISP Statistics - last cleared: never
Control Packets:
  Map-Requests in/out:                    6/27
    Encapsulated Map-Requests in/out:     6/2
    RLOC-probe Map-Requests in/out:       0/25
---<skip>---
Router# clear ipv6 lisp statistics
Router# show ipv6 lisp statistics
LISP Statistics - last cleared: 00:00:02
Control Packets:
  Map-Requests in/out:                    0/0
    Encapsulated Map-Requests in/out:     0/0
    RLOC-probe Map-Requests in/out:       0/0
---<skip>---
Router#
```

Related Commands

Command	Description
show ipv6 lisp statistics	Display LISP IPv6 address-family statistics.

---

clear lisp site

To clear registration data for the specified LISP site, use the **clear lisp site** command in privilege EXEC mode.

   clear lisp site {*EID-prefix/prefix-length* | *site-name*} [**instance-id** *iid*]

Syntax Description

EID-prefix/prefix-length	IPv4 or IPv6 EID-prefix configured on any site from LISP to clear
site-name	LISP site to clear registration data for.
Instance-id *iid*	(Optional) Display LISP site information matching this instance-id.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB2	This command was introduced.
2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
15.1(1)XB3	This command was modified.
2.5.1XBC	This command was modified.

Usage Guidelines

On a LISP Map-Server only, the **clear lisp site** command clears the registration data for the specified LISP site. When the *EID-prefix* form of the command is used, the indicated EID-prefix registration data is cleared from the site containing that EID-prefix. If the site is active, the EID-prefix will return when the site next registers. When the site-name form of the command is used, all site-specific registration information for the identified site is

cleared. If the site is active, the entire site will return when the site next registers. The registration status of LISP sites is displayed using the **show lisp site** command.

Examples

The following example clears the LISP registration data for the LISP site called Site-A with instance-id 123.

```
Map-Server# show lisp site 192.168.1.1 instance-id 123
LISP Site Registration Information

Site name: Site-A
Description: LISP Site A
Allowed configured locators: any
Requested EID-prefix:
  EID-prefix: 192.168.1.0/24 instance-id 123
    First registered:     00:00:32
    Routing table tag:    0x0
    Origin:               Configuration
    Registration errors:
      Authentication failures:   0
      Allowed locators mismatch: 0
    ETR 10.0.0.2, last registered 00:00:32, no proxy-reply, no map-notify
                TTL 1d00h
    Locator    Local  State       Pri/Wgt
    10.0.0.2   yes    up             1/1
Map-Server# clear lisp instance-id 123 site Site-A
Map-Server# show lisp site 192.168.1.1 instance-id 123
LISP Site Registration Information

Site name: Site-A
Description: LISP Site A
Allowed configured locators: any
Requested EID-prefix:
  EID-prefix: 192.168.1.0/24 instance-id 123
    First registered:     00:00:41
    Routing table tag:    0x0
    Origin:               Configuration
    Registration errors:
      Authentication failures:   0
      Allowed locators mismatch: 0
    No registrations.
…<wait a few seconds>...
Map-Server# show lisp site 192.168.1.1 instance-id 123
LISP Site Registration Information
Site name: Site-A
Description: LISP Site A
Allowed configured locators: any
Requested EID-prefix:
  EID-prefix: 192.168.1.0/24 instance-id 123
    First registered:     00:00:00
    Routing table tag:    0x0
    Origin:               Configuration
    Registration errors:
      Authentication failures:   0
      Allowed locators mismatch: 0
    ETR 10.0.0.2, last registered 00:00:00, no proxy-reply, no map-notify
                TTL 1d00h
    Locator    Local  State       Pri/Wgt
    10.0.0.2   yes    up             1/1
Map-Server#
```

Related Commands

Command	Description
show lisp site	Display LISP site information. Applicable only for the Map-Server.

Other LISP Related Commands

lig

To initiate a LISP Internet Groper (**lig**) operation for a destination EID or to test the routers' local EID prefix(es), use the **lig** command in privileged EXEC mode.

> **lig** {*hostname* | *destination-EID* | [**eid-table vrf** *vrf-name*] | [**instance-id** *iid*]} [**count** *count*] [**source** *source-EID*] [**to** *map-resolver*]
>
> **lig self all** [**count** *count*] [**source** *source-EID*] [**to** *map-resolver*]
>
> **lig self** [**ipv4**|**ipv6**] [**all-eid**] [**count** *count*] [**source** *source-EID*] [**to** *map-resolver*]

Syntax Description

hostname	Destination hostname
destination-EID	Destination IPv4 or IPv6 Endpoint Identifier (EID) to **lig** for.
eid-table vrf *vrf-name*	(Optional) Use **lig** to test if the specified EID-prefix is registered in the referenced **eid-table vrf**.
instance-id *iid*	(Optional) Use **lig** to test if the specified EID-prefix is registered in the referenced **instance-id**.
self	Use **lig** to test if the local EID-prefix is registered in the mapping database.
source *source-EID*	(Optional) Send the Map-Request using this IPv4 or IPv6 source EID.
to *map-resolver*	(Optional) Send the Map-Request(s) to this map-resolver locator instead of the configured Map-Resolver
count *count*	(Optional) Send this number of Map-Requests (value between 1 and 5).
all	(Optional) Specifies that a Map-Request is sent for all local EIDs configured on the router (IPv4 and IPv6).
all-eid	(Optional) Used in conjunction with the ipv4 or ipv6 keyword, specifies that a Map-Request is sent for all local EIDs configured on the router in the referenced address family.
ipv4	(Optional) Specifies that Map-Requests should only be sent for local IPv4 EIDs configured on the router.
ipv6	(Optional) Specifies that Map-Requests should only be sent for local IPv6 EIDs configured on the router.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

This command initiates a LISP Internet Groper (**lig**) query for the indicated destination hostname or EID, or the routers local EID-prefix. The **lig** function is analogous to the DNS-related **dig** function. Use this command as a simple means of testing whether a destination EID exists in the LISP mapping database system, or as a convenient way to see if your site is registered with the mapping database system.

When a **lig** query is initiated with a hostname or destination EID, the router sends a Map-Request to the configured Map-Resolver for the indicated destination hostname or EID. When a Map-Reply is returned, its contents are displayed to the user and entered in the LISP map-cache.

When a **lig self** query is initiated, the routers local EID-prefix is substituted in place of the destination EID when the router sends a Map-Request to the configured Map-Resolver.

- By default, at a minimum one Map-Request is sent to the Map-Resolver but up to three Map-Requests may be sent to the Map-Resolver. Once a Map-Reply is returned for a Map-Request, no further Map-Requests are sent. When the **count** option is applied, the specified number of Map-Requests is sent.
- By default, the source of the Map-Request will be the first configured EID-prefix for the site (with the host-bit set to zero). For example, if the local EID-prefix is 153.16.21.0/24, the source EID will be 153.16.21.0 for the Map-Request. When the **source** option is applied, a specific source EID may be used. However, the source-EID must be one of the EID addresses assigned to the LISP router.
- By default, **lig** refers to the default (global) routing table for all operations. When the **eid-table vrf** *vrf-name* form is used, **lig** queries for the specified EID prefix within the specified VRF. When the **instance-id** *iid* form is used, **lig** queries for the specified EID prefix within the specified instance-id.
- When **lig** is used with the **self** option is applied, the destination EID will also be the first configured EID-prefix for the site (with the host-bit set to zero). For example, if the local EID-prefix is 153.16.21.0/24, the destination EID will be 153.16.21.0 for the Map-Request.
- By default when **lig** is invoked, the Map-Request is sent to the configured Map-Resolver. When the **to** option is used, the Map-Request is forwarded to the specified Map-Resolver instead. Send a Map-Request to a different Map-Resolver can be useful for testing that your EID-prefix has been properly injected into the ALT infrastructure. In this case, the **lig** Map-Request is processed by the specified Map-Resolver and propagated through each ALT router hop to the Map-Server you have registered to. The Map-Server returns the Map-Request to your site. Your site then generates a Map-Reply to the source of the Map-Request – which could be itself, or a different xTR within your LISP site.

Examples

The following example shows all LISP map-cache entries, and then uses the **lig** command for the EID-prefix 153.16.10.0/24.

```
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 1 entries

0.0.0.0/0, uptime: 01:18:22, expires: never, via static

Router# lig 153.16.10.1
Mapping information for EID 153.16.10.1 from 207.98.65.94 with RTT 12 msecs
153.16.10.0/24, uptime: 00:00:00, expires: 23:59:59, via map-reply, complete
  Locator                    Uptime    State      Pri/Wgt
  128.223.156.134            00:00:00  up           1/50
  207.98.65.94              00:00:00  up           1/50
  2001:468:D01:9C::80DF:9C86  00:00:00  up           2/100
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 2 entries

0.0.0.0/0, uptime: 01:48:15, expires: never, via static

153.16.10.0/24, uptime: 00:00:08, expires: 23:59:51, via map-reply, complete
  Locator                    Uptime    State      Pri/Wgt
  128.223.156.134            00:00:08  up           1/50
  207.98.65.94              00:00:08  up           1/50
  2001:468:D01:9C::80DF:9C86  00:00:08  up           2/100
Router#
```

The following example shows all LISP map-cache entries, and then uses **lig self ipv6** to verify that the local IPv6 EID-prefix is registered the LISP mapping database.

```
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 2 entries

::/0, uptime: 00:00:01, expires: never, via static
  Negative cache entry, action: send-map-request
2610:D0::/32, uptime: 00:00:01, expires: never, via static
  Negative cache entry, action: send-map-request
Router# lig self ipv6
Mapping information for EID 2610:D0:1209:: from 128.223.156.222 with RTT 36 msecs
2610:D0:1209::/48, uptime: 00:00:00, expires: 23:59:57, via map-reply, self
  Locator         Uptime    State      Pri/Wgt
  128.223.156.222  00:00:00  up           1/100
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 3 entries
```

```
::/0, uptime: 00:00:14, expires: never, via static
  Negative cache entry, action: send-map-request
2610:D0::/32, uptime: 00:00:14, expires: never, via static
  Negative cache entry, action: send-map-request
2610:D0:1209::/48, uptime: 00:00:02, expires: 23:59:54, via map-reply, self
  Locator          Uptime     State        Pri/Wgt
  128.223.156.222  00:00:02  up            1/100
Router#
```

In the following example, **lig** is used to query for the EID 10.1.2.1 within LISP instance-id 1.

```
Router# lig instance-id 1 10.1.2.1
Mapping information for EID 10.1.2.1 from 12.2.0.2 with RTT 0 msecs
10.1.2.0/24, uptime: 00:00:00, expires: 23:59:52, via map-reply, complete
  Locator   Uptime    State     Pri/Wgt
  12.2.0.2  00:00:00  up         1/1
Router#
```

Related Commands

Command	Description
show ip lisp map-cache	Display the current dynamic and static IPv4 EID-to-RLOC map-cache entries.
show ipv6 lisp map-cache	Display the current dynamic and static IPv6 EID-to-RLOC map-cache entries.

---

ping

To diagnose basic network connectivity and test reachability and/or liveness of a destination EID or RLOC address, use the **ping** command in privileged EXEC mode.

> **ping** [**vrf** *vrf-name*] {*hostname* | *destination-addr*} [**df-bit**] [**repeat** *count*] [**size** *size*] [**source** *source-addr*]

Syntax Description

vrf *vrf-name*	(Optional) The name of the VPN (VRF context) within which to ping.
hostname	Hostname of the system to ping.
destination-addr	IPv4 or IPv6 Address of the system to ping.
df-bit	(Optional) Enables the "do not fragment" bit in the IP header (IPv4-only).
repeat *count*	(Optional) Specifies the number of times the ping should be sent (default 5).
size *size*	(Optional) Size, in bytes, of the ping datagram (default 100).
source *source-addr*	(Optional) IPv4 or IPv6 Address used by this system to ping.

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

For IPv4, the **ping** command sends an ICMP Echo Request (ICMP Type 8, Code 0) packet to the specified address then waits for a corresponding ICMP Echo Reply (ICMP Type 0, Code 0) packet reply. For IPv6, the **ping** command sends an ICMP Echo Request (ICMP Type 128, Code 0) packet to the specified IPv6 address then waits for a corresponding ICMP Echo Reply (ICMP Type 129, Code 0) packet reply.

✎

Note   The descriptions provided here represent a subset of all possible **ping** options and uses; in particular, those relevant to LISP. Other **ping** command options and uses beyond those described are covered in the general-use description of the **ping** command found at:
http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_m1.html#wp1013837.

LISP has separate control plane and data plane functions. The diagnostic tool **ping** can be used to test reachability and liveness of various the LISP data plane and control plane functions.

- If a Map-Cache entry exists for a specified destination EID, **ping** can be used to test the LISP data plane by using the **source** keyword to specify a source address that is an EID. Note that the LISP site for the destination EID must also have an existing Map-Cache entry in order for **ping** to succeed.
- If a Map-Cache entry does not exist for a specified destination EID, **ping** can be used to test the LISP control plane by first causing the router to generate a Map-Request for destination EID. Note that the **source** keyword must be used to specify a source address that is an EID, and the LISP site for the destination EID must also have an existing Map-Cache entry or use the LISP control plane to obtain one in order for **ping** to succeed.
- To test control plane RLOC namespace reachability and liveness of LISP devices, use **ping** with destination and use the **source** keyword to specify a source RLOC addresses.
- When a Proxy Ingress Tunnel Router (PITR) is involved, **ping** can be used to test used to test its functionality by using a non-LISP address for the destination and using the **source** keyword to specify a source address that is an EID.

Consider the following operational modes when using the **ping** command with LISP.

- Entering the **ping** command without any keywords or argument values causes an interactive system dialog to prompt the user for the additional syntax appropriate to the protocol specified.
- To test a connection in the context of a specific VPN connection, use the **ping vrf** command. If the **vrf** *vrf-name* keyword and argument are not displayed, it is because only the default VRF is being used (a VRF has not been configured).
- The optional data, **df-bit**, **repeat**, and **size** keywords can be used to customize **ping** effectiveness in diagnosing particular issues. You can use as many of these keywords as you need, and you can use them in any order after the hostname or system-address arguments. For example, **df-bit** and **size** can be used together to test effective path MTU, while **repeat** can be used to check counters.

⚠

Caution   In order to maximize the effectiveness and minimize ambiguity, the **source** keyword should always be used with **ping** to ensure that the correct namespace (EID or RLOC) is used within ping packets.

Examples

In the following example, a LISP map cache entry already exists in both sites and the ping command is used to verify the LISP data plane connectivity between source EID 192.168.1.255 and destination EID 192.168.2.1 with a repeat count of 100.

```
Router# ping 192.168.2.1 source 192.168.1.255 repeat 100
Type escape sequence to abort.
Sending 100, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.1.255
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (100/100), round-trip min/avg/max = 1/7/28 ms
Router#
```

In the following example, LISP map cache entries do not exists on either sites and the ping command is used to test the LISP control plane for source EID 192.168.1.255 and destination EID 192.168.2.1 and a repeat count of 10. Note that the first two ping packets fail. Once the map-cache is populated, the remaining ping packets succeed.

```
Router# ping 192.168.2.1 source 192.168.1.255 repeat 10
```

```
Type escape sequence to abort.
Sending 10, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.1.255
..!!!!!!!!!
Success rate is 80 percent (8/10), round-trip min/avg/max = 2/6/11 ms
Router#
```

Related Commands

Command	Description
lig	Initiate a LISP Internet Groper (**lig**) operation to test the LISP control plane.
traceroute	Discover the path packets take when traveling to their destination..

---

traceroute

To discover the path that packets take when traveling to a destination EID or RLOC address, use the **traceroute** command in privileged EXEC mode.

> **traceroute** [**vrf** *vrf-name*] {*hostname* | *destination-addr*} [**numeric**] [**port** *port*] [**probe** *number*] [**source** *source-addr*] [**timeout** *time*] [**ttl** *ttl ttl*]

Syntax Description

vrf *vrf-name*	(Optional) The name of the VPN (VRF context) within which to traceroute.
hostname	Hostname of the system to ping.
destination-addr	IPv4 or IPv6 Address of the system to ping.
numeric	(Optional) Enables the display numeric address (only).
port *port*	(Optional) Specifies the destination UDP port of first probe (1-65535).
probe *number*	(Optional) Specify number of probes per hop (default 3).
source *source-addr*	(Optional) IPv4 or IPv6 Address used by this system to traceroute to.
timeout *time*	(Optional) Specify time out in seconds (1-3600).
ttl *ttl ttl*	(Optional) Specify minimum and maximum ttl (0-255).

Command Modes

Privileged EXEC

Command History

Release	Modification
15.1(1)XB	This command was introduced.
2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA

Usage Guidelines

The **traceroute** command works by taking advantage of the ICMP error messages generated by routers when a datagram exceeds its hop limit value. The **traceroute** command starts by sending UDP probe datagrams with a hop limit (TTL) of 1. Including a hop limit of 1 with a probe datagram causes the neighboring routers to discard the probe datagram and send back an ICMP Time Exceeded (ICMP Type 11, Code 0) error message. The traceroute command sends several probes with increasing hop limits and displays the round-trip time for each. The **traceroute** command terminates when the destination responds with an ICMP Destination unreachable, Port Unreachable (Type 3, Code 3) message, when the hop limit is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, type Ctrl-^ X—by simultaneously pressing and releasing the Ctrl, Shift, and 6 keys, and then pressing the X key.

The traceroute command sends out one probe at a time. Each outgoing packet might result in one or more ICMP error message replies. A time-exceeded error message indicates that an intermediate router has seen and

discarded the probe. A destination unreachable error message indicates that the destination node has received and discarded the probe because the hop limit of the packet reached a value of 0. If the timer goes off before a response comes in, the traceroute command prints an asterisk (*).

✎

Note The descriptions provided here represent a subset of all possible **traceroute** options and uses; in particular, those relevant to LISP. Other **traceroute** command options and uses beyond those described are covered in the general-use description of the **traceroute** command found at: http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_t1.html#wp1065453.

LISP has separate control plane and data plane functions. The diagnostic tool **traceroute** can be used to test reachability and liveness of various the LISP data plane and control plane functions.

- If a Map-Cache entry exists for a specified destination EID, **traceroute** can be used to test the LISP data plane by using the **source** keyword to specify a source address that is an EID. Note that the LISP site for the destination EID must also have an existing Map-Cache entry in order for **traceroute** to succeed. Since the ICMP Time Exceeded will happen in the underlying network and their destination address will be and EID address of the sending router, Proxy Ingress Tunnel Router (PITR) functionality is required in order to get the ICMP Time Exceeded messages back to the sending router.
- If a Map-Cache entry does not exist for a specified destination EID, **traceroute** can be used to test the LISP control plane by first causing the router to generate a Map-Request for destination EID. Note that the **source** keyword must be used to specify a source address that is an EID, and the LISP site for the destination EID must also have an existing Map-Cache entry or use the LISP control plane to obtain one in order for **traceroute** to succeed.
- To test control plane RLOC namespace reachability and liveness of LISP devices, use **traceroute** with destination and use the **source** keyword to specify a source RLOC addresses.
- When a Proxy Ingress Tunnel Router (PITR) is involved, **ping** can be used to test used to test its functionality by using a non-LISP address for the destination and using the **source** keyword to specify a source address that is an EID.

Consider the following operational modes when using the **traceroute** command with LISP.

- Entering the **traceroute** command without any keywords or argument values causes an interactive system dialog to prompt the user for the additional syntax appropriate to the protocol specified.
- To test a connection in the context of a specific VPN connection, use the **traceroute vrf** command. If the **vrf** *vrf-name* keyword and argument are not displayed, it is because only the default VRF is being used (a VRF has not been configured).
- The optional data, **numeric**, **port**, **timeout**, and **ttl** keywords can be used to customize **traceroute** effectiveness in diagnosing particular issues. You can use as many of these keywords as you need, and you can use them in any order after the hostname or system-address arguments. When **numeric** is used, domain lookups are not performed on addresses. The **port** keyword and UDP port 4342 can be used in conjunction with the **ttl** keyword, for example, to test to see whether some intermediate access-list is blocking the LISP control plane.

⚠

Caution In order to maximize the effectiveness of **traceroute** and minimize ambiguity in results, the **source** keyword should always be used with **traceroute** to ensure that the correct namespace (EID or RLOC) is used within traceroute packets.

Examples

In the following example, a LISP map cache entry already exists in both sites and the **ping** command is used to verify the LISP data plane connectivity between source EID 192.168.1.255 and destination EID 192.168.2.1. Then, **traceroute** is used to identify the path packets take to the destination EID.

```
Router# ping 192.168.2.1 source 192.168.1.255
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
Packet sent with a source address of 192.168.1.255
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/16 ms
```

```
Router# traceroute 192.168.2.1 source 192.168.1.255
Type escape sequence to abort.
Tracing the route to 192.168.2.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.0.0.1 1 msec 1 msec 5 msec
  2 10.0.0.6 13 msec 1 msec 2 msec
  3 172.16.2.1 2 msec *  10 msec
Router#
```

In the following example, the **ping** command is used to verify the connectivity to a destination RLOC, and then **traceroute** is used to identify the path packets take to the destination RLOC.

```
Router# ping 10.0.0.6 source 10.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.6, timeout is 2 seconds:
Packet sent with a source address of 10.0.0.2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/5/17 ms
Router#
 Router# traceroute 10.0.0.6 source 10.0.0.2 port 4342
Type escape sequence to abort.
Tracing the route to 10.0.0.6
VRF info: (vrf in name/id, vrf out name/id)
  1 10.0.0.1 1 msec 0 msec 1 msec
  2 10.0.0.6 6 msec *  11 msec
Router#
```

Related Commands

Command	Description
lig	Initiate a LISP Internet Groper (**lig**) operation to test the LISP control plane.
ping	Diagnose basic network connectivity and test reachability and/or liveness of a destination EID or RLOC.