



## **Cisco IOS IP Routing: LISP Command Reference**

**First Published:** March 25, 2011

**Last Modified:** March 29, 2013

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

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

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <http://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

© 2011–2013 Cisco Systems, Inc. All rights reserved.



## CONTENTS

---

### CHAPTER 1

#### LISP Clear Commands 1

- clear ip lisp map-cache 2
- clear ip lisp route-import 4
- clear ip lisp statistics 6
- clear ipv6 lisp map-cache 8
- clear ipv6 lisp statistics 10
- clear ipv6 lisp route-import 12
- clear lisp ddt 14
- clear lisp site 16

---

### CHAPTER 2

#### LISP Debug Commands 19

- debug lisp control-plane all 21
- debug lisp control-plane configuration 24
- debug lisp control-plane etr-map-server 26
- debug lisp control-plane events 28
- debug lisp control-plane exceptions 30
- debug lisp control-plane forward-api-events 32
- debug lisp control-plane interface-address-watch 34
- debug lisp control-plane lig 36
- debug lisp control-plane local-eid-database 39
- debug lisp control-plane local-rloc 41
- debug lisp control-plane map-request 43
- debug lisp control-plane map-resolver 45
- debug lisp control-plane map-server 47
- debug lisp control-plane map-server-map-notify 49
- debug lisp control-plane map-server-map-request 50
- debug lisp control-plane map-server-registration 52
- debug lisp control-plane map-server-registration errors 54

debug lisp control-plane messages	56
debug lisp control-plane nsf	58
debug lisp control-plane remote-eid-cache	60
debug lisp control-plane remote-eid-persistent	62
debug lisp control-plane remote-rloc-watch	64
debug lisp control-plane rib-rloc-watch	65
debug lisp control-plane rib-route-import	67
debug lisp control-plane solicit-map-request	69
debug lisp control-plane static-mapping	71
debug lisp detail	73
debug lisp filter eid	75
debug lisp filter instance-id	77
debug lisp filter rloc	79
debug lisp filter router-lisp-id	81
debug lisp forwarding adjacency	83
debug lisp forwarding alt-prefix	85
debug lisp forwarding data-signal-map-request	87
debug lisp forwarding data-signal-status-bits	89
debug lisp forwarding ipv4-traceroute	92
debug lisp forwarding ipv6-traceroute	94
debug lisp forwarding remote-eid-prefix	95
debug lisp forwarding state	97
debug lisp forwarding virtual-interface-address	99

---

**CHAPTER 3****LISP DDT Configuration Commands 101**

ddt	102
ddt authoritative	104
delegate	108
ddt root	111
lisp-rig	113
map-server-peer	116

---

**CHAPTER 4****LISP Global Configuration Commands 121**

router lisp	122
-------------	-----

---

<b>CHAPTER 5</b>	<b>LISP Interface Configuration Commands</b> 123
	ip lisp source-locator 124
	ipv6 lisp source-locator 126
	lisp extended-subnet-mode 128
	lisp mobility 130

---

<b>CHAPTER 6</b>	<b>LISP-Related Configuration Commands</b> 133
	lig 134

---

<b>CHAPTER 7</b>	<b>LISP Router Configuration Commands</b> 137
	database-mapping (LISP EID-table) 138
	eid-notify authentication-key 143
	eid-notify key 145
	eid-table 147
	locator-down 151
	locator-scope 153
	locator-table 155
	loc-reach-algorithm 158
	map-cache 160
	other-xtr-probe 163
	rloc-prefix 165
	rtr-locator-set 167
	xtr instance-id 169

---

<b>CHAPTER 8</b>	<b>LISP Router IPv4 Configuration Commands</b> 171
	ipv4 alt-vrf 172
	ipv4 etr 175
	ipv4 etr accept-map-request-mapping 177
	ipv4 etr map-cache-ttl 179
	ipv4 etr map-server 181
	ipv4 itr 184
	ipv4 itr map-resolver 186
	ipv4 map-cache-limit 188
	ipv4 map-cache-persistent 191

---

[ipv4 map-request-source](#) 193  
[ipv4 map-resolver](#) 195  
[ipv4 map-server](#) 197  
[ipv4 path-mtu-discovery](#) 199  
[ipv4 proxy-etr](#) 201  
[ipv4 proxy-itr](#) 203  
[ipv4 route-import map-cache](#) 206  
[ipv4 route-import maximum-prefix](#) 209  
[ipv4 solicit-map-request ignore](#) 211  
[ipv4 use-petr](#) 213

---

## CHAPTER 9

### **LISP Router IPv6 Configuration Commands** 217

[ipv6 alt-vrf](#) 218  
[ipv6 etr](#) 220  
[ipv6 etr accept-map-request-mapping](#) 222  
[ipv6 etr map-cache-ttl](#) 224  
[ipv6 etr map-server](#) 226  
[ipv6 itr](#) 229  
[ipv6 itr map-resolver](#) 231  
[ipv6 map-cache-limit](#) 233  
[ipv6 map-cache-persistent](#) 236  
[ipv6 map-request-source](#) 238  
[ipv6 map-resolver](#) 240  
[ipv6 map-server](#) 242  
[ipv6 path-mtu-discovery](#) 244  
[ipv6 proxy-etr](#) 246  
[ipv6 proxy-itr](#) 248  
[ipv6 route-import map-cache](#) 251  
[ipv6 route-import maximum-prefix](#) 254  
[ipv6 solicit-map-request ignore](#) 256  
[ipv6 use-petr](#) 258

---

## CHAPTER 10

### **LISP Site Configuration Commands** 261

[site](#) 262  
[allowed-locator \(LISP site\)](#) 264

authentication-key (LISP site) 266  
description (LISP site) 269  
eid-prefix (LISP site) 271

---

**CHAPTER 11****LISP Show Commands 275**

show ip lisp 276  
show ip lisp database 281  
show ip lisp forwarding 282  
show ip lisp instance-id 285  
show ip lisp locator-table 286  
show ip lisp map-cache 288  
show ip lisp route-import 291  
show ip lisp statistics 293  
show ipv6 lisp 295  
show ipv6 lisp database 300  
show ipv6 lisp forwarding 302  
show ipv6 lisp instance-id 305  
show ipv6 lisp locator-table 306  
show ipv6 lisp map-cache 308  
show ipv6 lisp route-import 310  
show ipv6 lisp statistics 312  
show lisp 314  
show lisp ddt 316  
show lisp locator-table 318  
show lisp site 320

---

**CHAPTER 12****LISP VM-Mobility Commands 323**

database-mapping (LISP dynamic-EID) 324  
dynamic-eid 326  
map-notify-group 329  
map-server 331







## LISP Clear Commands

---

- [clear ip lisp map-cache, page 2](#)
- [clear ip lisp route-import, page 4](#)
- [clear ip lisp statistics, page 6](#)
- [clear ipv6 lisp map-cache, page 8](#)
- [clear ipv6 lisp statistics, page 10](#)
- [clear ipv6 lisp route-import, page 12](#)
- [clear lisp ddt, page 14](#)
- [clear lisp site, page 16](#)

# clear ip lisp map-cache

To clear the Locator/ID Separation Protocol (LISP) map cache, use the **clear ip lisp map-cache** command in privilege EXEC mode.

**clear ip lisp map-cache** [*EID-prefix/prefix-length*]

## Syntax Description

<i>EID-prefix/prefix-length</i>	(Optional) IPv4 endpoint identifier (EID) prefix to clear from LISP map cache
---------------------------------	---

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

The **clear ip lisp map-cache** command removes all IPv4 dynamic LISP map-cache entries stored by the router. When an optional IPv4 EID prefix is added to the command, only that IPv4 EID prefix is cleared from the LISP map-cache.

## Examples

The following example shows how to display all LISP map-cache entries and then clear the LISP map cache for the IPv4 EID prefix 172.16.10.0/24.

```
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 2 entries
0.0.0.0/0, uptime: 01:18:22, expires: never, via static
153.16.10.0/24, uptime: 00:00:04, expires: 23:59:55, via map-reply, complete
Locator      Uptime    State    Pri/Wgt
172.16.10.0/24 00:00:04  up       1/50
192.168.65.94 00:00:04  up       1/50
2001:468:D01:9C::80DF:9C86 00:00:04  up       2/100
Router# clear ip lisp map-cache 172.16.10.0/24
Router# show ip lisp map-cache
LISP IPv4 Mapping Cache, 1 entries
0.0.0.0/0, uptime: 01:18:42, expires: never, via static
Router#
```

**Related Commands**

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

# clear ip lisp route-import

To clear the current IPv4 routing information base (RIB) routes imported into Locator ID Separation Protocol (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

<b>eid-table vrf vrf-name</b>	(Optional) Clear the referenced EID table.
<b>instance-id iid</b>	(Optional) Clears the referenced instance ID.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(4)XB5	This command was introduced.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.

## Usage Guidelines

The **clear ip lisp route-import** command operates differently from other clear commands. Most clear commands remove the respective entries or counters only.

However, when the **clear ip lisp route-import** command is entered, all route-import routes are marked stale and then re-evaluated according to the **ip lisp route-import** command and remaining stale routes are removed. Thus, entering the **clear ip lisp route-import** command may or may not result in changes to the imported routes. The **show ip lisp route-import** command provides a listing of the current route imports.

To restrict the clear functions to a specific EID table, use the **eid-table vrf vrf-name** keyword and argument. To restrict the clear functions to a specific LISP instance ID, use the **instance-id iid** keyword and argument.

## 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 effect of using the **clear ip lisp route-import** command.

```
Router# debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is on
Router# 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
Router# clear ip lisp route-import
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval marking stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval walking rib.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval delete stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval done.
Router# 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
Router#

```

In this example, when **clear ip lisp route-import** is entered, all route-import routes are marked stale and then re-evaluated according to the **ip lisp route-import** command and remaining stale routes removed, as displayed in the debug output.

### Related Commands

Command	Description
<b>clear ip lisp map-cache</b>	Clears the LISP map cache.
<b>debug lisp control-plane rib-rloc-watch</b>	Displays messages related to the up/down local/remote status of local locators in the RIB.
<b>show ip lisp map-cache</b>	Displays the current dynamic and static IPv4 EID-to-RLOC map-cache entries.
<b>show ip lisp route-import</b>	Displays the current IPv4 RIB routes imported into LISP.

# clear ip lisp statistics

To clear Locator/ID Separation Protocol (LISP) Ingress Tunnel Router (ITR) and Egress Tunnel Router (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 how to display 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:                2451/2184
  Encapsulated Map-Requests in/out:    2428/1156
  RLOC-probe Map-Requests in/out:      23/1028
  Map-Reply records in/out:            2183/2428
  Authoritative records in/out:        1035/2428
---<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
  Map-Reply records in/out:            0/0
  Authoritative records in/out:        0/0
---<skip>---
Router#
```

**Related Commands**

Command	Description
show ip lisp statistics	Displays LISP IPv4 address-family statistics.

# clear ipv6 lisp map-cache

To clear the Locator/ID Separation Protocol (LISP) map cache, use the **clear ipv6 lisp map-cache** command in privilege EXEC mode.

**clear ipv6 lisp map-cache** [*EID-prefix/prefix-length*]

## Syntax Description

*EID-prefix/prefix-length*

(Optional) IPv6 endpoint identifier (EID) prefix to clear from the LISP map-cache.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

The **clear ipv6 lisp map-cache** command removes all IPv6 dynamic LISP map-cache entries stored by the router. When an optional IPv6 EID prefix is added to the command, only that IPv6 EID prefix is cleared from the LISP map cache.

## Examples

The following example shows how to display 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
::/0, uptime: 00:23:36, expires: never, via static
Negative cache entry, action: send-map-request
2001:DB8:AB::/48, uptime: 00:06:52, expires: 23:55:32, via map-reply, complete
Locator Uptime State Pri/Wgt
10.0.0.6 00:18:02 up 1/100
Router# clear ipv6 lisp map-cache 2001:DB8:AB::/48
Router# show ipv6 lisp map-cache
LISP IPv6 Mapping Cache, 1 entries
::/0, uptime: 00:24:13, expires: never, via static
Negative cache entry, action: send-map-request
Router#
```



**Related Commands**

Command	Description
show ipv6 lisp map-cache	Displays the current dynamic and static IPv6 EID-to-RLOC map-cache entries.

## clear ipv6 lisp statistics

To clear Locator/ID Separation Protocol (LISP) Ingress Tunnel Router (ITR) and Egress Tunnel Router (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **clear ipv6 lisp statistics** command clears 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 how to display 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
  Map-Reply records in/out:            24/29
  Authoritative records in/out:        24/29
---<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
  Map-Reply records in/out:            0/0
  Authoritative records in/out:        0/0
```

```
---<skip>---  
Router#
```

**Related Commands**

Command	Description
<b>show ipv6 lisp statistics</b>	Displays LISP IPv6 address-family statistics.

## clear ipv6 lisp route-import

To clear the current IPv6 routing information base (RIB) routes imported into Locator ID Separation Protocol (LISP), use the **clear ipv6 lisp route-import** command in privilege EXEC mode.

**clear ipv6 lisp route-import** [*eid-table vrf vrf-name* | *instance-id iid*]

### Syntax Description

<b>eid-table vrf</b> <i>vrf-name</i>	(Optional) Clears the referenced EID table.
<b>instance-id</b> <i>iid</i>	(Optional) Clears the referenced instance ID.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
15.1(4)XB5	This command was introduced.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.

### Usage Guidelines

The **clear ipv6 lisp route-import** command operates differently from other **clear** commands.

However, when the **clear ipv6 lisp route-import** command 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 provides a listing of the current route imports.

To restrict the clear functions to a specific EID table, use the **eid-table vrf vrf-name** keyword and argument. To restrict the clear functions to a specific LISP instance ID, use the **instance-id iid** keyword and argument.

### 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.

```
Router# debug lisp control-plane rib-rloc-watch
LISP control plane RIB RLOC watch debugging is on
Router# 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
Router# clear ipv6 lisp route-import
*Jun 27 23:50:02.911: LISP: AF IPv6, rtmp re-eval marking stale.
```

```
*Jun 27 23:50:02.911: LISP: AF IPv6, rtmp re-eval walking rib.
*Jun 27 23:50:02.911: LISP: AF IPv6, rtmp re-eval delete stale.
*Jun 27 23:50:02.911: LISP: AF IPv6, rtmp re-eval done.
Router# 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
Router#
```

In this example, when **clear ipv6 lisp route-import** is entered, all route-import routes are marked stale and then re-evaluated according to the **ipv6 lisp route-import** command and remaining stale routes are removed, as displayed in the debug output.

## Related Commands

Command	Description
<b>clear ipv6 lisp map-cache</b>	Clears the LISP map cache.
<b>debug lisp control-plane rib-rloc-watch</b>	Displays messages related to the up/down local/remote status of local locators in the RIB.
<b>show ipv6 lisp map-cache</b>	Displays the current dynamic and static IPv6 EID-to-RLOC map-cache entries.
<b>show ipv6 lisp route-import</b>	Displays the current IPv6 RIB routes imported into LISP.

# clear lisp ddt

To clear the DDT referral cache that is stored on a DDT-enabled map resolver, use the **clear lisp ddt** command in privileged EXEC mode.

**clear lisp ddt referral-cache** [**instance-id** *iid* | *eid* | **statistics**]

## Syntax Description

<b>referral-cache</b>	Clears the DDT referral cache contents.
<b>instance-ID</b> <i>iid</i>	(Optional) Displays the DDT referral cache related to this single instance ID.
<i>eid</i>	(Optional) Displays the DDT referral cache related to this single Endpoint ID (EID).
<b>statistics</b>	(Optional) Clears use statistics without deleting cache entries.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

Use this command to clear the referral cache on a DDT map resolver.

A DDT map resolver uses an iterative process of following referrals to find the correct ETR to answer a map request; this requires a DDT map resolver to maintain additional state: a map-referral cache and a lookup queue of map requests that are going through the iterative referral process. The **clear lisp ddt** command clears the contents of the map-referral cache.

When the **clear lisp ddt** command is specified using the optional *eid* entry, the single referral cache entry *eid* is removed.

When the **clear lisp ddt** command is specified using the optional **instance-id** *iid* keyword, all referral cache entries related to that instance ID are removed. When the **clear lisp ddt** command is specified using the optional **instance-id** *iid* keyword, the single referral cache entry *eid* within **instance-id** *iid* is removed.

## Examples

The following example clears the LISP DDT referral cache using the **clear lisp ddt** command, and then displays the output of **show lisp ddt** command:

```
Device> enable
Device# clear lisp ddt referral-cache
Device# show lisp ddt referral-cache
LISP-DDT Referral Cache in VRF "default", 0 entries
```

## Related Commands

Command	Description
<b>ddt</b>	Configures a device to enable LISP DDT functionality.
<b>show lisp ddt</b>	Displays the configured LISP DDT root(s) and/or DDT delegation nodes on a device enabled for LISP DDT.

# clear lisp site

To clear the registration data for the specified Locator/ID Separation Protocol (LISP) site, use the **clear lisp site** command in privilege EXEC mode.

**clear lisp site** {*EID-prefix/prefix-length*| *site-name*}

## Syntax Description

<i>EID-prefix/prefix-length</i>	IPv4 or IPv6 endpoint identifier (EID) prefix configured on any site for the LISP to clear.
<i>site-name</i>	LISP site for which registration data is to be cleared.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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* argument in the command, the 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 specified 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 shows how to clear the LISP registration data for the LISP site called Site1-xtr.


```
Map-Server# show lisp site name sitel-xtr
Site name: sitel-xtr
Description: LISP Site 1
Allowed configured locators: any
Allowed EID-prefixes:
  EID-prefix: 192.168.1.0/24
  First registered: 00:05:22
---<skip>---
Map-Server# clear lisp site sitel-xtr
Map-Server# show lisp site name sitel-xtr
Site name: sitel-xtr
```



```
Description: LISP Site 1
Allowed configured locators: any
Allowed EID-prefixes:
  EID-prefix: 192.168.1.0/24
    First registered:    00:05:45
    Routing table tag:   0x0
    No registrations.
  EID-prefix: 2001:DB8:A::/48
    First registered:    00:44:13
    Routing table tag:   0x0
    No registrations.
Map-Server#
```

**Related Commands**

Command	Description
<b>show lisp site</b>	Displays LISP site information.

 `clear lisp site`



## LISP Debug Commands

---

- [debug lisp control-plane all, page 21](#)
- [debug lisp control-plane configuration, page 24](#)
- [debug lisp control-plane etr-map-server, page 26](#)
- [debug lisp control-plane events, page 28](#)
- [debug lisp control-plane exceptions, page 30](#)
- [debug lisp control-plane forward-api-events, page 32](#)
- [debug lisp control-plane interface-address-watch, page 34](#)
- [debug lisp control-plane lig, page 36](#)
- [debug lisp control-plane local-eid-database, page 39](#)
- [debug lisp control-plane local-rloc, page 41](#)
- [debug lisp control-plane map-request, page 43](#)
- [debug lisp control-plane map-resolver, page 45](#)
- [debug lisp control-plane map-server, page 47](#)
- [debug lisp control-plane map-server-map-notify, page 49](#)
- [debug lisp control-plane map-server-map-request, page 50](#)
- [debug lisp control-plane map-server-registration, page 52](#)
- [debug lisp control-plane map-server-registration errors, page 54](#)
- [debug lisp control-plane messages, page 56](#)
- [debug lisp control-plane nsf, page 58](#)
- [debug lisp control-plane remote-eid-cache, page 60](#)
- [debug lisp control-plane remote-eid-persistent, page 62](#)
- [debug lisp control-plane remote-rloc-watch, page 64](#)
- [debug lisp control-plane rib-rloc-watch, page 65](#)
- [debug lisp control-plane rib-route-import, page 67](#)

- [debug lisp control-plane solicit-map-request, page 69](#)
- [debug lisp control-plane static-mapping, page 71](#)
- [debug lisp detail, page 73](#)
- [debug lisp filter eid, page 75](#)
- [debug lisp filter instance-id, page 77](#)
- [debug lisp filter rloc, page 79](#)
- [debug lisp filter router-lisp-id, page 81](#)
- [debug lisp forwarding adjacency, page 83](#)
- [debug lisp forwarding alt-prefix, page 85](#)
- [debug lisp forwarding data-signal-map-request, page 87](#)
- [debug lisp forwarding data-signal-status-bits, page 89](#)
- [debug lisp forwarding ipv4-traceroute, page 92](#)
- [debug lisp forwarding ipv6-traceroute, page 94](#)
- [debug lisp forwarding remote-eid-prefix, page 95](#)
- [debug lisp forwarding state, page 97](#)
- [debug lisp forwarding virtual-interface-address, page 99](#)

# debug lisp control-plane all

To turn on all possible debugging messages related to the Locator/ID Separation Protocol (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**

**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. Use of this command can severely diminish router performance or even render it unusable. In virtually all cases, you should 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.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines**

The **debug lisp control-plane all** command displays all possible debugging messages for the LISP control plane 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** command is used to query the mapping system for a remote endpoint identifier (EID) that is not currently in the local map cache as a test of the LISP control plane:

```
Router# debug lisp control-plane all
```

```
Dec 15 16:30:19.524 PST: LISP RIB_RWATCH: Debugging is ON
```

```
Router# lig self
```

```
Mapping information for EID 172.16.21.0 from 172.16.156.222 with RTT 4 msecs
```

```
172.16.21.0/24, uptime: 00:00:00, expires: 23:59:57, via map-reply, self
```

```
Locator Uptime State Pri/Wgt
```

```
192.168.156.222 00:00:00 up 1/100
```

```
Router#
```

```
Dec 15 16:30:34.476 PST: LISP: LIG LIG request for IPv4, EIDs self, count 3.
```

```
Dec 15 16:30:34.476 PST: LISP: Remote EID prefix 172.16.21.0/32, Change state to
```

```
incomplete (method: LIG, state: unknown, rlocs: 0, local).
```

```
Dec 15 16:30:34.508 PST: LISP: Remote EID prefix 172.16.21.0/32, Send map request (1)
```

```
(method: LIG, state: incomplete, rlocs: 0, local).
```

```
Dec 15 16:30:34.508 PST: LISP: LIG 172.16.21.0 Overriding map request parameters.
```

```
Dec 15 16:30:34.508 PST: LISP: Send map request for EID prefix 172.16.21.0/32.
```

```
Dec 15 16:30:34.508 PST: LISP: AF IPv4, Sending map-request from 172.16.156.222 to
```

```
172.16.21.0 for EID 172.16.21.0/32 nonce 0xCD28F5B9-0xBBA15B0E (encap src 172.16.156.222,
```

```
dst 172.16.156.139).
```

```
Dec 15 16:30:34.508 PST: LISP: Processing received Encap-Control message from
```

```
172.16.156.139 to 172.16.156.222.
```

```
Dec 15 16:30:34.508 PST: LISP: Processing received Map-Request message from 172.16.156.222
```

```
to 172.16.21.0.
```

```
Dec 15 16:30:34.508 PST: LISP: Received map request, source_eid 0.0.0.0, itr_rloc UNKNOWN,
```

```
records 1, nonce 0xCD28F5B9-0xBBA15B0E.
```

```
Dec 15 16:30:34.508 PST: LISP: Processing map request record for EID prefix
```

```
172.16.21.0/32.
```

```
Dec 15 16:30:34.508 PST: LISP: Local EID prefix 172.16.21.0/24, Sending map-reply from
```

```
172.16.156.222 to 172.16.156.222 (rlocs: 1).
```

```
Dec 15 16:30:34.512 PST: LISP: Processing mapping information for EID prefix
```

```
172.16.21.0/24.
```

```
Dec 15 16:30:34.512 PST: LISP: Remote EID prefix 172.16.21.0/24, Change state to
```

```
incomplete (method: map-request, state: unknown, rlocs: 0, local).
```

```
Dec 15 16:30:34.512 PST: LISP: Processing received Map-Reply message from 172.16.156.222
```

```
to 172.16.156.222.
```

```
Dec 15 16:30:34.512 PST: LISP: Received map reply nonce 0xCD28F5B9-0xBBA15B0E, records 1.
```

```
Dec 15 16:30:34.512 PST: LISP: Processing mapping information for EID prefix
```

```
172.16.21.0/24.
```

```
Dec 15 16:30:34.512 PST: LISP: Remote EID prefix 172.16.21.0/24, Updating existing entry
```

```
(method: map-request, state: incomplete, rlocs: 0, local).
```

```
Dec 15 16:30:34.512 PST: LISP: Remote EID prefix 172.16.21.0/24, Change state to complete
```

```
(method: map-reply, state: incomplete, rlocs: 0, local).
```

```
Dec 15 16:30:34.512 PST: LISP: Remote EID prefix 172.16.21.0/24, Starting idle timer
```

```
(method: map-reply, state: complete, rlocs: 0, local).
```

```
Dec 15 16:30:34.512 PST: LISP: Remote EID prefix 172.16.21.0/32, Change state to deleted
```

```
(method: LIG, state: incomplete, rlocs: 0, local).
```

```
Dec 15 16:30:34.512 PST: LISP: LIG 172.16.21.0 Moving info block from mapping entry
```

```
172.16.21.0/32 to 172.16.21.0/24.
```

```
Dec 15 16:30:34.516 PST: LISP: Remote EID prefix 172.16.21.0/24 locator 172.68.156.222
```

```
priority 1 weight 100, Added locator (method: map-reply, state: complete, rlocs: 1,
```

```
local).
```

```
Dec 15 16:30:34.516 PST: LISP: Remote EID prefix 172.16.21.0/24, Recalculated RLOC status
```

```
bits from 0x0 to 0x1 (method: map-reply, state: complete, rlocs: 1, local).
```

```
Dec 15 16:30:34.976 PST: LISP: LIG 172.16.21.0 Checking for mapping updates.
```

```
Dec 15 16:30:34.976 PST: LISP: LIG 172.16.21.0 Displaying info.
```

```
Router# no debug lisp control-plane all
```

```
Dec 15 16:31:25.069 PST: LISP RIB_RWATCH: Debugging is OFF
```

## Related Commands

Command	Description
<b>debug lisp control-plane configuration</b>	Displays LISP control plane configuration debug messages.
<b>debug lisp control-plane etr-map-server</b>	Displays LISP control plane ETR map server debug messages.

Command	Description
<b>debug lisp control-plane events</b>	Displays LISP control plane event debug messages.
<b>debug lisp control-plane exceptions</b>	Displays LISP control plane exception condition debug messages.
<b>debug lisp control-plane forward-api-events</b>	Displays LISP control plane API forwarding event debug messages.
<b>debug lisp control-plane lig</b>	Displays LISP Internet Groper control plane debug messages.
<b>debug lisp control-plane local-eid-database</b>	Displays LISP control plane local EID database debug messages.
<b>debug lisp control-plane local-rloc</b>	Displays LISP control plane routing locator (RLOC) debug messages
<b>debug lisp control-plane map-request</b>	Displays LISP control plane debug messages related to map requests.
<b>debug lisp control-plane map-resolver</b>	Displays LISP control plane debug messages related to map-resolver functions.
<b>debug lisp control-plane map-server</b>	Displays LISP control plane debug messages related to map-server functions.
<b>debug lisp control-plane messages</b>	Displays LISP control plane message packet debug messages.
<b>debug lisp control-plane nsf</b>	Displays LISP control plane NSF debug messages.
<b>debug lisp control-plane remote-eid-cache</b>	Displays LISP control plane remote EID cache debug messages.
<b>debug lisp control-plane rib-rloc-watch</b>	Displays LISP control plane RIB RLOC watch debug messages.
<b>debug lisp control-plane static-mapping</b>	Displays LISP control plane static remote EID mapping debug messages.
<b>lig</b>	Initiate a LISP Internet Groper operation.

# debug lisp control-plane configuration

To display Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 Egress Tunnel Router (ETR) map-cache time-to-live (TTL) is modified:

```
Router# debug lisp control-plane configuration
LISP control plane configuration debugging is on

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# ipv4 etr map-cache-ttl 123

Router(config)#
Dec 18 07:40:50.457 PST: LISP: Config: ipv4 etr map-cache-ttl 123.

Router(config)# exit
Dec 18 07:41:07 PST: %SYS-5-CONFIG_I: Configured from console by admin on console

Router# no debug lisp control-plane configuration
LISP control plane configuration debugging is off
```



**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane etr-map-server

To display messages related to Locator/ID Separation Protocol (LISP) Egress Tunnel Router (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane configuration etr-map-server** command displays messages related to LISP ETR map-server registration events, including initial registration and 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#
Dec 18 07:45:21.476 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
Dec 18 07:45:25.668 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
Dec 18 07:46:21.526 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
Dec 18 07:46:25.721 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
Dec 18 07:47:21.531 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
Dec 18 07:47:25.751 PST: LISP: Map Server 172.16.156.139, Sending map-register (src_rloc
172.16.156.222) .
```

```
Router# no debug lisp control-plane etr-map-server
LISP control plane ETR map server debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane events

To display messages related to high-level Locator/ID Separation Protocol (LISP) Egress Tunnel Router (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 events**

**no debug lisp control-plane 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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 **clear ip lisp map-cache** command 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
Router#
Dec 18 08:07:46.187 PST: LISP: AF IPv4, Completed remote EID clear processing.
Dec 18 08:07:46.187 PST: LISP: AF IPv4, Static mapping re-create request while idle.

Router# no debug lisp control-plane events
LISP control plane event debugging is off
```

**Related Commands**

Command	Description
<b>clear ip lisp map-cache</b>	Clears the LISP map cache .
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.
<b>debug lisp detail</b>	Enables the display of additional detailed information, when available, by LISP debug commands.

# debug lisp control-plane exceptions

To display Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane exceptions** displays all activities related to LISP control-plane exceptions not covered by other specific **debug lisp control-plane** commands. This debug command should be triggered only 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 Egress Tunnel Router (ETR) is configured to register with a map server prior to the configuration of any local endpoint identifier (EID) prefixes, resulting in an exception condition:

```
Router# debug lisp control-plane exceptions
LISP control plane exception condition debugging is on

Router# configure terminal
Router(config)# ipv4 etr map-server 192.168.156.23 key 6 #####

Dec 18 15:40:12.504 PST: LISP: Map Server 192.168.156.23, Cannot send map register, no
locally configured EID prefixes.

Router(config)# exit
Router# no debug lisp control-plane exceptions
LISP control plane exception condition debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane forward-api-events

To display Locator/ID Separation Protocol (LISP) control plane messages related to the Cisco Express Forwarding (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane forward-api-events** command displays messages related to the CEF process related to the LISP control-plane, including signals for new remote endpoint identifier (EID) prefixes for which data packets and locator status bit (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 Ingress Tunnel Router (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)# ipv4 itr
Router(config)#
*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)# exit
Router# no debug lisp control-plane forward-api-events
```



```
LISP control plane API forwarding event debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.
<b>debug lisp detail</b>	Enables the display of additional detailed information, when available, by LISP debug commands.

## debug lisp control-plane interface-address-watch

To display Locator/ID Separation Protocol (LISP) control plane messages related to routing locator (RLOC) interface tracking when an interface (as opposed to an address) is specified using the **database-mapping** command (such as when Dynamic Host Configuration Protocol (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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane interface-address-watch** command displays LISP control plane messages related to RLOC interface tracking when an interface (as opposed to an address) is specified using the **database-mapping** command (such as when DHCP is used). This command is 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 Ingress Tunnel Router (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
```

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an EID-to-RLOC mapping relationship and its associated traffic policy.
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.
<b>debug lisp detail</b>	Enables the display of additional detailed information, when available, by LISP debug commands.

# debug lisp control-plane lig

To display messages related to Locator/ID Separation Protocol (LISP) Internet Groper (LIG) activities, 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 lig**

**no debug lisp control-plane 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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane lig** command displays control-plane messages related to 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 endpoint-identifier (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 **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

Router#
Dec 18 08:37:48.421 PST: LISP: LIG LIG request for IPv4, EIDs self, count 3.
Dec 18 08:37:48.453 PST: LISP: LIG 172.16.21.0 Overriding map request parameters.
Dec 18 08:37:48.453 PST: LISP: Processing received Map-Reply message from 192.168.156.23
to 172.16.156.222.
Dec 18 08:37:48.457 PST: LISP: Received map reply nonce 0xF36F0E29-0x3E0CB09E, records 1.
Dec 18 08:37:48.457 PST: LISP: Processing mapping information for EID prefix
172.16.21.0/24.
Dec 18 08:37:48.457 PST: LISP: LIG 172.16.21.0 Moving info block from mapping entry
172.16.21.0/32 to 172.16.21.0/24.
```

```
Dec 18 08:37:48.921 PST: LISP: LIG 172.16.21.0 Checking for mapping updates.
Dec 18 08:37:48.921 PST: LISP: LIG 172.16.21.0 Displaying info.
```

In this example, the **lig** command is used to verify reachability and locator information for a remote EID:

```
Router# lig 172.16.12.1
```

```
Dec 18 08:38:24.391 PST: LISP: LIG LIG request for IPv4, EIDs 172.16.12.1, count 3.
Dec 18 08:38:24.423 PST: LISP: LIG 172.16.12.1 Overriding map request parameters.
Dec 18 08:38:24.423 PST: LISP: Processing received Map-Reply message from 192.168.156.23
to 172.16.156.222.
Dec 18 08:38:24.423 PST: LISP: Received map reply nonce 0x3B682123-0x7F506906, records 1.
Dec 18 08:38:24.423 PST: LISP: Processing mapping information for EID prefix
172.16.12.0/24.
Dec 18 08:38:24.423 PST: LISP: LIG 172.16.12.1 Moving info block from mapping entry
172.16.12.1/32 to 172.16.12.0/24.
Dec 18 08:38:24.891 PST: LISP: LIG 172.16.12.1 Checking for mapping updates.
Dec 18 08:38:24.891 PST: LISP: LIG 172.16.12.1 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 172.16.2.1
```

```
Dec 18 08:39:33.496 PST: LISP: LIG LIG request for IPv4, EIDs 172.16.2.1, count 3.
Dec 18 08:39:33.532 PST: LISP: LIG 172.16.2.1 Overriding map request parameters.
Dec 18 08:39:33.996 PST: LISP: LIG 172.16.2.1 Checking for mapping updates.
***Did not receive*** mapping information for EID 172.16.2.1
Displaying information already present in cache:
0.0.0.0/0, uptime: 00:06:23, expires: never, via static
```

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:ab::1
```

```
*Mar 5 19:54:06.635: LISP: LIG Request for IPv6, EIDs 2001:DB8:AB::1, count 3.
*Mar 5 19:54:06.635: LISP: Remote EID prefix 2001:DB8:AB::1/128, Change state to
incomplete (method: LIG, state: unknown, rlocs: 0).
*Mar 5 19:54:06.659: LISP: Remote EID prefix 2001:DB8:AB::1/128, Send map request (1)
(method: LIG, state: incomplete, rlocs: 0).
*Mar 5 19:54:06.659: LISP: LIG 2001:DB8:AB::1 Overriding map request parameters.
*Mar 5 19:54:06.659: LISP: Send map request for EID prefix 2001:DB8:AB::1/128.
*Mar 5 19:54:06.659: LISP: AF IPv6, Sending map-request from 2001:DB8:AA:: to
2001:DB8:AB::1 for EID 2001:DB8:AB::1/128 nonce 0xC521BE47-0xAB5DAFD1 (encap src 10.0.0.1,
dst 10.0.0.6).
*Mar 5 19:54:06.659: LISP: Processing received Map-Reply message from 10.0.0.6 to
10.0.0.1.
*Mar 5 19:54:06.659: LISP: Received map reply nonce 0xC521BE47-0xAB5DAFD1, records 1.
*Mar 5 19:54:06.659: LISP: Processing mapping information for EID prefix
2001:DB8:AB::/48.
*Mar 5 19:54:06.659: LISP: Remote EID prefix 2001:DB8:AB::1/128, Change state to deleted
(method: LIG, state: incomplete, rlocs: 0).
*Mar 5 19:54:06.659: LISP: Remote EID prefix 2001:DB8:AB::/48, Updating existing entry
(method: map-request, state: complete, rlocs: 1).
*Mar 5 19:54:06.659: LISP: LIG 2001:DB8:AB::1 Moving info block from mapping entry
2001:DB8:AB::1/128 to 2001:DB8:AB::/48.
*Mar 5 19:54:06.659: LISP: Remote EID prefix 2001:DB8:AB::/48 locator 10.0.0.6 priority 1
weight 100, No change in locator (method: map-reply, state: complete, rlocs: 1).
*Mar 5 19:54:07.147: LISP: LIG 2001:DB8:AB::1 Checking for mapping updates.
*Mar 5 19:54:07.147: LISP: LIG 2001:DB8:AB::1 Displaying info.Router#
Mapping information for EID 2001:DB8:AB::1 from 10.0.0.6 with RTT 0 msecs
2001:DB8:AB::/48, uptime: 00:00:00, expires: 23:59:57, via map-reply, complete
Locator Uptime State Pri/Wgt
10.0.0.6 00:11:10 up 1/100
```

```
Router# no debug lisp control-plane lig
LISP control plane Internet Groper debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.
<b>lig</b>	Initiates a LIG operation for a destination EID or to test the router's local EID prefixes.

# debug lisp control-plane local-eid-database

To display Locator/ID Separation Protocol (LISP) map-cache database mapping activities related to the addition or removal of local endpoint-identifier (EID) prefixes using the **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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 **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 **database-mapping** command:

```
Router# debug lisp control-plane local-eid-database
LISP control plane local EID database debugging is on

Router# configure terminal
Router(config)# database-mapping 10.1.1.0/24 192.223.156.22 priority 1 weight 100

Dec 18 08:41:56.857 PST: LISP: Local EID prefix 10.1.1.0/24, Created (rlocs: 0).
Dec 18 08:41:56.857 PST: LISP: Local RLOC Addr 192.223.156.22, Created (instances: 0).
Dec 18 08:41:56.857 PST: LISP: Local RLOC Addr prefix 10.1.1.0/24 192.223.156.22, Added
EID prefix (instances: 1).
Dec 18 08:41:56.857 PST: LISP: Local EID prefix 10.1.1.0/24 locator 192.223.156.22
priority 0 weight 0, Setting locator state to down (was unknown) (rlocs: 1).
Dec 18 08:41:56.861 PST: LISP: Local EID prefix 10.1.1.0/24 locator 192.223.156.22
priority 1 weight 100, Added locator (rlocs: 1).
Dec 18 08:41:56.861 PST: LISP: Local EID prefix 10.1.1.0/24 locator 192.223.156.22
priority 1 weight 100, Setting locator state to up (was down) (rlocs: 1).
```

```
Dec 18 08:41:56.861 PST: LISP: Local EID prefix 10.1.1.0/24, Updating locator status bits
from 0x0 to 0x1 (rlocs: 1).
```

In this example, a local EID prefix is removed using the **no database-mapping** command:

```
Router(config)# no database-mapping 10.1.1.0/24 172.16.156.22 priority 1 weight 100
```

```
Dec 18 08:43:25.681 PST: LISP: Local EID prefix 10.1.1.0/24 locator 192.223.156.22
```

```
priority 1 weight 100, Deleting locator (rlocs: 1).
```

```
Dec 18 08:43:25.681 PST: LISP: Local RLOC Addr prefix 10.1.1.0/24 192.223.156.22, Removed
prefix (instances: 0).
```

```
Dec 18 08:43:25.681 PST: LISP: Local EID prefix 10.1.1.0/24, Updating locator status bits
from 0x1 to 0x0 (rlocs: 0).
```

```
Dec 18 08:43:25.681 PST: LISP: Local EID prefix 10.1.1.0/24, Deleting (rlocs: 0).
```

```
Router(config)# exit
```

```
Router# no debug lisp control-plane local-eid-database
```

```
LISP control plane local EID database debugging is off
```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.



# debug lisp control-plane local-rloc

To display Locator/ID Separation Protocol (LISP) database activities related to local routing locators (RLOCs), 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.
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane local-rloc** command display 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
```

Related Commands	Command	Description
	<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

 `debug lisp control-plane local-rloc`

# debug lisp control-plane map-request

To display Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane map-request** command display LISP control plane activities related to sending map requests. This command is 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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane map-resolver

On a device configured as a Locator/ID Separation Protocol (LISP) map resolver, to display LISP database activities related to local routing locators (RLOCs), 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.
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 endpoint identifier-to-routing locator (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 there is no entry, the map resolver returns a negative-map-reply:

On the map resolver:

```
Router# debug lisp control-plane map-resolver
```

LISP control plane map-resolver debugging is on

Next, on an Ingress Tunnel Router (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
```

Then, on the map resolver:

```
Router#
```

```
*Jun 25 20:00:21.879: LISP: Processing received Encap-Control message from 10.0.2.1 to
```

**debug lisp control-plane map-resolver**

```
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.
```

```
Router# no debug lisp control-plane map-resolver
```

```
LISP control plane map-resolver debugging is off  
Router#
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane map-server

To display Locator/ID Separation Protocol (LISP) database activities related to local routing locators (RLOCs), 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.
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 of 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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.



# debug lisp control-plane map-server-map-notify

To display Locator/ID Separation Protocol (LISP) control plane activities related to map-server map-notify message processing on a device configured as a LISP map server, 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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 reports output only when the xTR is an NX-OS device. Use this command for troubleshooting issues related to map-server functions.

**Examples** The following example shows how to enable LISP control-plane map-server-map-notify debugging:

```
Router# debug lisp control-plane map-server-map-notify
```

Related Commands	Command	Description
	<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane map-server-map-request

To display Locator/ID Separation Protocol (LISP) control plane activities related to map-server map-request message processing on a device configured as a LISP map server, 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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 of Encapsulated Control Messages. Use this command 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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane map-server-registration

To display Locator/ID Separation Protocol (LISP) control plane activities related to map-server map-registration message processing on a device configured as a LISP map server, 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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane map-server-registration** command displays LISP control plane activities related to MS map-registration message processing. Use this command 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
© 1992-2010 Cisco Systems, Inc. All rights reserved.
LISP---101
*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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane map-server-registration errors

To display Locator/ID Separation Protocol (LISP) control plane errors related to map-server map-registration message processing on a device configured as a LISP map server, use the **debug lisp control-plane map-server-registration-errors** 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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane map-server-registration-errors** command displays LISP control plane errors related to map-server map-registration message processing. Use this command 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, which results in a “Registration failed authentication” error message:

```
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
© 1992-2010 Cisco Systems, Inc. All rights reserved.
LISP---102
*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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane messages

To display Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 172.16.12.1
```

```
Dec 18 08:45:07.793 PST: LISP: Send map request for EID prefix 172.16.12.1/32.
```

```
Dec 18 08:45:07.793 PST: LISP: AF IPv4, Sending map-request from 172.16.156.222 to 172.16.12.1 for EID 172.16.12.1/32 nonce 0x8D222F15-0x056AA867 (encap src 172.16.156.222, dst 172.16.156.139).
```

```
Dec 18 08:45:07.829 PST: LISP: Send map request for EID prefix 172.16.12.0/24.
```

```
Dec 18 08:45:07.829 PST: LISP: AF IPv4, Sending map-request from 172.16.156.222 to 172.16.156.23 for EID 172.16.12.0/24 nonce 0x531A2B97-0xEDD787F7.
```

```
Dec 18 08:45:12.240 PST: LISP: Processing received Encap-Control message from 172.16.156.139 to 172.16.156.222.
```

```
Dec 18 08:45:12.240 PST: LISP: Processing received Map-Request message from 164.73.6.2 to 172.16.21.67.
```

```
Dec 18 08:45:12.240 PST: LISP: Received map request, source_eid 190.2.29.193, itr_rloc 164.73.6.2, records 1, nonce 0x79A57533-0x2A41B57F.
```



```
Dec 18 08:45:12.240 PST: LISP: Processing map request record for EID prefix
172.16.21.67/32.
Dec 18 08:45:12.240 PST: LISP: Local EID prefix 172.16.21.0/24, Sending map-reply from
172.16.156.222 to 164.73.6.2 (rlocs: 1).
```

In this example, the local Egress Tunnel Router (ETR) is processing map request LISP control-plane messages:

```
Router#
Dec 18 08:48:54.250 PST: LISP: Processing received Encap-Control message from
172.16.156.139 to 172.16.156.222.
Dec 18 08:48:54.250 PST: LISP: Processing received Map-Request message from 172.16.156.23
to 172.16.21.1.
Dec 18 08:48:54.250 PST: LISP: Received map request, source_eid 172.16.12.0, itr_rloc
172.16.156.23, records 1, nonce 0xE8CF16C6-0x0A2DCEE8.
Dec 18 08:48:54.250 PST: LISP: Processing map request record for EID prefix
172.16.21.1/32.
Dec 18 08:48:54.250 PST: LISP: Local EID prefix 172.16.21.0/24, Sending map-reply from
172.16.156.222 to 172.16.156.23 (rlocs: 1).
Dec 18 08:48:54.250 PST: LISP: AF IPv4, Control packet parsing, Map-Request message has
trailing data (4).
```

```
Router# no debug lisp control-plane messages
```

```
LISP control plane messages debugging is off
```

## Related Commands

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane nsf

To display Locator/ID Separation Protocol (LISP) control plane activities related to nonstop 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
	15.1(1)XB	This command was introduced.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 output is displayed on the standby router:

```
Router-standby# debug lisp control-plane nsf
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_SUCCEEDED: 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 nsf
LISP control plane NSF debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane remote-eid-cache

To display messages alerting to modifications to the Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane remote-eid-cache** command displays messages alerting you to modifications to the LISP mapping cache. This command can be useful for troubleshooting issues such as endpoint-identifier (EID) reachability.

**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 172.16.12.1
Dec 18 08:50:18.970 PST: LISP: Remote EID prefix 172.16.12.1/32, Change state to
incomplete (method: LIG, state: unknown, rlocs: 0).
Dec 18 08:50:19.006 PST: LISP: Remote EID prefix 172.16.12.1/32, Send map request (1)
(method: LIG, state: incomplete, rlocs: 0).
Dec 18 08:50:19.006 PST: LISP: Processing received Map-Reply message from 172.16.156.23 to
172.16.156.222.
Dec 18 08:50:19.006 PST: LISP: Received map reply nonce 0x8F5B46DE-0xC515F41C, records 1.
Dec 18 08:50:19.006 PST: LISP: Processing mapping information for EID prefix
172.16.12.0/24.
Dec 18 08:50:19.006 PST: LISP: Remote EID prefix 172.16.12.0/24, Updating existing entry
(method: map-reply, state: complete, rlocs: 1).
Dec 18 08:50:19.006 PST: LISP: Remote EID prefix 172.16.12.1/32, Change state to deleted
```

```
(method: LIG, state: incomplete, rlocs: 0).
Dec 18 08:50:19.010 PST: LISP: Remote EID prefix 172.16.12.0/24 locator 172.16.156.23
priority 1 weight 100, No change in locator (method: map-reply, state: complete, rlocs:
1).
```

The following example shows how to enter the **clear ip lisp map-cache** command to clear the LISP map cache:

```
Router# clear ip lisp map-cache
```

```
Dec 18 08:52:40.816 PST: LISP: Remote EID prefix 0.0.0.0/0, Change state to deleted
(method: static, state: send-map-request, rlocs: 0).
Dec 18 08:52:40.816 PST: LISP: Remote EID prefix 0.0.0.0/1, Change state to deleted
(method: map-reply, state: forward-native, rlocs: 0).
Dec 18 08:52:40.816 PST: LISP: Remote EID prefix 172.16.12.0/24, Change state to deleted
(method: map-reply, state: complete, rlocs: 1).
Dec 18 08:52:40.816 PST: LISP: Remote EID prefix 172.16.12.0/24 locator 172.16.156.23
priority 1 weight 100, Deleting locator (method: map-reply, state: complete, rlocs: 1).
Dec 18 08:52:40.816 PST: LISP: Remote EID prefix 172.16.12.0/24, Recalculated RLOC status
bits from 0x1 to 0x0 (method: map-reply, state: complete, rlocs: 0).
Dec 18 08:52:40.820 PST: LISP: AF IPv4, Completed remote EID clear processing.
Dec 18 08:52:40.820 PST: 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
```

## Related Commands

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

## debug lisp control-plane remote-eid-persistent

To display alert messages regarding modifications to the Locator/ID Separation Protocol (LISP) mapping cache for remote endpoint identifiers (EIDs), use the **debug lisp control-plane remote-eid-persistent** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**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)XB3	This command was introduced.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** Use the **debug lisp control-plane remote-eid-persistent** command to display messages alerts regarding modifications to the LISP mapping cache for remote EIDs. You can use this command for troubleshooting issues such as remote EID reachability problems.

**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-persistent
```

```
LISP control plane remote EID mapping persistent debugging is off
```

### Related Commands

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane remote-rloc-watch

To display messages related to routing-locator (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)XB3	This command was introduced.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** Use the **debug lisp control-plane remote-rloc-watch** command to display messages related to RLOC probes from other xTRs. Use this command for troubleshooting local endpoint identifier-to-routing locator (EID-to-RLOC) mapping issues.

**Examples** The following example shows how to enable debugging related to RLOC probes from other xTRs:

```
Router# debug lisp control-plane remote-rloc watch
```

Related Commands	Command	Description
	<b>debug lisp control-plane all</b>	Displays 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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 RIB. This command can be useful for troubleshooting local endpoint identifier-to-routing locator (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 locator is marked as unreachable (down) using the **locator-down** command:

```
Router# debug lisp control-plane rib-rloc-watch

LISP control plane RIB RLOC watch debugging is on
Dec 18 09:26:21.932 PST: LISP RIB_RWATCH: Debugging is ON

Router# configure terminal
Router(config)# router lisp
Router(config-router-lisp)# locator-down 172.16.21.0/24 172.16.156.222

Dec 18 09:29:02.864 PST: LISP: Local RLOC Addr prefix 172.16.21.0/24 172.16.156.222,
Removed prefix (instances: 0).
Dec 18 09:29:02.864 PST: LISP: Local RLOC Addr 172.16.156.222, Deleting (instances: 0).
Dec 18 09:29:02.868 PST: LISP RIB_RWATCH: (default:ipv4:base) W 172.16.156.222/32
c=0x4843B5DC EVENT Track stop
Dec 18 09:29:02.868 PST: LISP RIB_RWATCH: (default:ipv4:base) W 172.16.156.222/32
c=0x4843B5DC Removing

Router(config-router-lisp)# no locator-down 172.16.21.0/24 172.16.156.222
```

**debug lisp control-plane rib-rloc-watch**

```

Dec 18 09:30:16.869 PST: LISP RIB_RWATCH: (default:ipv4:base) T 172.16.156.222/32 EVENT
Track start
Dec 18 09:30:16.869 PST: LISP RIB_RWATCH: (default:ipv4:base) N 172.16.156.222/32 Adding
track
Dec 18 09:30:16.869 PST: LISP RIB_RWATCH: Adding to client notification queue
Dec 18 09:30:16.869 PST: LISP: Local RLOC Addr prefix 172.16.21.0/24 172.16.156.222, Added
EID prefix (instances: 1).
Dec 18 09:30:16.869 PST: LISP RIB_RWATCH: (default:ipv4:base) W 172.16.156.222/32
c=0x4843B5DC Client notified reachable
Dec 18 09:30:16.869 PST: LISP: Local RLOC Addr 172.16.156.222, Reachability notification,
up* local* (instances: 1).

Router(config-router-lisp)# exit
Router# no debug lisp control-plane rib-rloc-watch

LISP control plane RIB RLOC watch debugging is off
Dec 18 09:31:13.614 PST: LISP RIB_RWATCH: Debugging is OFF

```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp control-plane rib-route-import

To display Locator ID Separation Protocol (LISP) control plane activities related to the **ipv4 route-import** or **ipv6 route-import** commands, 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
	15.2(3)T	This command was introduced.

**Usage Guidelines** When a Proxy Ingress Tunnel Router (PITR) is configured to dynamically import IPv4 or IPv6 endpoint identifier (EID) prefixes for use in signaling the LISP control plane to send a Map Request message for EID-to-RLOC mapping resolution, it may be desirable to monitor this dynamic import activity. The **debug lisp control-plane rib-route-import** command displays events related to LISP control plane route-import activities.

**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 are marked stale, then re-evaluated according to the **ip lisp route-import map-cache** command, and remaining stale routes removed, as indicated by the debug output.

```
Router# debug lisp control-plane rib-route-import
LISP control plane RIB route import debugging is on
Router# clear ip lisp route-import
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval marking stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval walking rib.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval delete stale.
*Jun 27 21:42:12.215: LISP: AF IPv4, rtmp re-eval done.
Router# 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
Router# no debug lisp control-plane rib-route-import
LISP control plane RIB route import debugging is off
Router#
```

**Related Commands**

Command	Description
<b>clear ip lisp route-import</b>	Clears the IPv4 table and forces a re-evaluation of all imported routes.
<b>clear ipv6 lisp route-import</b>	Clears the IPv6 table and forces a re-evaluation of all imported routes.
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.
<b>ipv4 route-import map-cache</b>	Configures a Proxy-ITR to dynamically import IPv4 LISP EID space for which it is proxying.
<b>ipv6 route-import map-cache</b>	Configures a Proxy-ITR to dynamically import IPv6 LISP EID space for which it is proxying.

# debug lisp control-plane solicit-map-request

To display information related to Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp control-plane solicit-map-request** command controls the display of information related to LISP solicit-map-request (SMR) messages. When this command is configured, an SMR is sent each time endpoint identifier-to-routing locator (EID-to-RLOC) mapping information changes. Use this command 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# configure terminal
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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays 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 Locator/ID Separation Protocol (LISP) static map-cache entries via the **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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 **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 **map-cache** command:

```
Router# debug lisp control-plane static-mapping
LISP control plane static remote EID mapping debugging is on

Router# configure terminal
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)# exit
Router# no debug lisp control-plane static-mapping
LISP control plane static remote EID mapping debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.



# debug lisp detail

To enable the display of additional detailed information, when available, by Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp 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 **clear ip lisp map-cache** command is first issued with the debug **debug lisp control-plane events** command enabled. The **clear ip lisp map-cache** command is then repeated after you enter the debug **debug lisp detail** command 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-creating 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
```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

## debug lisp filter eid

To restrict the output of Locator/ID Separation Protocol (LISP) debug 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**}

**no debug lisp filter eid**

### Syntax Description

<i>EID-prefix/prefix-length</i>	IPv4 or IPv6 EID-prefix to filter debug output..
<b>ipv4</b>	Enables debugging of all IPv4 EID prefixes
<b>ipv6</b>	Enables debugging of all IPv6 EID prefixes

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### Usage Guidelines

The amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging is not filtered to match 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 172.16.12.1/32, and then the **debug lisp control-plane lig** command is enabled. The **lig** command is used for the EID 172.16.12.1, and then repeated for the EID 172.16.8.1 for comparison. As shown, no debug output is displayed in the second case because the EID does not match the filter:

In this example, a debug LISP filter is set for the EID 172.16.12.1/32,

```
Router# debug lisp filter eid 172.16.12.1/32
Router# debug lisp control-plane lig
Router# lig 172.16.12.1

Mapping information for EID 172.16.12.1 from 172.16.156.23 with RTT 0 msec
172.16.12.0/24, uptime: 00:09:27, expires: 23:59:57, via map-reply, complete
  Locator      Uptime      State      Pri/Wgt
172.16.156.23  00:09:27    up         1/100
Dec 18 10:12:51.664 PST: LISP: LIG LIG request for IPv4, EIDs 172.16.12.1, count 3.
Dec 18 10:12:51.700 PST: LISP: LIG 172.16.12.1 Overriding map request parameters.
Dec 18 10:12:51.700 PST: LISP: Processing received Map-Reply message from 172.16.156.23 to
172.16.156.222.
Dec 18 10:12:51.700 PST: LISP: Received map reply nonce 0x1D48A927-0x50643A78, records 1.
Dec 18 10:12:51.700 PST: LISP: Processing mapping information for EID prefix
172.16.12.0/24.
Dec 18 10:12:51.700 PST: LISP: LIG 172.16.12.1 Moving info block from mapping entry
172.16.12.1/32 to 172.16.12.0/24.
Dec 18 10:12:52.168 PST: LISP: LIG 172.16.12.1 Checking for mapping updates.
Dec 18 10:12:52.168 PST: LISP: LIG 172.16.12.1 Displaying info.

Router# lig 172.16.8.1

Mapping information for EID 172.16.8.1 from 149.142.0.87 with RTT 92 msec
172.16.8.0/24, uptime: 00:00:00, expires: 23:59:57, via map-reply, complete
Locator      Uptime      State      Pri/Wgt
149.142.0.87  00:00:00    up         1/100
2607:F010:3FD:3:230:48FF:FE7E:6EDF  00:00:00    up         1/100

Router# no debug lisp filter 172.16.12.1/32
```

## Related Commands

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

## debug lisp filter instance-id

To 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

<i>iid</i>	IPv4 or IPv6 EID instance ID.
------------	-------------------------------

### 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 2.5.1XC

### Usage Guidelines

On an LISP Map-Server (MS), 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. Use the **debug lisp filter instance-id** command to reduce the output of the various LISP-related debug commands by matching on and displaying only packets related to a specified LISP instance. Use this command 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 configured for instance 123 and then the **debug lisp control-plane map-server-registration** command 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
© 1992-2010 Cisco Systems, Inc. All rights reserved.
LISP--114
```

```
*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
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

## debug lisp filter rloc

To restrict the output of Locator/ID Separation Protocol (LISP) debugging 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

<i>locator</i>	Specific IPv4 or IPv6 locator address to filter debug output.
----------------	---

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### Usage Guidelines

The amount of output displayed by debug commands can be overwhelming, making the task of troubleshooting difficult. This is especially true when debugging is not filtered to match 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 172.16.156.23, and then the **debug lisp control-plane lig** command is enabled. The **lig** command is used for the EID 172.16.12.1 (which is mapped to the locator 172.16.156.23 and matches the locator filter), and then repeated for the EID 172.16.8.1 (for which the locator does not match the locator filter) for comparison:

```
Router# debug lisp filter rloc 172.16.156.23
Router# debug lisp control-plane lig
Router# lig 172.16.12.1
```

```
Mapping information for EID 172.16.12.1 from 172.16.156.23 with RTT 40 msecs
```

**debug lisp filter rloc**

```

172.16.12.0/24, uptime: 00:00:00, expires: 23:59:57, via map-reply, complete
Locator      Uptime      State      Pri/Wgt
172.16.156.23 00:00:00    up         1/100
Dec 18 10:07:45.546 PST: LISP: LIG LIG request for IPv4, EIDs 172.16.12.1, count 3.
Dec 18 10:07:45.578 PST: LISP: LIG 172.16.12.1 Overriding map request parameters.
Dec 18 10:07:45.578 PST: LISP: Processing received Map-Reply message from 172.16.156.23 to
172.16.156.222.
Dec 18 10:07:45.578 PST: LISP: Received map reply nonce 0xB2FB1854-0xC509CF61, records 1.
Dec 18 10:07:45.578 PST: LISP: Processing mapping information for EID prefix
172.16.12.0/24.
Dec 18 10:07:45.578 PST: LISP: LIG 172.16.12.1 Moving info block from mapping entry
172.16.12.1/32 to 172.16.12.0/24.
Dec 18 10:07:46.046 PST: LISP: LIG 172.16.12.1 Checking for mapping updates.
Dec 18 10:07:46.046 PST: LISP: LIG 172.16.12.1 Displaying info.
dmm-isr#lig 172.16.10.1
Mapping information for EID 172.16.10.1 from 172.16.156.134 with RTT 0 msec
172.16.10.0/24, uptime: 00:07:27, expires: 23:59:57, via map-reply, complete
Locator      Uptime      State      Pri/Wgt
172.16.156.134 00:07:27    up         1/50
192.168.65.94  00:07:27    up         1/50
2001:468:D01:9C::80DF:9C86 00:07:27    up         2/100

Router# no debug lisp filter rloc 172.16.156.23

```

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.



## debug lisp filter router-lisp-id

To restrict the output of Locator ID Separation Protocol (LISP)-related **debug** commands by filtering on a specific router LISP ID, use the **debug lisp filter router-lisp-id** command in privileged EXEC mode prior to issuing any other LISP **debug** command. To remove specific or all debug filtering restrictions for LISP **debug** commands, use the **no** form of this command.

**debug lisp filter router-lisp-id** *id*

**no debug lisp filter router-lisp-id** *id*

### Syntax Description

<i>id</i>	LISP instantiation ID. Valid values are 0 to 15.
-----------	--

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
15.1(4)XB6	This command was introduced.

### Usage Guidelines

On a LISP map server (MS), 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. Use the **debug lisp filter router-lisp-id** command to reduce the output of the various LISP-related **debug** commands by matching on and displaying only packets related to a specified router LISP ID. Use this command for troubleshooting any LISP-related issue.

### Examples

In the following example, the **debug lisp filter router-lisp-id** command is configured on a LISP map server for the router LISP ID 1. Then, the **debug lisp control-plane map-server-registration** command is enabled. The result is that only map registrations associated with the router LISP ID 1 are displayed.

```
Router# debug lisp filter router-lisp-id 1
LISP control debug Router LISP ID filtering is on
Router# debug lisp control-plane map-server-registration
LISP control plane map-server registration debugging is on
Router#
*Oct 19 06:46:35.386: LISP: Processing received Map-Register message from 10.1.1.1 to
10.100.1.2
*Oct 19 06:46:35.386: LISP: Processing Map-Register no proxy, no map-notify, no merge,
security, no mobile-node, 1 record, nonce 0x358177B0-0xDCA71C5C, key-id 1, auth-data-len
20
*Oct 19 06:46:35.386: LISP: Processing Map-Register mapping record for IID 101 192.168.1.0/24,
ttl 1440, action none, authoritative, 1 locator
10.1.1.1 pri/wei=1/1 Lpr
*Oct 19 06:46:35.386: LISP-1: MS registration IID 101 prefix 192.168.1.0/24 10.1.1.1 site
plc1sl, Updating.
Router# no debug lisp filter router-lisp-id 1
LISP control debug Router LISP ID filtering is off
```

Router#

**Related Commands**

Command	Description
<b>debug lisp control-plane all</b>	Displays all possible debugging messages for the LISP control plane.

# debug lisp forwarding adjacency

To display messages related to Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp forwarding adjacency** command displays events related to LISP forwarding adjacency activities including when an adjacency is reevaluated, a new next hop is used, or when an adjacency maximum transmission unit (MTU) is updated as the result of path MTU discovery (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 endpoint identifier-to-routing locator (EID-to-RLOC) map entry is configured using the **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# configure terminal
Router(config)# router lisp
```

```
Router(config-router-lisp)# map-cache 10.2.3.0/24 10.10.10.1 priority 1 weight 100
Dec 18 11:29:51.266 PST: LISPadj: IP adj out of LISP0, addr 10.10.10.1 (incomplete) adding
LISP source
Dec 18 11:29:51.270 PST: LISPadj: IP midchain out of LISP0, addr 10.10.10.1 (incomplete)
pick source RLOC 172.16.156.222 MTU 1464
Dec 18 11:29:51.270 PST: LISPadj: IP midchain out of LISP0, addr 10.10.10.1 pick source
RLOC 172.16.156.222 MTU 1464
```

**debug lisp forwarding adjacency**

```
Router(config-router-lisp)# ^Z
Router# no debug lisp forwarding adjacency

LISP adjacency debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-map-request</b>	Displays LISP data-driven map request debug messages.
<b>debug lisp forwarding data-signal-status-bits</b>	Displays LISP data driven locator status bits change debug messages.
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding remote-eid-prefix</b>	Displays LISP remote eid prefix events in forwarding module debug messages.
<b>debug lisp forwarding state</b>	Displays debug messages related to LISP forwarding module state.
<b>debug lisp forwarding virtual-interface-address</b>	Displays LISP virtual interface address selection debugs.

# debug lisp forwarding alt-prefix

To display messages related to Locator/ID Separation Protocol (LISP) forwarding adjacency activities associated with the LISP Alternative Logical Topology (ALT) virtual routing and forwarding (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp forwarding alt-prefix** command displays messages related to merging of prefixes from the ALT VRF into the main table. This command is used only when running as a Proxy Ingress Tunnel Router (PITR).

This command can be useful for troubleshooting LISP forwarding issues when a LISP ITR or PITR uses the ALT directly for IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) mapping resolution.

**Examples** The following is sample output from the **debug lisp forwarding alt-prefix** command. In this example, **ipv4 proxy-itr** and **ipv4 alt-vrf** command functions are enabled, and LISP ALT prefix events in forwarding module debugging is on:

```
Router# configure terminal
Router(config)# router lisp
Router(config-router-lisp)# ipv4 proxy-itr
Router(config-router-lisp)# ipv4 alt-vrf lisp
Router(config-router-lisp)# exit
Router# debug lisp forwarding alt-prefix

*Feb 24 01:14:15.347: LISPalt: IPv4:Default repopulate end
*Feb 24 01:14:15.347: LISPalt: IPv4:Default:172.16.0.0/24 Added LISP_ALT src, success
*Feb 24 01:14:15.347: LISPalt: IPv4:Default:172.16.1.0/31 Added LISP_ALT src, success
*Feb 24 01:14:15.347: LISPalt: IPv4:Default:172.16.1.0/32 Added LISP_ALT src, success
*Feb 24 01:14:15.347: LISPalt: IPv4:Default:192.168.1.0/24 Added LISP_ALT src, success
```

```
*Feb 24 01:14:15.347: 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
```

**Related Commands**

Command	Description
<b>ipv4 alt-vrf</b>	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.
<b>ipv4 proxy-itr</b>	Configures the router to act as an IPv4 LISP PITR.
<b>ipv6 alt-vrf</b>	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.
<b>ipv6 proxy-itr</b>	Configures the router to act as an IPv6 LISP PITR.

# debug lisp forwarding data-signal-map-request

To display Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 172.16.10.1 source 172.16.21.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.10.1, timeout is 2 seconds:
Packet sent with a source address of 172.16.21.1
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/2/4 ms
Dec 18 11:36:07.312 PST: LISPdata-signal: sending signal for 172.16.21.1->172.16.10.1 on
in IPv4:Default
Router#
Router# no debug lisp forwarding data-signal-map-request
LISP data driven map requests debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP debug messages related to forwarding adjacency activities.
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-status-bits</b>	Displays LISP data-driven locator status bits change debug messages.
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding remote-eid-prefix</b>	Displays LISP remote EID prefix events in forwarding module debug messages.
<b>debug lisp forwarding state</b>	Displays debug messages related to LISP forwarding module state.
<b>debug lisp forwarding virtual-interface-address</b>	Displays LISP virtual interface address selection debugs.



## debug lisp forwarding data-signal-status-bits

To display Locator/ID Separation Protocol (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 endpoint identifier (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp forwarding data-signal-status-bits** command enables the display of LISP control plane signaling information resulting when the 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 Egress Tunnel Router (ETR) database-mapping is modified, resulting in a change to the map-cache LSB for that EID entry on the Ingress Tunnel Router (ITR) when the EID is pinged:

ETR (Router-1):

```
Router-1# show run | include lisp database-mapping
.
.
.
database-mapping 172.16.12.0/24 172.16.156.23 priority 1 weight 100

Router-1# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.

Router-1(config)# router lisp
Router-1(config-router-lisp)# database-mapping 172.16.12.0/24 172.16.156.23 priority 2 w
```

50

Router-1(config-router-lisp)#

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 172.16.12.1**

LISP IPv4 Mapping Cache, 4 entries

172.16.12.0/24, uptime: 00:01:11, expires: 23:58:45, via map-reply, complete

State: complete, last modified: 00:01:11, map-source: 172.16.156.23

Active, Packets out: 0

Locator Uptime State Pri/Wgt

172.16.156.23 00:01:11 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: 00:01:11 (rtt 0ms)

Next RLOC-probe in: 00:58:48

Router-2# **ping 172.16.12.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.16.12.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms

Dec 18 11:45:59.321 PST: LISPdata-signal: 172.16.156.23 sent status bits 0x00000000 for

172.16.12.0/24, we got 0x00000001

Router-2# **show ip lisp map-cache 172.16.12.1**

LISP IPv4 Mapping Cache, 4 entries

172.16.12.0/24, uptime: 00:02:31, expires: 23:59:51, via map-reply, complete

State: complete, last modified: 00:01:06, map-source: 172.16.156.23

Active, Packets out: 5 (~ 00:00:33 ago)

Locator Uptime State Pri/Wgt

172.16.156.23 00:02:31 down 2/50

Last up-down state change: 00:01:06, state change count: 1

Last priority / weight change: 00:01:06/00:01:06

RLOC-probing loc-status algorithm:

Last RLOC-probe sent: 00:00:06 (rtt 0ms)

Next RLOC-probe in: 00:00:53

Router-2# **no debug lisp forwarding data-signal-status-bits**

LISP data driven locator status bits change debugging is off

**Related Commands**

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP debug messages related to forwarding adjacency activities.
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-map-request</b>	Displays LISP data driven map request debug messages.

Command	Description
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding remote-eid-prefix</b>	Displays LISP remote EID prefix events in forwarding module debug messages.
<b>debug lisp forwarding state</b>	Displays debug messages related to LISP forwarding module state.
<b>debug lisp forwarding virtual-interface-address</b>	Displays LISP virtual interface address selection debugs.

## debug lisp forwarding ipv4-traceroute

To display information on events related to caching IPv4 traceroute headers in an Ingress Tunnel Router (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 Internet Control Message Protocol (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 Locator/ID Separation Protocol (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 172.16.3.1 source 172.16.1.1
```

```
Router#
```

```
*Dec 18 21:02:28.379: LISPipv4_tr: added pkt 172.16.1.1 -> 172.16.3.1 encap udp port 5888  
entry 0x71004A0 payload udp 49154/33434
```

```
*Dec 18 21:02:28.383: LISPipv4_tr: probe #1 pkt 172.16.1.1 -> 172.16.3.1 entry 0x71004A0  
payload udp 49155/33435
```

```
*Dec 18 21:02:28.383: LISPipv4_tr: probe #2 pkt 172.16.1.1 -> 172.16.3.1 entry 0x71004A0  
payload udp 49156/33436
```

```
*Dec 18 21:02:31.395: LISPipv4_tr: proxy pkt 10.0.0.2 -> 172.16.1.1 for entry 0x71004A0
```

```
payload udp 49157/33437
*Dec 18 21:02:34.403: LISPipv4_tr: proxy pkt 10.0.0.2 -> 172.16.1.1 for entry 0x71004A0
payload udp 49158/33438
```

```
Router# no debug lisp forwarding ipv4-traceroute
```

```
LISP IPv4 traceroute debugging is off
```

**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 Ingress Tunnel Router (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 Internet Control Message Protocol (ICMP) time-exceeded messages, and ICMP messages returned to the ITR and forwarded back to the traceroute source.

**Examples** The following example shows how to enable debugging on events related to caching IPv6 traceroute headers in an ITR:

```
Router# debug lisp forwarding ipv6-traceroute
```

### Related Commands

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP adjacency debug information.

# debug lisp forwarding remote-eid-prefix

To display Locator/ID Separation Protocol (LISP) control plane signaling information related to updates about a remote endpoint identifier (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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
Dec 18 10:34:42.725 PST: LISPreid: 0.0.0.0/0 Removed LISP src, success
Dec 18 10:34:42.729 PST: LISPreid: 0.0.0.0/0 Removed LISP IPL src, success
Dec 18 10:34:42.729 PST: LISPreid: 172.16.10.0/24 Removed LISP src, success
Dec 18 10:34:42.729 PST: LISPreid: 172.16.10.0/24 Removed LISP IPL src, success
Dec 18 10:34:42.729 PST: LISPreid: 0.0.0.0/0 Added LISP IPL src, success
Dec 18 10:34:42.729 PST: LISPreid: 0.0.0.0/0 Created pco 0x48CE88C0 linked to glean for LISP0
Dec 18 10:34:42.729 PST: LISPreid: 0.0.0.0/0 Added LISP src, success
Dec 18 10:34:42.733 PST: LISPreid: 172.16.10.0/24 Removed LISP subtree, success

Router# ping 172.16.10.1 source 172.16.21.1
Type escape sequence to abort.
```

**debug lisp forwarding remote-eid-prefix**

Sending 5, 100-byte ICMP Echos to 172.16.10.1, timeout is 2 seconds:  
 Packet sent with a source address of 172.16.21.1

```
Dec 18 10:35:34.498 PST: LISPreid: 172.16.10.1/32 Added LISP IPL src, success
Dec 18 10:35:34.498 PST: LISPreid: 172.16.10.1/32 Created pco 0x493BE260 linked to drop
Dec 18 10:35:34.498 PST: LISPreid: 172.16.10.1/32 Added LISP src, success
Dec 18 10:35:34.498 PST: LISPreid: 172.16.10.1/32 Added LISP subtree, success
Dec 18 10:35:34.530 PST: LISPreid: 172.16.10.1/32 Null modify of pco 0x493BE260 linked to drop
Dec 18 10:35:34.534 PST: LISPreid: 172.16.10.0/24 Added LISP IPL src, success
Dec 18 10:35:34.538 PST: LISPreid: 172.16.10.0/24 Created pco 0x493BE320 linked to loadinfo 48D2D6E8, per-session, flags 0083, 3 locks
Dec 18 10:35:34.538 PST: LISPreid: 172.16.10.0/24 Added LISP src, success
Dec 18 10:35:34.538 PST: LISPreid: 172.16.10.1/32 Removed LISP src, success
Dec 18 10:35:34.538 PST: LISPreid: 172.16.10.1/32 Removed LISP IPL src, success
Dec 18 10:35:34.542 PST: LISPreid: 172.16.10.0/24 Added LISP subtree, success
Dec 18 10:35:34.542 PST: LISPreid: 172.16.10.0/24 Null modify of pco 0x493BE320 linked to loadinfo 48D2D6E8, per-session, flags 0083, 3 locks
Dec 18 10:35:34.542 PST: LISPreid: 172.16.10.1/32 Removed LISP subtree, success
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/2/4 ms
```

Router# **no debug lisp forwarding remote-eid-prefix**

LISP remote eid prefix events in forwarding module debugging is off

**Related Commands**

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP debug messages related to forwarding adjacency activities.
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-map-request</b>	Displays LISP data-driven map request debug messages.
<b>debug lisp forwarding data-signal-status-bits</b>	Displays LISP data-driven locator status bits change debug messages.
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding state</b>	Displays debug messages related to LISP forwarding module state.
<b>debug lisp forwarding virtual-interface-address</b>	Displays LISP virtual interface address selection debugs.



# debug lisp forwarding state

To display messages related to Locator/ID Separation Protocol (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **debug lisp forwarding state** command displays messages related to LISP forwarding module state. LISP forwarding state is dependent on the device role (for example, Ingress Tunnel Router (ITR) or Proxy ITR), locator status bit (LSB) changes, RLOC changes, Alternative Logical Topology (ALT) virtual routing and forwarding (VRF) configuration, and other similar functions. This command can be useful for troubleshooting LISP forwarding-related 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 endpoint identifier (EID):

```
Router# debug lisp forwarding state

LISP forwarding module state debugging is on

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# router lisp
Router(config)# no database-mapping 192.168.1.0/24 10.0.0.1 priority 1 weight 100
Router(config-router-lisp)#
*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
Router(config-router-lisp)# ^Z
Router(config)#
*Feb 24 21:32:36.371: LISPstate: IPv4:Default set LSB to 0x00000001
(config)#
```

```
Router(config-router-lisp)# ^Z
Router# no debug lisp forwarding state
LISP forwarding module state debugging is off
```

**Related Commands**

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP debug messages related to forwarding adjacency activities.
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-map-request</b>	Displays LISP data-driven map request debug messages.
<b>debug lisp forwarding data-signal-status-bits</b>	Displays LISP data-driven locator status bits change debug messages.
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding remote-eid-prefix</b>	Displays LISP remote EID prefix events in forwarding module debug messages.
<b>debug lisp forwarding virtual-interface-address</b>	Displays LISP virtual interface address selection debugs.

# debug lisp forwarding virtual-interface-address

To display Locator/ID Separation Protocol (LISP) information related to the process of selecting an interface with a local endpoint identifier (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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M

**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 172.16.21.1/32 to 172.16.21.2/32.

```
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 (153.16.21.1)
---<skip>---
Router# configure terminal
Router(config)# interface Loopback0
Router(config-if)# ip address 172.16.21.2 255.255.255.252
Dec 18 12:21:42.800 PST: LISPvif-addr: Start timer with delay of 1 seconds
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 start walk to check
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 Checking if FastEthernet0/0 addr
172.16.156.222/24 against local EID 172.16.21.0/24, no match
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 Skipping if LISP0 no address configured
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 Checking if Loopback0 addr 172.16.21.0/24
against local EID 172.16.21.0/24, match
```

```

Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 Skipping if Null0 no address configured
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 walk ended, found address 172.16.21.0/24
    on Loopback0
Dec 18 12:21:43.800 PST: LISPvif-addr: IPv4 LISP0 already unnumbered to Loopback0, no change
Dec 18 12:21:43.800 PST: LISPvif-addr: All interfaces are unnumbered request timer to be
stopped
Router(config-if)# exit
Router(config)# exit
Router# no debug lisp forwarding virtual-interface-address
LISP virtual interface address selection debugging is off
Router#

```

**Related Commands**

Command	Description
<b>debug lisp forwarding adjacency</b>	Displays LISP debug messages related to forwarding adjacency activities.
<b>debug lisp forwarding alt-prefix</b>	Displays debug messages related to LISP forwarding adjacency activities associated with the LISP ALT VRF.
<b>debug lisp forwarding data-signal-map-request</b>	Displays LISP data-driven map request debug messages.
<b>debug lisp forwarding data-signal-status-bits</b>	Displays LISP data-driven locator status bits change debug messages.
<b>debug lisp forwarding ipv4-traceroute</b>	Displays debug messages on events related to caching IPv4 traceroute headers in an ITR.
<b>debug lisp forwarding ipv6-traceroute</b>	Displays information on events related to caching IPv6 traceroute headers in an ITR.
<b>debug lisp forwarding remote-eid-prefix</b>	Displays LISP remote EID prefix events in forwarding module debug messages.
<b>debug lisp forwarding state</b>	Displays debug messages related to LISP forwarding module state.



## LISP DDT Configuration Commands

---

- [ddt](#), page 102
- [ddt authoritative](#), page 104
- [delegate](#), page 108
- [ddt root](#), page 111
- [lisp-rig](#), page 113
- [map-server-peer](#), page 116

# ddt

To configure a device to perform Locator/ID Separation Protocol (LISP) Delegated Database Tree (DDT) functionality, use the **ddt** command in LISP configuration mode. To remove LISP DDT functionality, use the **no** form of this command.

**ddt** [**cache-limit** *number*]

**no ddt** [**cache-limit**]

## Syntax Description

<b>cache-limit</b> <i>number</i>	(Optional) Displays the DDT resolver cache-entry limit and the number of DDT prefixes to allow in the cache. The range is from 1 to 100000. The default is 1000.
----------------------------------	--

## Command Default

The device does not provide DDT services.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

Use this command to enable a device to function in a DDT node. This command is configured on DDT-enabled map resolvers, map servers, and DDT-only devices.

DDT is a hierarchical distributed database delegating authority to provide mappings from EIDs to RLOCs. DDT functions in the same role as ALT. However, DDT is superior in that it provides inherent support for virtualization (instance IDs), as well as support for other EID address families in addition to IPv4 and IPv6.

This command only enables DDT support. Additional DDT commands are required to configure the specific DDT role(s) supported by this DDT node within the DDT hierarchical database. A DDT node may be configured as authoritative for one or more EID prefixes, along with the set of RLOCs for other DDT nodes to which more-specific EID prefixes are delegated.



### Note

DDT services must be enabled via the **ddt** command before any other DDT functions can be configured.

## Examples

The following example shows how to configure DDT resolver cache-entry limit functionality on a device:

```
Device# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Device(config)# router lisp  
Device(config-router-lisp)# ddt  
Device(config-router-lisp)# ddt cache-limit 2
```

## Related Commands

Command	Description
<b>ddt authoritative-prefix</b>	Configures an extended EID prefix (instance ID and EID prefix) for which a DDT node is authoritative.
<b>ddt delegate</b>	Configures a DDT node to delegate to another DDT node the authority for the specified extended EID prefix (instance ID and EID-prefix).
<b>ddt map-server-peer</b>	Configures the IPv4 or IPv6 locator address and extended EID prefix (instance ID and EID prefix) for a peer map server operating in a delegation hierarchy.
<b>ddt root</b>	Configures an IPv4 or IPv6 locator for a DDT root node within the delegation hierarchy on a DDT-enabled map resolver.

## ddt authoritative

To configure a Locator/ID Separation Protocol (LISP) Delegated Database Tree (DDT) node to be authoritative for a specified EID prefix, use the **ddt authoritative** command in LISP configuration mode. To remove a specific EID prefix from being represented as authoritative on this device, use the **no** form of this command.

**ddt authoritative**{eid-prefix| instance-id iid }

**no ddt authoritative**{eid-prefix| instance-id iid }

### Syntax Description

<b>eid-prefix</b>	Configures the IPv4 or IPv6 EID prefix for which the LISP DDT node is authoritative.
<b>instance-id iid</b>	Configures the instance ID associated with the specified EID prefix or a range of instance IDs.

### Command Default

A LISP DDT node is not configured to be authoritative for any EID-prefixes.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

### Usage Guidelines

Use this command to configure an EID prefix and optional instance ID or instance ID range for which the LISP DDT node or DDT-enabled map server will be authoritative.

This command enables the ability to send a negative map-referral message in response to a DDT-based map request for an EID that matches the EID prefix specified in the **ddt authoritative** command but does not match an EID prefix specified in any **delegate** commands, or in the case of a DDT-enabled map server, does not match any configured LISP site EID prefix.

When a DDT node receives a DDT map request, it does the following:

- The requested EID is checked for a match against any EID prefixes specified in any configured LISP DDT authoritative prefix commands.
  - If there is no match, the DDT node sends a negative map-referral message back to the requesting map resolver, indicating that it is not authoritative for the EID. The map resolver caches this information and drops the map request.
  - If there is a match, the DDT node processing continues below.



- The requested EID is checked for a match against any EID prefixes specified in any **delegate** commands. If the DDT node is also a map server, the EID is checked against EID prefixes specified in **lisp site** commands as well.
  - If there is no match, the DDT node sends a negative map-referral message covering the coarsest negative prefix within the configured EID-prefix range for which the DDT node is authoritative. This indicates that the requested EID is within a delegation-hole and is (currently) not a LISP destination.
  - If there is a match and the DDT node is not a map server, the DDT node sends a map-referral message with the matched more-specific EID prefix and the set of routing locators (RLOCs) for the delegated (child) DDT nodes. When the configured **delegate** command also includes the optional **map-server** keyword, the returned map-referral message also indicates for the receiving map resolver that the next map request will be to a DDT-enabled map server. If the DDT node is a map server, the map server replies with the most appropriate response to the EID in the map request. (See the **map-server-peer** command for details.)
- When the **ddt authoritative** command is configured to specify authority for a specific LISP instance ID, or for a range of instance IDs, the optional **instance-id** keyword is included with the command. The value associated with the **instance-id** keyword will be specified as follows, depending upon the instance-ID scope being configured:
  - For a single instance ID for a specific EID prefix, *iid* is specified as an integer between 1 and 16777215 in the form:
 

**ddt authoritative instance-id iid eid-prefix eid-prefix**
  - For a range of instance IDs, iid can either be specified in x-y format, where y must be greater than x and the range must be in a 24-bit instance ID/mask block (where x is a power-of-2 and y is a power-of-2 minus 1) with a range representable by a 24-bit instance ID/mask or in IPv4 prefix format. An EID prefix cannot be included when an instance-ID range is specified. The command is entered in either of these forms:
 

**ddt authoritative instance-id x-y**

**ddt authoritative instance-id A.B.C.D/length**
  - For the entire EID address space, for all address families, and for all instance IDs, the \* character can be included. In this case, an EID prefix is not included and the command is entered in the form:
 

**ddt authoritative**

**Note**

The ultimate root DDT node can be configured using the command **ddt authoritative\*** to indicate that it is authoritative for all EID prefixes, for all address families, and for all instance IDs.

**Note**

When a child LISP DDT node is configured with the **ddt authoritative** command for an EID prefix (or instance ID) space, the parent LISP DDT node must also be configured using the **delegate** command with a matching EID prefix (or instance ID) space.

## Examples

The following example configures the LISP DDT node to be authoritative for the IPv4 EID-prefix 172.16.0.0/16 and the IPv6 EID prefix 2001:db8:eeee::/48. Note that in this case, the optional instance ID keyword and value are not specified and hence, the EID prefixes are only associated with the default instance ID (0):

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative eid-prefix 172.16.0.0/16
Device(config-router-lisp)# ddt authoritative eid-prefix 2001:db8:eeee::/48
Device(config-router-lisp)# end
Device# show ddt
---<skip>---
Configured authoritative EID-prefixes:
[0] 172.16.0.0/16
[0] 2001:db8:eeee::/48
```

In the following example, the LISP DDT node is configured to be authoritative for the IPv4 EID-prefix 172.16.0.0/16 within the instance ID 1234:

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative instance-id 1234 eid-prefix 172.16.0.0/16
Device(config-router-lisp)# end
Device# show ddt
---<skip>---
Configured authoritative EID-prefixes:
[1234] 172.16.0.0/16
```

In the following example, the LISP DDT node is configured to be authoritative for all EID prefixes within the instance-ID range of 16 to 31. (Note that this is equivalent to using the prefix format of 0.0.0.16/28).

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative instance-id 16-31
Device(config-router-lisp)# end
Device# show ddt
---<skip>---
Configured authoritative EID-prefixes:
[16-31 (0.0.0.16/28)] *
```

In the following example, a root LISP DDT node is configured to be authoritative for all EID prefixes, for all address families, and for all instance IDs:

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative *
Device(config-router-lisp)# end
Device# show ddt
---<skip>---
Configured authoritative EID-prefixes:
[*] *
```

## Related Commands

Command	Description
<b>ddt</b>	Configures a router to enable LISP DDT functionality.

Command	Description
<b>ddt root</b>	Configures an IPv4 or IPv6 locator for a DDT root node within the delegation hierarchy on a DDT-enabled map resolver.
<b>delegate</b>	Configures a LISP DDT node to delegate to another LISP DDT node the authority for the specified extended EID prefix (instance ID and EID prefix).
<b>map-server-peer</b>	Configures the IPv4 or IPv6 locator address and extended EID prefix (instance ID and EID prefix) for a peer map server operating in a delegation hierarchy.

# delegate

To configure the routing locator (RLOC) address of a Locator/ID Separation Protocol (LISP) Delegated Database Tree (DDT) node within the delegation hierarchy for which a specified EID prefix is being delegated, use the **delegate** command in LISP DDT authoritative mode. To remove the delegation for a specific EID prefix, use the **no** form of this command.

**delegate** {eid-prefix| instance-id iid} child-locator map-server

**no delegate** {eid-prefix| instance-id iid} child-locator map-server

## Syntax Description

<b>eid-prefix</b>	Configures the IPv4 or IPv6 EID prefix for which the LISP DDT node is delegating authority.
<b>instance-id iid</b>	Configures a range of instance IDs or the instance ID associated with a specified EID prefix.
<i>child-locator</i>	IPv4 or IPv6 locator address of the delegation DDT node or map server.
<b>map-server</b>	Indicates that the delegated (child) DDT node being referenced is a map server for the configured IPv4 or IPv6 EID prefix.

## Command Default

A LISP DDT node is not configured to delegate authority for any EID prefixes.

## Command Modes

LISP DDT authoritative (config-router-lisp-ddt-auth)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

Use this command to configure the IPv4 or IPv6 locator address, EID prefix, and optional instance ID that is delegated to a child DDT node within the delegation hierarchy on a parent DDT node. This enables the DDT node to send a map referral message in response to a DDT-based map request for an EID that matches the EID prefix specified in the **delegate** command.

**Note**

For correct hierarchical delegation, the EID prefix specified in the parent's **delegate** command must match the EID prefix in the child DDT node's **ddt authoritative** command

When a DDT node receives a DDT map request, it does the following:

- 1 The requested EID is checked for a match against any EID prefix specified in any configured **ddt authoritative** commands.  
If there is no match, the DDT node sends a negative map referral message back to the requesting map resolver, indicating that it is not authoritative for the EID. The map resolver caches this information and drops the map request.  
If there is a match, the DDT node processing continues.
- 2 The requested EID is checked for a match against any EID prefixes specified in any **delegate** commands. If the DDT node is also a map server, the EID is checked against EID prefixes specified in **lisp site** commands as well.  
If there is no match, the DDT node sends a negative map referral message covering the coarsest negative prefix within the configured EID prefix range for which the DDT node is authoritative. This indicates that the requested EID is within a delegation hole and is (currently) not a LISP destination. If there is a match and the DDT node is not also a map server, the DDT node sends a map referral message with the more specific matched EID prefix and the set of RLOCs for the delegated (child) DDT nodes. When the configured **delegate** command also includes the optional **map-server** keyword, the returned map-referral message also indicates for the receiving map resolver that the next map request will be to a DDT-enabled map server. If the DDT node is a map server, the map server replies with the most appropriate response to the EID in the map request. (See the **map-server-peer** command for details).

When the **delegate** command is configured to delegate a specific LISP instance ID, or for a range of instance IDs, the optional **instance-id** keyword is included with the command. The value associated with the keyword will be specified as follows, depending upon the instance ID scope being configured:

**delegate** *child-locator* **instance-id** *iid* **eid-prefix** *eid-prefix*

For a range of instance IDs, *iid* can either be specified in x-y format, where y must be greater than x and the range must be in a power-of-2 block (where x is a power-of-2 and y is a power-of-2 minus 1) with a range represented by a 24-bit instance ID/mask or in IPv4 prefix format. An EID prefix cannot be included when an instance-ID range is specified. The command is entered in either of these forms:

**delegate** *child-locator* **instance-id** *x-y*

**delegate** *child-locator* **instance-id** *A.B.C.D/length*

**Note**

When a LISP DDT node is configured with a **delegate** command for an EID prefix or instance-ID space, the child LISP DDT node must be configured with the **ddt authoritative** command with a matching EID prefix and/or instance-ID space.

**Examples**

The following example shows how to configure a LISP DDT node to delegate authority for the IPv4 EID prefix 172.16.0.0/16 and the IPv6 EID prefix 2001:db8:eeee::/48 to the DDT node with child locator 10.1.1.1.

Note that in this case, the **instance-id** keyword and value are not specified and hence, the EID prefixes are only associated with the default instance ID (0).

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# delegate 10.1.1.1 eid-prefix 172.16.0.0/16
Device(config-router-lisp-ddt-auth)# delegate 10.1.1.1 eid-prefix 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# end
Device# show ddt
---<skip>---
Configured DDT delegated nodes/map-servers:
[0] 172.16.0.0/16 -> 10.1.1.1, p/w: 0/0
[0] 2001:db8:eeee::/48 -> 10.1.1.1, p/w: 0/0
```

In the following example, a LISP DDT node is configured to delegate authority for the IPv4 EID prefix 172.16.0.0/16 to the DDT node with child locator 10.1.1.1 where the child is specified as a map server.

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# delegate 10.1.1.1 eid-prefix 172.16.0.0/16 map-server
Device(config-router-lisp-ddt-auth)# end
Device# show ddt
---<skip>---
Configured DDT delegated nodes/map-servers:
[0] 172.16.0.0/16 -> 10.1.1.1, p/w: 0/0, map-server-child
```

In the following example, the LISP DDT node is configured to be authoritative for all EID prefixes within the instance-ID range of 0 to 15 to the DDT node with child locator 10.1.1.1. Note that this is equivalent to using the prefix format of 0.0.0.0/28.

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# delegate 10.1.1.1 instance-id 0-15
Device(config-router-lisp-ddt-auth)# end
Device# show ddt
---<skip>---
Configured DDT delegated nodes/map-servers:
[0-15 (0.0.0.0/28)] * -> 10.1.1.1, p/w: 0/0
```

Command	Description
<b>ddt</b>	Configures a device to enable LISP DDT functionality.
<b>ddt authoritative</b>	Configures an extended EID prefix (instance ID and EID prefix) for which a LISP DDT node is authoritative.
<b>ddt root</b>	Configures an IPv4 or IPv6 locator for a DDT root node within the delegation hierarchy on a DDT-enabled map resolver.
<b>map-server-peer</b>	Configures an IPv4 or IPv6 locator address and extended EID prefix (instance ID and EID prefix) for a peer map server operating in a delegation hierarchy.

# ddt root

To configure an IPv4 or IPv6 locator for a delegated database tree (DDT) root node within the delegation hierarchy on a DDT-enabled map resolver, use the **ddt root** command in LISP configuration mode. To remove a root DDT node reference, use the **no** form of this command.

**ddt root** *root-locator*

**no ddt root** *root-locator*

## Syntax Description

<i>root-locator</i>	IPv4 or IPv6 locator address of the DDT root node.
---------------------	--

## Command Default

A map resolver running DDT is not configured to point to a DDT root node.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

Use this command to configure a map resolver running DDT to point to a DDT root node within the delegation hierarchy.



### Note

Up to eight DDT root node references (summed across all address families) may be configured on a map resolver. When multiple DDT root nodes are configured, the map resolver uses load-balancing mechanisms to send DDT-based map requests to these DDT root nodes.

Unlike a standalone map resolver or one that uses the ALT mapping system, a DDT map resolver uses an iterative process of following referrals to find the correct Egress Tunnel Router (ETR) to answer a map request. This requires a DDT map resolver to maintain additional state, including a map referral cache and a lookup queue of map requests that are going through the iterative referral process.

When a DDT-enabled map resolver receives an ECM-based map request from an Ingress Tunnel Router (ITR), a map resolver running DDT begins the iterative process by sending a DDT-based map request to a DDT root node referenced in the **ddt root** command. The DDT root node is configured with the appropriate **ddt authoritative** and **delegate** commands to satisfy the request, or refer the map resolver to the next (set of) DDT nodes and ultimately, DDT map servers, within the DDT hierarchy that can provide the most appropriate response for the EID in the map request. (See the **ddt authoritative** command, **delegate** command, and **map-server-peer** command for details on response behavior.)

## Examples

The following example shows how to configure a DDT-enabled map resolver to refer to three DDT root node locators: 10.1.1.1, 10.2.1.1, and 2001:db8:1::1111.

```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt root 10.1.1.1
Device(config-router-lisp)# ddt root 10.2.1.1
Device(config-router-lisp)# ddt root 2001:db8:1::1111
Device(config-router-lisp)# end
Device# show ddt
LISP-DDT Configuration in VRF "default"
  Configured DDT roots: 10.1.1.1 10.2.1.1 2001:db8:1::1111
---<skip>---
```

## Related Commands

Command	Description
<b>ddt</b>	Configures a router to enable LISP DDT functionality.
<b>ddt authoritative</b>	Configures an extended EID prefix (instance ID and EID Prefix) for which a LISP DDT node is authoritative.
<b>delegate</b>	Configures a LISP DDT node to delegate to another LISP DDT node the authority for the specified extended EID prefix (instance ID and EID prefix).
<b>map-server-peer</b>	Configures an IPv4 or IPv6 locator address and extended EID prefix (instance ID and EID prefix) for a peer map server operating in a delegation hierarchy.



# lisp-rig

To configure a LISP rig operation to query the LISP DDT mapping system to return map referrals for a destination EID , use the **lisp-rig** command in privileged EXEC mode.

**lisp-rig** {**instance-id** *iid* | **eid-table** *name* | **locator-table** *name* | {**vrf** *name* | **default** }} *EID* **to** *ddt-node* {**follow-all-referrals**}

## Syntax Description

<b>instance-id</b> <i>iid</i>	Specifies the instance ID for the IPv4 or IPv6 EID to perform the <b>lisp-rig</b> operation on.
<b>eid-table</b> <i>name</i>	Specifies the EID table VRF.
<b>locator-table</b> <i>name</i>	Specifies the router LISP ID through an RLOC VRF.
<b>vrf</b> <i>name</i>	Specifies the VRF name.
<b>default</b>	Specifies the default VRF.
<i>EID</i>	Specifies the IPv4/IPv6 destination EID.
<b>to</b>	Specifies the destination DDT node to send map request.
<i>ddt-node</i>	Specifies the IPV4/IPV6 DDT node address.
<b>follow-all-referrals</b>	Resolves alternatives after receiving done referral.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

The **lisp-rig** command initiates a operation to query the LISP-DDT hierarchy for the indicated destination hostname or EID.

The **lisp-rig** function initiates an ECM-based map request for the specified EID or extended EID **instance-id iid EID** and sends it to the specified DDT node. The DDT node receiving the query returns an appropriate map-referral message (based on its knowledge of the queried EID), and this information is displayed.

**Note**

When the **lisp-rig** command is entered and referrals are returned, these referrals do not create or modify state in the referral cache.

**Examples**

The following examples use the **lisp-rig** command to query the LISP DDT hierarchy for the EID 172.16.17.17.

```
Device# lisp-rig 172.16.17.17 to 10.1.1.1
```

```
rig LISP-DDT hierarchy for EID [0] 172.16.17.17
Send Map-Request to DDT-node 10.1.1.1 ... replied, rtt: 0.007072 secs
  EID-prefix [0] 172.16.17.16/28, ttl: 1, action: ms-not-registered, referrals:
    10.1.1.1, priority/weight: 0/0
    10.2.1.1, priority/weight: 0/0
    10.3.1.1, priority/weight: 0/0
```

```
Device# lisp-rig 172.16.17.17 to 192.168.252.136
```

```
Send Map-Request to DDT-node 192.168.252.136 ... node referral, rtt: 12 ms
  EID-prefix: [0] 172.16.0.0/16, ttl: 1440
  referrals: 192.168.1.91, 10.36.254.167, 10.217.187.20
```

```
Send Map-Request to DDT-node 192.168.1.91 ... node referral, rtt: 132 ms
  EID-prefix: [0] 172.16.0.0/19, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 192.168.48.61 ... map-server not registered, rtt: 72 ms
  EID-prefix: [0] 172.16.17.16/28, ttl: 1
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Device# lisp-rig 172.16.17.17 to 192.168.252.136 follow-all-referrals
```

```
Send Map-Request to DDT-node 192.149.252.136 ... node referral, rtt: 4 ms
  EID-prefix: [0] 172.16.0.0/16, ttl: 1440
  referrals: 192.168.1.91, 10.36.254.167, 10.217.187.20
```

```
Send Map-Request to DDT-node 192.168.1.91 ... node referral, rtt: 132 ms
  EID-prefix: [0] 172.16.0.0/19, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 192.168.48.61 ... map-server not registered, rtt: 76 ms
  EID-prefix: [0] 172.16.17.16/28, ttl: 1
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 10.36.254.164 ... map-server acknowledgement, rtt: 80 ms
  EID-prefix: [0] 172.16.17.16/28, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 192.168.255.37 ... map-server not registered, rtt: 8 ms
  EID-prefix: [0] 172.16.17.16/28, ttl: 1
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 10.223.132.89 ... map-server acknowledgement, rtt: 92 ms
  EID-prefix: [0] 172.16.17.16/28, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 10.36.254.167 ... node referral, rtt: 76 ms
  EID-prefix: [0] 172.16.0.0/19, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

```
Send Map-Request to DDT-node 10.217.187.20 ... node referral, rtt: 80 ms
  EID-prefix: [0] 172.16.0.0/19, ttl: 1440
  referrals: 192.168.48.61, 10.36.254.164, 192.168.255.37, 10.223.132.89
```

No more referrals to pursue.

**Related Commands**

Command	Description
<b>clear lisp ddt</b>	Clears the DDT referral cache stored on a DDT-enabled map resolver.
<b>ddt</b>	Configures a device to enable LISP DDT functionality.
<b>show lisp ddt</b>	Displays the configured LISP DDT root(s) and/or DDT delegation nodes on a device enabled for LISP DDT.

## map-server-peer

To configure on a DDT-enabled map server the locator and EID prefix (and/or instance ID) for a map server peer within the Locator/ID Separation Protocol (LISP) delegated database tree (DDT) delegation hierarchy, use the **map-server-peer** command in LISP DDT authoritative mode. To remove the map server as a peer, use the **no** form of this command.

**map-server-peer** *map-server-locator*

**no map-server-peer** *map-server-locator*

### Syntax Description

<i>map-server-locator</i>	Configures the IPv4 or IPv6 locator address of this map server, or of a map server peer that is also authoritative for the same EID prefix (and/or instance ID).
---------------------------	--

### Command Default

No map-server peers are configured.

### Command Modes

LISP DDT authoritative (config-router-lisp-ddt-auth)

### Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

### Usage Guidelines

Use this command to configure the IPv4 or IPv6 locator address of map server peers that are all configured to be authoritative and acting as map servers for the same EID prefix (and/or instance ID) within the LISP DDT delegation hierarchy. This enables the map server to provide the appropriate response when the EID in a DDT-based map-request matches the EID prefix specified in this **map-server-peer** command.

A map server is generally configured with one or more **lisp site** configurations that include EID prefixes (and possibly instance IDs) for which one or more LISP Sites and ETRs may be registering. In addition, there may be more than one map server to which a LISP Site and its ETRs may be configured to register (for example, in a redundant map servers are deployment). When multiple map servers are deployed within a LISP DDT delegation hierarchy and they are all configured to be authoritative for the same EID prefix (and/or instance ID) space they are then considered peers. map server peers also have upstream LISP DDT node(s) delegating the same EID prefix (and/or instance ID) space to them. In this case, the following considerations are important:

- Each map server must be identically configured with **map-server-peer** commands specifying each map server locator, including their own, for each EID prefix (and/or instance ID) represented by the map server and its peers.

- Each map server must be identically configured with **ddt authoritative** commands with an EID prefix (and/or instance ID) matching the one used within the **map-server-peer** commands.
- The EID prefix configured in **map-server-peer** and **ddt authoritative** commands must cover the EID prefix contained in the **lisp site** configurations. If there are multiple **lisp site** configurations and the EID prefix can be summarized by a coarse aggregate, the EID prefix configured in **map-server-peer** and **ddt authoritative** commands may use this aggregate instead of the individual EID prefixes from each **lisp site** configuration.
- For a given authoritative prefix, each map server must have identical **lisp site** configurations, regardless of whether the LISP Site is configured to register to all/any one map server or not. This is because when the upstream LISP DDT node configures the **delegate** command and includes the **map-server** keyword, the map referral message it returns to the querying map resolver includes the set of RLOCs for all map servers (referral target DDT nodes) to which the EID prefix has been delegated. Thus, any map server in the peer group can receive subsequent DDT map requests from the map resolver.
- Depending on the EID prefix configured in **map-server-peer** and **ddt authoritative** commands and the state of LISP Site registrations, the following responses may be generated by this map server.
  - 1 When the EID in a DDT map request matches an EID prefix for a LISP site that is currently registered to THIS map server, the map server forwards the ECM-based map request to the ETR at that LISP site (or sends a map reply if it is providing proxy map reply services). This ETR will send a map reply back to the requesting ITR. The map server also returns a map referral back to the map resolver indicating that it successfully processed the map request and forwarded it to the registering ETR.
  - 2 When the EID in a DDT map request matches an EID prefix for a LISP site that is configured but not currently registered to THIS map server, the map server returns a map referral message back to the map resolver. The map resolver caches the fact that the LISP site is configured but not currently registered to THIS map server, and proceeds to query the other map server peers for the EID prefix. If one of those map servers has the LISP site registered, it will respond as in (1) above. If none of the map server peers has the LISP site registered, the map resolver will send a negative map reply (TTL 1 minute) back to the requesting ITR.
  - 3 When the EID in a DDT map request does not match any EID prefix for configured LISP sites but is within the EID prefix (and/or instance ID) configured in **map-server-peer** and **ddt authoritative** commands, this means that the EID prefix (or Instance ID) configured in **map-server-peer** and **ddt authoritative** commands is a coarse aggregate and a LISP Site has not been configured to cover some portion of it. In this case, the map server returns a negative map referral message back to the map resolver indicating that the EID does not match any EID prefix (and/or instance ID) delegated to the map server. This negative map referral contains the “least specific” EID prefix that covers the delegation hole, allowing the map resolver to create and send a negative map reply (TTL 15 minutes) back to the requesting ITR.

**Note**

Because all map server peers must be identically configured, a DDT map resolver receiving a negative map referral from a DDT map server can accept it without further need for checking of the other map server peers for a configured or registered LISP Site.

When the **map-server-peer** command is configured for a specific LISP instance ID, or for a range of instance IDs, the optional **instance-id** keyword is included with the command. The value associated with the keyword will be specified as follows, depending upon the instance ID scope being configured:

- For a single instance ID for a specific EID prefix, *iid* is specified as an integer between 1 and 16777215 in the form:

**map-server-peer** *map-server-locator* **instance-id** *iid* **eid-prefix** *eid-prefix*

- For a range of instance IDs, iid can either be specified in x-y format, where y must be greater than x and the range must be in a power-of-2 block (where x is a power-of-2 and y is a power-of-2 minus 1) with a range representable by a 24-bit instance ID/mask or in IPv4 prefix format. An EID prefix cannot be included when an instance ID range is specified. The command is entered in either of these forms:

**map-server-peer** *map-server-locator* **instance-id** *x-y*

**map-server-peer** *map-server-locator* **instance-id** *A.B.C.D/length*

## Examples

The following example shows how to configure a LISP DDT map server as authoritative for the IPv4 EID prefix 172.16.0.0/16 and the IPv6 EID prefix 2001:db8:eeee::/48 for its own locator 10.1.1.1, as well as one other map server peer (for the same EID prefix space) with map-server locator 10.2.1.1. Note that in this case, the optional **instance-id** keyword and value are not specified and hence, the EID prefixes are only associated with the default instance ID (0).


```
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# map-server-peer 10.1.1.1 eid-prefix 172.16.0.0/16
Device(config-router-lisp-ddt-auth)# map-server-peer 10.2.1.1 eid-prefix 172.16.0.0/16
Device(config-router-lisp-ddt-auth)# authoritative eid-prefix 172.16.0.0/16
Device(config-router-lisp-ddt-auth)# map-server-peer 10.1.1.1 eid-prefix 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# map-server-peer 10.2.1.1 eid-prefix 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# authoritative eid-prefix 2001:db8:eeee::/48
Device# end
Device# show ddt
---<skip>---
Configured DDT delegated nodes/map-servers:
[0] 172.16.0.0/16 -> 10.1.1.1, p/w: 0/0, map-server-peer
[0] 172.16.0.0/16 -> 10.2.1.1, p/w: 0/0, map-server-peer
[0] 2001:db8:eeee::/48 -> 10.1.1.1, p/w: 0/0, map-server-peer
[0] 2001:db8:eeee::/48 -> 10.2.1.1, p/w: 0/0, map-server-peer
Configured authoritative EID-prefixes:
[0] 172.16.0.0/16
[0] 2001:db8:eeee::/48
Device(config)#
```

In the following example, a LISP DDT map server is configured as authoritative for all EID prefixes within the instance ID range of 0 to 15. Its own locator is 10.1.1.1; one other map server peer with locator 10.2.1.1 is configured for the same Instance ID space. (Note that this is equivalent to using the prefix format of 0.0.0.0/28).

```
Device> enable
Device# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Device(config)# router lisp
Device(config-router-lisp)# ddt authoritative 2001:db8:eeee::/48
Device(config-router-lisp-ddt-auth)# map-server-peer 10.1.1.1 instance-id 0-15
Device(config-router-lisp-ddt-auth)# map-server-peer 10.2.1.1 instance-id 0-15
Device(config-router-lisp-ddt-auth)# authoritative instance-id 0-15
Device# end
Device# show ddt
---<skip>---
Configured DDT delegated nodes/map-servers:
[0-15 (0.0.0.0/28)] * -> 10.1.1.1, p/w: 0/0, map-server-peer
[0-15 (0.0.0.0/28)] * -> 10.2.1.1, p/w: 0/0, map-server-peer
Configured authoritative EID-prefixes:
[0-15 (0.0.0.0/28)] *
Device(config)#
```

**Related Commands**

Command	Description
<b>ddt</b>	Configures a device to enable LISP DDT functionality.
<b>ddt authoritative</b>	Configures an extended EID prefix (instance ID and EID prefix) for which a LISP DDT node is authoritative.
<b>delegate</b>	Configures a LISP DDT node to delegate to another LISP DDT node the authority for the specified extended EID prefix (instance ID and EID prefix).
<b>ddt root</b>	Configures an IPv4 or IPv6 locator for a DDT root node within the delegation hierarchy on a DDT-enabled map resolver.

 **map-server-peer**





# LISP Global Configuration Commands

---

- [router lisp, page 122](#)

# router lisp

To enter Locator/ID Separation Protocol (LISP) configuration mode and configure LISP commands on a router, use the **router lisp** command in global configuration mode. To remove LISP configuration, use the **no** form of this command.

**router lisp**

**no router lisp**

**Syntax Description** This command has no arguments or keywords.

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

**Command Modes** Global configuration (config)

Command History	Release	Modification
	Cisco IOS XE Release 3.3.0S	This command was introduced.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**Usage Guidelines** The **router lisp** command is applicable to all LISP devices. Use the **router lisp** command to enter LISP configuration mode. In LISP configuration mode, you can configure most attributes associated with a LISP site. (LISP interface configuration commands are entered in interface configuration mode). Use the **no** form of the command to remove all LISP configurations from the router.

**Examples** The following example shows how to enter LISP site configuration mode.

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



## LISP Interface Configuration Commands

---

- [ip lisp source-locator](#), page 124
- [ipv6 lisp source-locator](#), page 126
- [lisp extended-subnet-mode](#), page 128
- [lisp mobility](#), page 130

# ip lisp source-locator

To configure a source locator to be used for IPv4 Locator/ID Separation Protocol (LISP) 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.

```
ip lisp source-locator interface
no ip lisp source-locator interface
```

## Syntax Description

<i>interface</i>	The name of the interface whose IPv4 address should be used as the source locator address for outbound LISP encapsulated packets.
------------------	---

## Command Default

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

## Command Modes

Interface configuration (config-if)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

When you send 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 LISP encapsulated packet.

It might 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 Ingress Tunnel Router (ITR) has multiple egress interfaces, you can 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 shows how to configure the ITR to use the IPv4 address of interface Loopback0 as the source-locator when LISP encapsulated packets are sent 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
```

**Note**

In Cisco IOS XE Releases, the FastEthernet interfaces require three values to define the interface (for example, FastEthernet 1/0/1).

### Related Commands

Command	Description
ipv4 itr	Configures the router to act as an IPv4 LISP ITR.

# ipv6 lisp source-locator

To configure a source locator to be used for IPv6 Locator/ID Separation Protocol (LISP)-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.

```

ipv6 lisp source-locator interface
no ipv6 lisp source-locator interface
    
```

## Syntax Description

<i>interface</i>	The name of the interface whose IPv6 address should be used as the source locator address for outbound LISP-encapsulated packets.
------------------	---

## Command Default

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

## Command Modes

Interface configuration (config-if)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

When a LISP-encapsulated packet (data or control message) is sent, 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 LISP encapsulated packet.

It might 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 Ingress Tunnel Router (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 shows how to configure 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
```

**Note**

In Cisco IOS XE Releases, the FastEthernet interfaces require three values to define the interface (for example, FastEthernet 1/0/1).

### Related Commands

Command	Description
ipv6 itr	Configures the router to act as an IPv6 LISP ITR.

# lisp extended-subnet-mode

To configure an interface to create a dynamic EID state for hosts attached on their own subnet in order to track the movement of endpoint identifiers (EIDs) from one part of its subnet to another part of the same subnet, use the **lisp extended-subnet-mode** command in interface configuration mode. To remove the configuration, use the **no** form of this command.

**lisp extended-subnet-mode**  
**no lisp extended-subnet-mode**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, this command is disabled.

**Command Modes** Interface configuration (config-if)

Command History	Release	Modification
	Cisco IOS XE Release 3.9S	This command was introduced.

**Usage Guidelines** This command is used when a subnet is extended across a layer-3 cloud where layer-2 connectivity is maintained by a mechanism other than Locator/ID Separation Protocol (LISP), for example, overlay transport virtualization (OTV) or virtual private LAN services (VPLS). This command enables a dynamic EID state to be created for hosts attached on their own subnet so that remote Ingress Tunnel Routers (ITRs)/Proxy Ingress Tunnel Routers (PITRs) can track the movement of EIDs from one part of its subnet to another part of the same subnet (by LISP encapsulating to the current locator-set for the roaming dynamic EID). The default setting for this command is disabled.



**Note** When the **lisp extended-subnet-mode** command is configured on an interface, any dynamic-EID prefixes configured using the **lisp mobility** command on the same interface must be more specific prefixes than any overlapping subnet prefixes. For example, if the **lisp extended-subnet-mode** command is configured on an interface that has a base subnet of /24, then when the **lisp mobility dynamic-eid-name** command is configured, the EID-prefix for dynamic EID *dynamic-eid-name* must be /25 or greater.

**Examples** The following example configures the Ethernet2/0 interface to use the **lisp extended-subnet-mode** command.

```
Device(config)# interface Ethernet2/0
Device(config-if)# lisp extended-subnet-mode
```



**Related Commands**

Command	Description
<b>dynamic-eid</b>	Configures a LISP VM-mobility (dynamic-EID roaming) policy.
<b>lisp mobility</b>	Configures an interface on an ITR to participate in LISP VM-mobility (dynamic-EID roaming) for the referenced dynamic-EID policy.

# lisp mobility

To configure an interface on an Ingress Tunnel Router (ITR) to participate in Locator/ID Separation Protocol (LISP) virtual machine (VM)-mobility (dynamic-EID roaming) for a referenced dynamic-EID policy, use the **lisp mobility** command in interface configuration mode. To remove the configuration, use the **no** form of this command.

**lisp mobility** {*dynamic-eid-name* | [**nbr-proxy-reply requests** *number*]} [**discover arp** | **liveness** | {**test** | **ttl** *value*}]

**no lisp mobility** {*dynamic-eid-name* | [**nbr-proxy-reply requests** *number*]} [**discover arp** | **liveness** | {**test** | **ttl** *value*}]

## Syntax Description

<i>dynamic-eid-name</i>	Name of the LISP dynamic-EID policy to apply to this interface.
<b>nbr-proxy-reply</b>	The neighbor proxy reply behavior for the dynamic-EID group.
<b>requests</b> <i>number</i>	Sends neighbor proxy reply after reaching the request threshold and the number of the requests threshold. The range is from 0 to 5. The default is 1.
<b>discover</b>	Configures the mobility dynamic-EID discover settings.
<b>arp</b>	Dynamic-EID discover through ARP events on this interface.
<b>liveness</b>	Configures mobility liveness settings.
<b>test</b>	Performs liveness test on dynamic EID discovered on this interface.
<b>ttl</b> <i>value</i>	Configures the Time to Live (TTL) in the liveness test packet. The value range is from 2 to 255.

## Command Default

By default, the interface does not participate in LISP VM-mobility (dynamic-EID roaming).

## Command Modes

Interface configuration (config-if)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

In order for an interface on a LISP ITR/ETR (xTR) to participate in LISP VM-mobility (dynamic-EID roaming), it must be associated by name with a specific LISP dynamic-EID roaming policy. A LISP dynamic-EID roaming policy is configured using the **dynamic-eid** command. This policy is then associated with an interface using the **lisp mobility** command, where the *dynamic-eid-name* argument provides the association.

When a packet is received on an interface configured for LISP VM-mobility, the packet is considered a candidate for LISP VM-mobility (dynamic-EID roaming) and its source address is compared against the EID prefix in the database-mapping entry included in the dynamic-eid roaming policy. If there is a match, the detected dynamic-EID roaming policy is registered with the mapping system and the packet is LISP encapsulated if the destination is an EID or it is forwarded natively.

Multiple **lisp mobility** commands referring to different LISP dynamic-EID policies can be applied to the same interface.

**Note**

The following caveats apply to LISP VM-mobility:

- When a dynamic EID will be roaming across subnets, the dynamic-EID prefix must be "more-specific" than the subnet configured on the interface.
- All LISP VM-router interfaces (the interface the dynamic EID will roam to) must have the same MAC address. Interfaces can be configured with the following command: **mac-address 0000.0e1d.010c**
- Note that any MAC address can be used; the MAC address in the example above, which approximates "EID" (0e1d) and "LOC" (010c), is an example.

**Note**

This feature is available for only IPv4 at this time. Support for IPv6, including necessary changes for IPv6 neighbor discovery (ND) has not yet been implemented.

**Note**

Any dynamic-EID prefixes configured using **lisp mobility** commands on the same interface must be equal or more specific prefixes than any subnet prefixes. For example, if an interface has a base subnet of /24, then the dynamic-EID prefix must be /24 or greater.



**Note**

When **lisp mobility** *dynamic-eid-name* is configured:

- Dynamic-EID discovery from arp packets is enabled by default in across subnet mode (ASM). Use the **no** form of the command to disable dynamic-EID discovery from arp packets.  
(The **discover arp** option is not applicable when the **lisp extended-subnet-mode** command is configured on the interface.)
- **liveness test** is enabled by default in ASM mode. The liveness test sends a ping every 60 seconds to the dynamic EIDs to check if the dynamic EID is attached to the subnet. Use the **no** form of the command to disable the liveness test on the interface for dynamic EIDs.  
(The **liveness test** option is not applicable when the **lisp extended-subnet-mode** command is configured on the interface.)

**Examples**

The following example configures the Ethernet2/0 interface to use the **Site-1** policy defined under the LISP dynamic-EID configuration.

```

Device(config)# interface Ethernet2/0
Device(config-if)# lisp mobility site-1
The following example shows output for interface Ethernet2/0:

!
interface Ethernet2/0
 mac-address 0000.0d0e.010c
 ip address 22.1.0.2 255.255.255.0
 lisp mobility site-1
!
```

**Related Commands**

Command	Description
<b>dynamic-eid</b>	Configures a LISP VM-mobility (dynamic-EID roaming) policy.
<b>lisp extended-subnet-mode</b>	Configures an interface to create a dynamic-EID state for hosts attached on their own subnet to track EID movement from one part of the subnet to another part of the same subnet.



## LISP-Related Configuration Commands

---

- [lig](#), page 134

# lig

To initiate a Locator/ID Separation Protocol (LISP) Internet Groper (**lig**) operation for a destination endpoint identifier (EID) or to test the routers' local EID prefix(es), use the **lig** command in privileged EXEC mode.

**lig** {*hostname*| *destination-EID*} [**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

<i>hostname</i>	Destination hostname.
<i>destination-EID</i>	Destination IPv4 or IPv6 Endpoint Identifier (EID) for the lig operation.
<b>count</b> <i>count</i>	(Optional) Send this number of map requests (value between 1 and 5).
<b>source</b> <i>source-EID</i>	(Optional) Send the map request using this IPv4 or IPv6 source EID.
<b>to</b> <i>map resolver</i>	(Optional) Send the map request to this map resolver locator instead of the configured map resolver.
<b>self</b>	Use lig to test if the local EID prefix is registered in the mapping database.
<b>all</b>	(Optional) Specifies that a map request is sent for all local EIDs configured on the router (IPv4 and IPv6).
<b>ipv4</b>	(Optional) Specifies that map requests should be sent only for local IPv4 EIDs configured on the router.
<b>ipv6</b>	(Optional) Specifies that map requests should be sent only for local IPv6 EIDs configured on the router.
<b>all-eid</b>	(Optional) Used in conjunction with the <b>ipv4</b> or <b>ipv6</b> keyword, specifies that a map request is sent for all local EIDs configured on the router in the referenced address family.

## 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.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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 domain name service (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. After 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 172.16.21.0/24, the source EID will be 172.16.21.0 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.

When the **lig** command is used with the **self** option, 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 172.16.21.0/24, the destination EID will be 172.16.21.0 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. Sending a map request to a different map resolver can be useful for testing that your EID prefix has been properly injected into the Alternative Logical Topology (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 how to display all LISP map-cache entries and then use the **lig** command for the EID-prefix 172.16.10.0/24.

```
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 172.16.10.1
Mapping information for EID 172.16.10.1 from 192.168.65.94 with RTT 12 msecs
```

```

172.16.10.0/24, uptime: 00:00:00, expires: 23:59:59, via map-reply, complete
Locator      Uptime      State      Pri/Wgt
172.16.156.134    00:00:00    up        1/50
192.168.65.94    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
172.16.10.0/24, uptime: 00:00:08, expires: 23:59:51, via map-reply, complete
Locator      Uptime      State      Pri/Wgt
172.16.156.134    00:00:08    up        1/50
192.168.65.94    00:00:08    up        1/50
2001:468:D01:9C::80DF:9C86 00:00:08    up        2/100
Router#

```

The following example shows how to display all LISP map-cache entries and then use the **lig self ipv6** command to verify that the local IPv6 EID prefix is registered to 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 172.16.156.222 with RTT 36 msec
2610:D0:1209::/48, uptime: 00:00:00, expires: 23:59:57, via map-reply, self
Locator      Uptime      State      Pri/Wgt
172.16.156.222 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
172.16.156.222 00:00:02    up        1/100
Router#

```

## Related Commands

Command	Description
<b>show ip lisp map-cache</b>	Displays the current dynamic and static IPv4 EID-to-RLOC map-cache entries.
<b>show ipv6 lisp map-cache</b>	Displays the current dynamic and static IPv6 EID-to-RLOC map-cache entries.





## LISP Router Configuration Commands

---

- [database-mapping \(LISP EID-table\), page 138](#)
- [eid-notify authentication-key, page 143](#)
- [eid-notify key, page 145](#)
- [eid-table, page 147](#)
- [locator-down, page 151](#)
- [locator-scope, page 153](#)
- [locator-table, page 155](#)
- [loc-reach-algorithm, page 158](#)
- [map-cache, page 160](#)
- [other-xtr-probe, page 163](#)
- [rloc-prefix, page 165](#)
- [rtr-locator-set, page 167](#)
- [xtr instance-id, page 169](#)

## database-mapping (LISP EID-table)

To configure an IPv4 or IPv6 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship and an associated traffic policy for Locator/ID Separation Protocol (LISP), use the **database-mapping** command in LISP EID-table or LISP EID-table dynamic-EID configuration mode. To remove the configured database mapping, use the **no** form of this command.

**database-mapping** *eid-prefix/prefix-length* {*locator* | **ipv4-interface** *interface-name*| **ipv6-interface** *interface-name*| **auto-discover-rlocs**} **priority** *priority* **weight** *weight*

**no database-mapping** *eid-prefix/prefix-length* {*locator* | **ipv4-interface** *interface-name*| **ipv6-interface** *interface-name*| **auto-discover-rlocs**}

### Syntax Description

<i>eid-prefix/prefix-length</i>	IPv4 or IPv6 EID prefix and length to be advertised by the router.
<i>locator</i>	IPv4 or IPv6 routing locator (RLOC) associated with the value specified for the <i>eid-prefix/prefix-length</i> argument.
<b>ipv4-interface</b> <i>interface-name</i>	Specifies the IPv4 address and name of the interface to be used as the RLOC for the EID prefix.
<b>ipv6-interface</b> <i>interface-name</i>	Specifies the IPv6 address and name of the interface to be used as the RLOC for the EID prefix.
<b>auto-discover-rlocs</b>	Configures the Egress Tunnel Router (ETR) to discover the locators of all routers configured to function as both an ETR and an Ingress Tunnel Router (ITR)—such routers are referred to as xTRs—in the ETR 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.
<b>priority</b> <i>priority</i>	Specifies the priority assigned to the RLOC. Valid values are from 0 to 255.
<b>weight</b> <i>weight</i>	Specifies the weight assigned to the locator. Valid values are from 0 to 100.

### Command Default

No LISP database entries are defined.

### Command Modes

LISP EID-table configuration (config-router-lisp-eid-table)

LISP EID-table dynamic-EID (config-router-lisp-eid-table-dynamic-eid)

**Note**

The EID-table dynamic-EID command mode only supports the locator-set option for configuring RLOCs and its associated policies.

**Command History**

Release	Modification
15.1(1)XB	This command was introduced.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.
Cisco IOS XE Release 3.3S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.
15.2(3)T	This command was modified to permit up to 100 database-mapping entries per site.
Cisco IOS XE Release 3.6S	This command was modified to permit up to 100 database-mapping entries per site.
15.3(1)T	This command was modified and support was added for the LISP EID-table dynamic-EID configuration mode.
Cisco IOS XE Release 3.8S	This command was modified and support was added for the LISP EID-table dynamic-EID configuration mode.

**Usage Guidelines**

This command configures the LISP database parameters for a specified IPv4 or IPv6 EID-prefix block. Parameters for each IPv4 or IPv6 EID-prefix block include the associated locator, priority, and weight. The IPv4 or IPv6 specified in the *eid-prefix/prefix-length* argument of the command syntax is the LISP IPv4 or IPv6 EID-prefix block associated with the site.

Typically, the device registers as being authoritative with a map server. The locator is typically the IPv4 or IPv6 address of any interface used as the RLOC address for the EID prefix assigned to the site but can also be the IPv4 or IPv6 address of a loopback interface. Priority and weight values are associated with the locator address to define traffic policies when multiple RLOCs are defined for the same EID-prefix block.

When a device is configured as an ETR, the 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 destination locator (outer header) address for encapsulating packets destined to the EID prefix based on these advertised parameters.

**Note**

When LISP is configured for virtualization, multitenancy 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 so that the subsequent **database-mapping** entries are associated with the appropriate LISP instance ID specified in the **eid-table** command. Additional details on this usage of the **database-mapping** command with instance IDs can be found on the **eid-table** command page.

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 from 0 to 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, they can 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 nonzero 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 nonzero weight value. 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, 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 Cisco IOS Release 15.2(3)T and Cisco IOS XE Release 3.6S, a maximum of 10 database-mapping entries were permitted per site. Beginning with Cisco IOS Release 15.2(3)T and Cisco IOS XE Release 3.6S, 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 be configured with 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 to be used as a routing locator is determined dynamically, such as by DHCP, you must 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** or **ipv6-interface interface-name** keyword-argument pair of the **database-mapping** command to configure the appropriate RLOC.

When multiple ETRs are used at a LISP site, you must configure consistent **database-mapping** commands on all ETRs for all locators—including those local and not local to each ETR. To accomplish this when the **database-mapping eid-prefix/prefix-length ipv4-interface interface-name** 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** keyword signals

to the map server that it should merge all locators for the associated EID prefixes within map-register messages it receives from all of the ETRs within a LISP site and send the merged locator set back to all registering ETRs via a map-notify message.

**Note**

To reduce the configuration length and complexity when a LISP site contains multiple xTRs, configure the **auto-discover-rlocs** form of the **database-mapping** command (even when static addresses are used for local locators).

**Examples**

The following example shows how to enter LISP EID table configuration mode and configure the **database-mapping** command with the dynamic-EID prefix 172.16.91.0/24:

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# database-mapping 172.16.91.0/24
```

The following example shows how to configure LISP database-mapping entries for a single IPv4 EID-prefix block with two IPv4 locators. It also shows how to configure 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.

```
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# database-mapping 172.16.91.0/24 10.1.1.1 priority 1 weight 50
Device(config-router-lisp-eid-table)# database-mapping 172.16.91.0/24 10.2.1.1 priority 1 weight 50
Device(config-router-lisp-eid-table)# database-mapping 2001:DB8:BB::/48 10.1.1.1 priority 1 weight 50
Device(config-router-lisp-eid-table)# database-mapping 2001:DB8:BB::/48 10.2.1.1 priority 1 weight 50
```

The following example shows how to configure LISP database-mapping entries for a single IPv4 EID-prefix block with the IPv4 addresses from Gigabit Ethernet interface 0/0/0 referenced as the RLOC:

```
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# database-mapping 172.16.91.0/24 ipv4-interface GigabitEthernet0/0/0 priority 1 weight 100
```

The following example shows how to configure 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 Gigabit Ethernet interface 0/0/0 referenced as the RLOC. In this case, because both xTRs use dynamically determined locator addresses, the **auto-discover-rlocs** form of the 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.

**Configuration on xTR-1**

```
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# database-mapping 2001:db8:a::/48 ipv4-interface GigabitEthernet0/0/0 priority 1 weight 50
Device(config-router-lisp-eid-table)# database-mapping 2001:db8:a::/48 auto-discover-rlocs
```

**Configuration on xTR-2**

```

Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# database-mapping 2001:db8:a::/48 ipv4-interface
GigabitEthernet0/0/0 priority 1 weight 50
Device(config-router-lisp-eid-table)# database-mapping 2001:db8:a::/48 auto-discover-rlocs

```

**Verification on xTR-2**

```

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

```

```

Device# 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
<b>database-mapping</b> (LISP dynamic-EID)	Configures an IPv4 mapping relationship and an associated traffic policy for LISP VM (dynamic-EID) policy.
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.
<b>ipv4 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to be used by the ETR when registering for IPv4 EIDs.
<b>ipv6 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to be used by the ETR when registering for IPv6 EIDs.
<b>locator-down</b>	Configures a locator from a locator set associated with an IPv4 or IPv6 EID-prefix database-mapping to be unreachable (down).
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy or statically configures the packet handling behavior associated with a specified destination IPv4 or IPv6 EID prefix.
<b>other-xtr-probe</b>	Configures the interval, in seconds, that an xTR probes site-local RLOCs.

## eid-notify authentication-key

To specify an authentication key to validate the endpoint identifier (EID)-notify messages received from a device, use the **eid-notify authentication-key** command in Locator/ID Separation Protocol (LISP) EID-table dynamic-EID configuration mode. To remove the specified authentication key, use the **no** form of the command.

**eid-notify authentication-key** {**0** *unencrypted-password* | **6** *encrypted-password* | *password*}

**no** eid-notify authentication-key

### Syntax Description

<b>authentication-key</b>	Specifies the authentication key used to validate EID-notify messages received from a device.
<b>0</b> <i>unencrypted-password</i>	Specifies that the password is in unencrypted form.
<b>6</b> <i>encrypted-password</i>	Specifies that the password is in encrypted form.
<i>password</i>	Specifies that the password is unencrypted and in a cleartext format.

### Command Default

No authentication key is specified to validate the EID-notify messages received from a device.

### Command Modes

LISP EID-table dynamic-EID (config-router-lisp-eid-table-dynamic-eid)

### Command History

Release	Modification
15.4(1)T	This command was introduced.
Cisco IOS XE Release 3.11S	This command was integrated into Cisco IOS XE Release 3.11S.

### Usage Guidelines

Use the **eid-notify authentication-key** command to specify an authentication key that the site gateway uses to authenticate endpoint identifier (EID)-notify messages that are received from a device. This command is configured on a site gateway device. A device that functions both as an ingress tunnel router (ITR) and egress tunnel router (ETR) is known as an xTR .

After the site gateway xTR authenticates an EID-notify message for a particular host discovery and if a different LISP device registers the same host later, as in the case of a virtual machine (VM) move, the site gateway xTR sends a unicast map-notify control plane message to the original first-hop router (FHR) to signal the change in host location.

### Examples

The following example shows how to specify an unencrypted authentication key k:

```
Device> enable
```

```

Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# dynamic-eid VMs
Device(config-router-lisp-eid-table-dynamic-eid)# eid-notify authentication-key 0 k

```

**Related Commands**

Command	Description
<b>dynamic-eid</b>	Configures a LISP VM-mobility (dynamic-EID roaming) policy.
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a device.



## eid-notify key

To enable sending of dynamic endpoint identifier (EID) presence notifications to a gateway xTR with the specified IPv4/IPv6 address along with the authentication key used with the gateway xTR, use the **eid-notify key** command in Locator/ID Separation Protocol (LISP) EID-table dynamic-EID configuration mode. To disable the configured options, use the **no** form of the command.

**eid-notify** {*ipv4-address* | *ipv6-address*} **key** {**0** *unencrypted-password* | **6** *encrypted-password* | *password*} [**hash-function** {**sha1** | **sha2**}]

**no eid-notify** [{*ipv4-address* | *ipv6-address*} [**key**]]

### Syntax Description

<i>ipv4-address</i>	Specifies the IPv4 address of gateway xTR.
<i>ipv6-address</i>	Specifies the IPv6 address of gateway xTR.
<b>key</b>	Specifies the authentication-key used with gateway xTR.
<b>0</b> <i>unencrypted-password</i>	Specifies that the password is in unencrypted form.
<b>6</b> <i>encrypted-password</i>	Specifies that the password is in encrypted form.
<i>password</i>	Specifies that the password is unencrypted and in a cleartext format.
<b>hash-function</b>	Specifies the authentication type for the EID-notify message.
<b>sha1</b>	Specifies the usage of SHA-1-96 hash function.
<b>sha2</b>	Specifies the usage of SHA-256-128 hash function.

### Command Default

No dynamic EID presence notifications are sent to the gateway xTR.

### Command Modes

LISP EID-table dynamic-EID (config-router-lisp-eid-table-dynamic-eid)

**Command History**

Release	Modification
15.4(1)T	This command was introduced.
Cisco IOS XE Release 3.11S	This command was integrated into Cisco IOS XE Release 3.11S.

**Usage Guidelines**

Use the **eid-notify key** command to configure a site gateway xTR on a first-hop router (FHR). This ensures that an EID-notify message is sent to the site-gateway xTR upon the discovery of a host. A device that functions both as an ingress tunnel router (ITR) and an egress tunnel router (ETR) is known as an xTR. The key is specific to a site gateway xTR.

The EID-notify message is a special map-notify control plane message that uses the ipv4-address or ipv6-address as the destination IP address that is specified using the **eid-notify key** command and any of the specified locator-set entries as the source IP address that is configured using the **database-mapping dynamic-eid-prefix/prefix-length locator-set name** command in LISP EID table dynamic EID configuration mode.

**Examples**

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# dynamic-eid VMs
Device(config-router-lisp-eid-table-dynamic-eid)# eid-notify 192.0.2.21 key 0 k
Device(config-router-lisp-eid-table-dynamic-eid)# eid-notify 2001:DB8::1 key 0 k
```

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and an associated traffic policy for LISP.
<b>dynamic-eid</b>	Configures a LISP VM-mobility (dynamic-EID roaming) policy.
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.

# eid-table

To configure a Locator ID Separation Protocol (LISP) instance ID for association with a virtual routing and forwarding (VRF) table or default table through which the endpoint identifier (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.

**eid-table** {**default** | **vrf** *vrf-name*} **instance-id** *iid*

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

## Syntax Description

<b>default</b>	Selects the default (global) routing table for association with the configured instance ID.
<b>vrf</b> <i>vrf-name</i>	Selects the specified VRF table for association with the configured instance ID.
<b>instance-id</b> <i>iid</i>	Specifies the instance ID to be associated with this EID table (value between 0 and 16777215).

## Command Default

A router configured for LISP associates the default table with instance ID 0.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB3	The command <b>eid-table</b> was introduced to support LISP virtualization.
2.5.1XC	The command <b>eid-table</b> was introduced to support LISP virtualization.
15.1(4)XB4	The syntax of this command was modified.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.

## Usage Guidelines

The **eid-table** command is used to associate a LISP instance ID with either the default routing table, or a 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 multitenancy. 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 a customer traffic virtual private network (VPN) 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 segments 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 of the **eid-table** command is used, the **default** keyword can be used only with the **instance-id 0** keywords when other instance IDs 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 LISP site configuration 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 (for example, **database-mapping**, **map-cache**, **ipv4 map-resolver**, and **ipv4 map-server**) are available for entry and are applied directly in LISP router configuration mode and without considering virtualization. You will notice in the output of the **show ip lisp** command 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 (for example, **ipv4 map-resolver** and **ipv4 map-server** commands) 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 be created using the **vrf definition** command and at least one address family must be enabled within that VRF.

**Examples**

In the example below, an xTR is configured to segment traffic using two VRFs named **green** and **blue**. In addition, the loopback interface is configured for management purposes using the default table. Thus the

management loopback is carried in the default table in instance ID 0, the EID prefix associated with the VRF named green is connected to instance ID 123, and the EID prefixes associated with the VRF named 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, the map resolver/map server (MR/MS) site functionality is configured to match the example above.

```
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
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and an associated traffic policy for LISP.
<b>eid-prefix</b>	Configures a list of EID prefixes that are allowed in a Map Register message sent by an ETR when registering to the map server.
<b>ipv4 map-resolver</b>	Configures a router to act as an IPv4 LISP map resolver.
<b>ipv4 map-server</b>	Configures a router to act as an IPv4 LISP map server.

Command	Description
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy or statically configures the packet handling behavior associated with a specified destination IPv4 or IPv6 EID prefix.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.
<b>show ip lisp</b>	Displays the IPv4 LISP configuration status.
<b>vrf definition</b>	Configures a VRF routing table instance and enters VRF configuration mode.

# locator-down

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

**locator-down** *EID-prefix/prefix-length* *locator*

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

## Syntax Description

<i>EID-prefix/prefix-length</i>	The IPv4 or IPv6 EID prefix and length advertised by this router. The slash is required in the syntax.
<i>locator</i>	The IPv4 or IPv6 locator associated with the value specified for the <i>EID-prefix/prefix-length</i> argument.

## Command Default

An IPv4 or IPv6 locator associated with a configured IPv4 or IPv6 EID-prefix block is considered reachable (up) unless an Interior Gateway Protocol (IGP) routing protocol indicates it is down.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.

## Usage Guidelines

When LISP database parameters are configured on an Ingress Tunnel Router (ITR) for specified IPv4 or IPv6 EID-prefix blocks using the **database-mapping** command or **map-cache** command, the locators associated with these IPv4 or IPv6 EID-prefix blocks are considered as reachable (up) by default. The **locator-down** command can be used to configure a locator from a 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 packets are encapsulated and sent to remote sites. ETRs at remote sites look for changes in the LSBs when decapsulating LISP packets when the LSBs indicate that a specific locator is down, the egress tunnel router (ETR) will not encapsulate packets using this locator to reach the local site.

**Note**

If this command is configured on an ITR to indicate that a 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.

**Examples**

The following example shows how to configure the locator 10.1.1.1 to a down state for the IPv4 EID-prefix block 172.16.1.0/24.

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

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

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID prefix to a locator map-cache entry.



# locator-scope

To specify a locator scope and enter Locator/ID Separation Protocol (LISP) locator scope configuration mode, use the **locator-scope** command in LISP configuration mode. To remove the specified locator scope, use the **no** form of the command.

**locator-scope** *locator-scope-name*

**no locator-scope** *locator-scope-name*

## Syntax Description

*locator-scope-name*

Specifies the name of the locator-scope.

## Command Default

No locator-scope is specified.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.4(1)T	This command was introduced.
Cisco IOS XE Release 3.11S	This command was integrated into Cisco IOS XE Release 3.11S.

## Usage Guidelines

Use the **locator-scope** command to specify the locator scope name and to define the disjointed routing locator (RLOC) scopes. The map server will consider disjointed RLOCs in its map-request message only if the locator scopes are configured.

## Examples

The following example shows how to configure a locator scope:

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# locator-scope s2
```

## Related Commands

Command	Description
<b>rloc-prefix</b>	Specifies an RLOC prefix to check against the ITR RLOC and the ETR RLOC.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.

Command	Description
rtr-locator-set	Specifies a locator-set of RTR RLOCs.

# locator-table

To associate a virtual routing and forwarding (VRF) table through which the routing locator address space is reachable to a router Locator ID Separation Protocol (LISP) instantiation, use the **locator-table** command in LISP configuration mode. To remove this association, use the **no** form of this command.

**locator-table** {**default**| **vrf** *vrf-name*}

**no locator-table**

## Syntax Description

<b>default</b>	Selects the default (global) routing table for association with the routing locator address space.
<b>vrf</b> <i>vrf-name</i>	Selects the routing table for the specified VRF name for association with the routing locator address space.

## Command Default

A router LISP instantiation is associated with the default (global) routing table.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(4)XB6	This command was introduced.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
XE 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.

## Usage Guidelines

When a LISP device is deployed in a multitenant (virtualized) network environment with segmented routing locator (RLOC) address space, separate router LISP instantiations are required for each locator address space. Separate instantiations are created by including the optional *id* entry with the **router lisp** command. Each router LISP instantiation is considered to be standalone and must be associated with an RLOC address space. The **locator-table** command is used to associate a VRF table through which the routing locator address space is reachable to a router LISP instantiation. All necessary LISP components used in the operation of that particular router LISP instantiation, (for example, map server, map resolver, proxy ingress tunnel router (PITR), proxy egress tunnel router (PETR), and other routers that function as both egress and ingress tunnel routers, also known as xTRs) must be reachable via the routing locator address space referred to by the **locator-table** command.

**Note**

Most multitenant deployments will not require separate locator forwarding tables. As with most current virtualization schemes, LISP endpoint ID (EID) virtualization (configured using the **eid-table instance-id** keywords) does not require locators and map-resolver/map-server (MR/MS) devices to exist in a VRF.

The following guidelines may be helpful in understanding the use of the **locator-table** command when RLOC address space virtualization is configured.

Router LISP instantiations are configured:

- When a router LISP instantiation is created without using the optional ID entry or when using the optional ID entry with a value of 0 (that is, **router lisp 0**), and no locator table is specified using the **locator-table** command. That particular router LISP instantiation then automatically uses the default (global) routing table as its RLOC or locator table. All locators, map resolvers, map servers, PETRs, PITRs, and other LISP devices must be reachable via the default routing table.
- When a router LISP instantiation is created using an optional ID entry other than 0, a locator table must be specified using the **locator-table** command. That particular router LISP instantiation then uses the routing table (default or VRF) referenced by the **locator-table** command and all locators, map resolvers, map servers, PETRs, PITRs, and other LISP devices must be reachable via a specified routing table.
- Only a single **locator-table** command can be configured per router LISP instantiation. Within each router LISP instantiation, multiple EID table instances may be configured, as necessary, to associate all EID address space with that routing locator addresses space.
- When a router LISP instantiation is created, it can only use a routing locator address space that has not already previously been assigned to another router LISP instantiation. That is, the default (global) routing table or any single VRF table referenced by a **locator-table** command can only be assigned within a single router LISP instantiation. Likewise, endpoint identifier (EID) address space referenced by the **eid-table** command can only be associated with a single router LISP instantiation.

**Note**

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

**Examples**

The following example shows a LISP device deployed as a MR/MS to support multiple customers configured in a virtualized network. In this case, the MR/MS can be configured using the **router lisp** command (in conjunction with the **locator-table** command) to segment and associate the MR/MS with multiple customer VRFs to support LISP site entries and Map Registration and Map Request (control plane) messages received within specific routing locator address space. In the example below, the VRF named Cust1-loc defines the routing locator space VRF to be used by one router LISP instantiation deployed in this scenario.

```
Router(config)# vrf definition Cust1-loc
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit
Router(config-vrf)# exit
Router(config)# router lisp 1
Router(config-router-lisp)# locator-table vrf Cust1-loc
Router(config-router-lisp)#
---<more>---
```

The following example shows a LISP device deployed as an xTR in a multitenant environment where multiple customers share the resources of a single LISP xTR. In this case, both the EID address space and the routing locator address space are segmented. The xTR can be configured with multiple router LISP instantiations that bind each customers EID address space and the routing locator address space. In the example below, the VRF named Cust1-loc defines the routing locator space VRF, and the VRF named Cust1-eid defines the EID address space VRF (tied to instance ID 123) to be used by one router LISP instantiation deployed in this scenario.

```
Router(config)# vrf definition Cust1-loc
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit
Router(config-vrf)# exit
Router(config)# vrf definition Cust1-eid
Router(config-vrf)# address-family ipv4
Router(config-vrf-af)# exit
Router(config-vrf)# exit
Router(config)# router lisp 1
Router(config-router-lisp)# locator-table vrf Cust1-loc
Router(config-router-lisp)# eid-table vrf Cust1-eid instance-id 123
Router(config-router-lisp-eid-table)#
---<more>---
```

## Related Commands

Command	Description
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.

# loc-reach-algorithm

To configure a Locator/ID Separation Protocol (LISP) locator reachability algorithm, use the **loc-reach-algorithm** command in LISP configuration mode. To disable this functionality, use the **no** form of this command.

**loc-reach-algorithm rloc-probing**

**no loc-reach-algorithm rloc-probing**

## Syntax Description

<b>rloc-probing</b>	Enables the RLOC-probing locator reachability algorithm.
---------------------	--

## Command Default

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

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Use the **loc-reach-algorithm** command to enable LISP locator reachability algorithms. 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 disable RLOC probing, use the **no** form of this 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 and map-reply messages between an Ingress Tunnel Router (ITR) and Egress Tunnel Router (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 provides a robust mechanism for switching to using another locator from the cached locator.

### Examples

The following example shows how to configure the locator reachability algorithm RLOC probing functionality on the router.

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

### Related Commands

Command	Description
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.

## map-cache

To configure a static IPv4 or IPv6 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship and its associated traffic policy, or to statically configure the packet handling behavior associated with a specified destination IPv4 or IPv6 EID prefix, use the **map-cache** command in Locator/ID Separation Protocol (LISP) configuration mode. To remove the configuration, use the **no** form of this command.

**map-cache** *destination-EID-prefix/prefix-length locator priority priority weight percentage*

**map-cache** *destination-EID-prefix/prefix-length {drop| map-request| native-forward}*

**no map-cache** *destination-EID-prefix/prefix-length*

### Syntax Description

<i>destination-EID-prefix/prefix-length</i>	Destination IPv4 or IPv6 EID-prefix/prefix-length. The slash is required in the syntax.
<i>locator</i>	The IPv4 or IPv6 RLOC associated with the value specified for the <i>EID-prefix/prefix-length</i> argument.
<b>priority</b> <i>priority</i>	The priority (value from 0 to 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.
<b>weight</b> <i>percentage</i>	The weight (value from 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.
<b>drop</b>	(Optional) Drop packets that match this map-cache entry
<b>map-request</b>	(Optional) Send a map request for packets that match this map-cache entry
<b>native-forward</b>	(Optional) Natively forward packets that match this map-cache entry

### Command Default

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

### Command Modes

LISP configuration (config-router-lisp)



**Command History**

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 2.5.1XA. This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.
15.1(4)M	This command was integrated into Cisco IOS XE Release 2.5.1XA. This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> , <b>ipv6</b> , and <b>lisp</b> keywords were removed from the command syntax.

**Usage Guidelines**

The first use of this command is to configure an Ingress Tunnel Router (ITR) with a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy. For each entry, a destination EID-prefix block and its associated locator, priority, and weight are entered. The value in the EID-prefix/prefix-length argument 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 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 and 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.
- **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.
- **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.

## Examples

The following example shows how to configure 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 IPv4 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
Router(config)# map-cache 172.16.1.0/24 10.1.1.1 priority 1 weight 100
```

The following example shows how to configure 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 IPv6 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
Router(config)# map-cache 2001:DB8:BB::/48 2001:DB8:0A::1 priority 1 weight 100
```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv4 map-cache-limit</b>	Configures the maximum number of IPv4 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 routing locators (RLOCs), use the **other-xtr-probe** command in Locator/ID Separation Protocol (LISP) configuration mode. To return to the default setting, use the **no** form of this command.

**other-xtr-probe period** *seconds*

**default other-xtr-probe period**

**no other-xtr-probe period**

### Syntax Description

<b>period</b> <i>seconds</i>	Configures the site-local RLOC probing period, in seconds. The range is 5 to 900.
------------------------------	---

### Command Default

Probing of site-local RLOCs is enabled by default and cannot be disabled. The default interval is 30 seconds.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB3	This command was introduced.
Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> and <b>lisp</b> keywords were removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> and <b>lisp</b> keywords were removed from the command syntax.

### 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 using 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** command 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** command outputs). 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 **other-xtr-probe** command 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 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.

**Examples**

The following example shows how to configure the **other-xtr-probe** command interval to 20 seconds.

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

# rloc-prefix

To specify a routing locator (RLOC) prefix to check against the ingress tunnel router (ITR) RLOC and the egress tunnel router (ETR) RLOC, use the **rloc-prefix** command in Locator/ID Separation Protocol (LISP) locator scope configuration mode. To remove the RLOC prefix, use the **no** form of the command.

**rloc-prefix** {*ipv4-rloc-prefix* | *ipv6-rloc-prefix*}

**no rloc-prefix** {*ipv4-rloc-prefix* | *ipv6-rloc-prefix*}

## Syntax Description

<i>ipv4-rloc-prefix</i>	Specifies the IPv4 RLOC prefix that belongs to a locator scope.
<i>ipv6-rloc-prefix</i>	Specifies the IPv6 RLOC prefix that belongs to a locator scope.

## Command Default

No RLOC prefixes are defined.

## Command Modes

LISP locator scope (config-router-lisp-locator-scope)

## Command History

Release	Modification
15.4(1)T	This command was introduced.
Cisco IOS XE Release 3.11S	This command was integrated into Cisco IOS XE Release 3.11S.

## Usage Guidelines

Use the **rloc-prefix** command to specify a RLOC prefix to define locator scopes on a LISP map server. The map server uses these defined locator scopes to determine how to process the LISP map-request message that it receives.

In a LISP environment, it is possible for some LISP sites to have RLOC connectivity in one locator-scope, such as IPv4 Internet, and other LISP sites to have RLOC connectivity in a different locator-scope, such as IPv6 Internet. The deployment of a LISP device called a Re-encapsulating tunnel router (RTR) solves this disjointed RLOC scope connectivity problem by defining locator-scopes covering the disjointed RLOC scopes on the map server. When locator scopes are defined on a map server and the map server receives a LISP map request message, it compares the locator scope associated with the ingress tunnel router (ITR) RLOC that the map request contains against the locator scope associated with the egress tunnel router (ETR) RLOC reported in the map server site registration for the EID prefix referred to in the Map-Request message. Based on this comparison, the following results can occur:

- If the ITR and ETR share at least one RLOC of the same address-family in the same locator scope, the map server forwards the map-request message to the ETR as it normally would.
- If the ITR and ETR do not share RLOCs of the same address-family in the same locator-scope, the map server sends a proxy map-reply message containing an RTR RLOC list to the ITR. The RTR RLOC list

is extracted from the RTR locator set configured in the locator scope matching the ITR RLOC. If no RTR RLOC set is defined within the locator scope matching the ITR RLOC, the map server returns a negative map-reply as normal.

- If the ITR and ETR RLOCs match no locator scopes, the map server forwards the map-request message to the ETR as it normally would. This default action makes the assumption that the RLOCs are reachable via routing even though they are not defined in any locator scope configuration.

## Examples

The following example shows how to specify locator sets containing the RLOCs of an RTR that are associated with particular locator scopes. In this example, two locator sets are created, one to define the RTR RLOC associated with the IPv4 locator scope, and a second to define the RTR RLOC associated with the IPv6 locator scope:

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# locator-set rtr-set1
Device(config-router-lisp-locator-set)# 10.0.3.1 priority 1 weight 1
Device(config-router-lisp-locator-set)# exit
Device(config-router-lisp)# locator-set rtr-set2
Device(config-router-lisp-locator-set)# 2001:db8:3::1 priority 1 weight 1
Device(config-router-lisp-locator-set)# exit
Device(config-router-lisp)# locator-scope ipv4-Internet
Device(config-router-lisp-locator-scope)# rloc-prefix 0.0.0.0/0
Device(config-router-lisp-locator-scope)# rtr-locator-set rtr-set1
Device(config-router-lisp-locator-scope)# exit
Device(config-router-lisp)# locator-scope ipv6-Internet
Device(config-router-lisp-locator-scope)# rloc-prefix ::/0
Device(config-router-lisp-locator-scope)# rtr-locator-set rtr-set2
Device(config-router-lisp-locator-scope)# exit
```

## Related Commands

Command	Description
<b>locator-scope</b>	Specifies a locator-scope and enters LISP locator-scope configuration mode.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a device.
<b>rtr-locator-set</b>	Specifies a locator-set of RTR RLOCs.

## rtr-locator-set

To specify a locator set of the re-encapsulating tunnel router (RTR) routing locators (RLOCs), use the **rtr-locator-set** command in Locator/ID Separation Protocol (LISP) locator scope configuration mode. To remove the specified locator set, use the **no** form of the command.

**rtr-locator-set** *locator-set-name*

**no rtr-locator-set**

### Syntax Description

<i>locator-set-name</i>	Specifies the locator-set of the RTR.
-------------------------	---------------------------------------

### Command Default

No RTR locator sets are defined.

### Command Modes

LISP locator scope (config-router-lisp-locator-scope)

### Command History

Release	Modification
15.4(1)T	This command was introduced.
Cisco IOS XE Release 3.11S	This command was integrated into Cisco IOS XE Release 3.11S.

### Usage Guidelines

Use the **rtr-locator-set** command on a LISP map server to specify a locator set that includes the RLOCs of an RTR that are associated with a particular locator scope.

In a LISP environment, it is possible for some LISP sites to have RLOC connectivity in one locator-scope, such as IPv4 Internet, and other LISP sites to have RLOC connectivity in a different locator-scope, such as IPv6 Internet. The deployment of a LISP device called as the RTR solves the disjointed RLOC scope connectivity problem by defining locator scopes covering the disjointed RLOC scopes on the map server. When locator scopes are defined on a map server and the map server receives a LISP map-request message, it compares the locator scope associated with the ingress tunnel router (ITR) RLOC that the map-request message contains against the locator scope associated with the egress tunnel router (ETR) RLOC reported in the map server site registration for the EID prefix referred to in the map-request message. Based on this comparison, the following results can occur:

- If the ITR and ETR share at least one RLOC of the same address-family in the same locator scope, the map server forwards the map-request message to the ETR as it normally would.
- If the ITR and ETR do not share RLOCs of the same address family in the same locator scope, the map server sends a proxy map-reply message containing an RTR RLOC list to the ITR. The RTR RLOC list is extracted from the RTR locator set configured in the locator scope matching the ITR RLOC. If no RTR RLOC set is defined within the locator scope matching the ITR RLOC, the map server returns a negative map-reply as normal.

- If the ITR and ETR RLOCs match no locator scopes, the map server forwards the map-request message to the ETR as it normally would. This default action makes the assumption that the RLOCs are reachable via routing even though they are not defined in any locator scope configuration.

You must define a locator set before referring to it by using the **locator-set** command.

## Examples

The following example shows how to specify a locator set of an RTR to use in the proxy reply for disjoint/cross address family RLOC:

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# locator-set rtr-set1
Device(config-router-lisp-locator-set)# 10.0.3.1 priority 1 weight 1
Device(config-router-lisp-locator-set)# exit
Device(config-router-lisp)# locator-set rtr-set2
Device(config-router-lisp-locator-set)# 2001:db8:3::1 priority 1 weight 1
Device(config-router-lisp-locator-set)# exit
Device(config-router-lisp)# locator-scope ipv4-Internet
Device(config-router-lisp-locator-scope)# rloc-prefix 0.0.0.0/0
Device(config-router-lisp-locator-scope)# rtr-locator-set rtr-set1
Device(config-router-lisp-locator-scope)# exit
Device(config-router-lisp)# locator-scope IPv6-Internet
Device(config-router-lisp-locator-scope)# rloc-prefix ::/0
Device(config-router-lisp-locator-scope)# rtr-locator-set rtr-set2
Device(config-router-lisp-locator-scope)# exit
```

## Related Commands

Command	Description
<b>locator-scope</b>	Specifies a locator-scope and enters LISP locator-scope configuration mode.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a device.



## xtr instance-id

To configure an instance-id to be associated with EID-prefixes for a LISP xTR, use the **xtr instance-id** command in LISP configuration mode. To disable this functionality, use the **no** form of this command.

**xtr instance-id** *iid*

**no xtr instance-id** *iid*

### Syntax Description

<i>iid</i>	Configures the instance-id for this xTR (value between 1 and 16777215).
------------	---

### Command Default

By default, an xTR is not configured to use an instance-id.

### Command Modes

LISP configuration

### Command History

Release	Modification
15.1(1)XB3	This command was introduced.
2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
15.1(4)M	This command was modified. The command name was changed from <b>ip lisp xtr instance-id</b> to <b>xtr instance-id</b> .
3.3.0S	This command was modified. The command name was changed from <b>ip lisp xtr instance-id</b> to <b>xtr instance-id</b> .

### Usage Guidelines

Virtualization support is currently is available in LISP xTRs and MS/MRs. The instance-id has been added to LISP to support virtualization.

Use the **xtr instance-id** command to configure the instance-id associated with this xTR. Only one instance-id can be configured on an xTR. When an instance-id is configured, this instance-id will be included with the EID-prefixes when they are registered with the Map-Server. The Map-Server must also include the same instance-id within the EID-prefix configurations for this LISP site. Instance-id's are configured on the Map-Server using the **eid-prefix** command in LISP Site configuration mode.



#### Note

Virtualization support is not currently available for the LISP ALT, which means that it is also not supported on LISP PITRs. To configure an xTR that is configured with an instance-id to communicate with non-LISP sites, you must use NAT techniques instead of a Pitr for this functionality.

## Examples

The following example configures an instance-ID of 123 on this xTR.

```
Router(config-router-lisp)# xtr instance-id 123  
Router(config-router-lisp)#
```

## Related Commands

Command	Description
<b>eid-prefix (LISP site)</b>	Configures the EID-prefix associated with a LISP site on a Map-Server as part of the LISP Site configuration process.



## LISP Router IPv4 Configuration Commands

---

- [ipv4 alt-vrf, page 172](#)
- [ipv4 etr, page 175](#)
- [ipv4 etr accept-map-request-mapping, page 177](#)
- [ipv4 etr map-cache-ttl, page 179](#)
- [ipv4 etr map-server, page 181](#)
- [ipv4 itr, page 184](#)
- [ipv4 itr map-resolver, page 186](#)
- [ipv4 map-cache-limit, page 188](#)
- [ipv4 map-cache-persistent, page 191](#)
- [ipv4 map-request-source, page 193](#)
- [ipv4 map-resolver, page 195](#)
- [ipv4 map-server, page 197](#)
- [ipv4 path-mtu-discovery, page 199](#)
- [ipv4 proxy-etr, page 201](#)
- [ipv4 proxy-itr, page 203](#)
- [ipv4 route-import map-cache, page 206](#)
- [ipv4 route-import maximum-prefix, page 209](#)
- [ipv4 solicit-map-request ignore, page 211](#)
- [ipv4 use-petr, page 213](#)

# ipv4 alt-vrf

To configure which virtual routing and forwarding (VRF) instance supporting the IPv4 address-family that Locator/ID Separation Protocol (LISP) should use when sending map requests for an IPv4 endpoint identifier-to-routing locator ( EID-to-RLOC) mapping directly over the alternative logical topology (ALT), use the **ipv4 alt-vrf** command in LISP configuration mode. To remove this reference to a VRF, use the **no** form of this command.

```

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

## Syntax Description

<i>vrf-name</i>	Name assigned to the ALT VRF.
-----------------	-------------------------------

## Command Default

By default, no ALT VRF is referenced by LISP.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

The **ipv4 alt-vrf** command is required for all LISP devices that are connected to the ALT for exchange of LISP control plane messages for IPv4 EID mapping resolution. The VRF instance specified using the **ipv4 alt-vrf** command is used to segment EID prefixes from the global table and must be configured to enable the IPv4 address family (use the **ipv6 alt-vrf** command to enable the IPv6 address family).

Additionally, you must use the **ipv4 alt-vrf** command (or **ipv6 alt-vrf** command for IPv6 EID mapping resolution) when configuring any LISP device as a map resolver (MR), map server (MS), or proxy ingress

tunnel router (PITR). For these LISP devices, configuring the **ipv4 alt-vrf** or **ipv6 alt-vrf** command is required regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone MR, MS, PITR, or any combination of the three (such as when a LISP MS/MR device has full knowledge of the LISP mapping system for a private LISP deployment and is not connected to any ALT).

When configuring a device as a LISP ingress tunnel router (ITR) to resolve IPv4 EID-to-RLOC mappings for destination EIDs, you can configure the device to use one of the following two options:

- Send map requests to a map resolver—the ITR sends map requests in a LISP encapsulated control message (ECM) header with either an IPv4 or IPv6 map-resolver RLOC as its destination address (depending on the configuration). For this option, use the **ipv4 itrmap-resolver** command instead of the **ipv4 alt-vrf** command.
- Send map requests directly over the LISP ALT using the VRF instance specified when configuring this command—the ITR sends map requests directly over the ALT (without the additional LISP ECM header). The destination of the map request is the EID being queried. For this option, use the **ipv4 alt-vrf** command.

When using the ALT, you must configure the correct address family (IPv4 or IPv6) for resolving EID-to-RLOC mappings. If an IPv4 EID mapping is required, configure the **ipv4 alt-vrf** command and specify a VRF that enables the IPv4 address-family and connects to an IPv4-capable ALT.



#### Note

Before this command is used, the referenced VRF must already have been created using the **vrf definition** command. In addition, the corresponding configurations for connecting the LISP device to the ALT, including the GRE tunnel interfaces and any routing associated with the VRF (static or dynamic) must also have been created.

### Examples

The following example shows how to configure the VRF named lisp and how to configure LISP to use this VRF when resolving IPv4 EID-to-RLOC mappings:

```
Router (config)# router lisp
Router(config-router-lisp)# vrf definition lisp
Router(config-vrf)# rd 65100:100
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
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv4 itr map-resolver</b>	Configures the IPv4 locator address of the LISP map resolver to which the ITR sends IPv4 map request messages.
<b>ipv4 proxy-itr</b>	Configures the router to act as an IPv4 LISP PITR.

Command	Description
<b>ipv6 alt-vrf</b>	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 etr

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

**ipv4 etr**

**no ipv4 etr**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide ETR functionality.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(1)XB	This command was introduced.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines** Use this command to enable IPv4 LISP ETR functionality on the router. A router configured as an IPv4 ETR is also typically configured with **database-mapping** commands so that the ETR knows what endpoint identifier (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-routing locator (EID-to-RLOC) mappings with the **map-cache** command to participate in LISP networking.

**Note**

A device configured as an ETR should also be configured as an Ingress Tunnel Router (ITR). However, the LISP architecture does not require this and ETR and ITR functionality can occur in different devices.

**Examples**

The following example shows how to configure IPv4 LISP ETR functionality on the router:

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 etrmap-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv4 EID prefixes.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID prefix to locator map-cache entry.



## ipv4 etr accept-map-request-mapping

To configure an Egress Tunnel Router (ETR) to cache IPv4 mapping data contained in a map-request message, use the **ipv4 etr accept-map-request-mapping** command in Locator/ID Separation Protocol (LISP) configuration mode. To remove this functionality, use the **no** form of this command.

**ipv4 etr accept-map-request-mapping [verify]**

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

### Syntax Description

<b>verify</b>	(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.
---------------	--

### Command Default

The router does not cache mapping data contained in a map request message.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

When an ETR receives a map request message, the message may contain mapping data for the invoking IPv4 source-EID's packet. By default, the ETR ignores mapping data included in map-request messages. However, if you configure the **ipv4 etr accept-map-request-mapping** command, the ETR caches the mapping data in its map cache and immediately uses it for forwarding packets.

If you configure the optional **verify** keyword, the ETR caches the mapping data but does 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).

If this command is enabled and then later disabled, issuing the command **clear ip lisp map-cache** is required to clear any map-cache entries 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 shows how to configure the ETR to cache IPv4 mapping data included in map-request messages and verify the accuracy of the data before forwarding packets:

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

### Related Commands

Command	Description
<b>clear ip lisp map-cache</b>	Clears the LISP IPv4 or IPv6 map cache on the local router.
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.

## ipv4 etr map-cache-ttl

To configure the time-to-live (TTL) value inserted into Locator/ID Separation Protocol (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.

**ipv4 etr map-cache-ttl** *minutes*

**no ipv4 etr map-cache-ttl** [*minutes*]

### Syntax Description

<i>minutes</i>	A value, in minutes, to be inserted in the TTL field in map-reply messages. Valid entries are between 60 (1 hour) and 10080 (1 week).
----------------	---

### Command Default

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

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

Use this command to change the default value associated with the TTL field in IPv4 map-reply messages. You can use this command to change the default TTL that remote ITRs will cache and use for your site's IPv4 EID prefix. The default value is 1440 minutes (24 hours), and the minimum value is 60 minutes.

Examples

The following example shows how to configure the Egress Tunnel Router (ETR) to use a TTL of 120 minutes in IPv4 map-reply messages:

```
Router(config)# router lisp
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 ETR.

## ipv4 etr map-server

To configure the IPv4 or IPv6 locator address of the Locator/ID Separation Protocol (LISP) map server to be used by the Egress Tunnel Router (ETR) when registering for IPv4 endpoint identifiers (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.

**ipv4 etr map-server** *map-server-address* **key** {0| 6} *authentication-key*

**no ipv4 etr map-server** *map-server-address* **key** [ {0| 6} *authentication-key* ]

### Syntax Description

<i>map-server-address</i>	The IPv4 or IPv6 locator addresses of the map server.
<b>key</b>	Specifies the key type.
<b>0</b>	Indicates that the password is entered as cleartext.
<b>6</b>	Indicates that the password is in the AES encrypted form.
<i>authentication-key</i>	The password used for computing the SHA-1 HMAC hash that is included in the header of the map-register message.

### Command Default

No LISP map server locator addresses are configured by default.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

**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 EIDs. The *authentication key* argument in the command syntax is a password that is used for a SHA-1 HMAC hash (included in the header of the map-register message).

You can configure the ETR to register with up to two map servers. After the ETR registers with the map servers, the map servers begin to advertise the EID-prefix blocks and RLOCs 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 0. To enter an AES encrypted password, specify 6.

**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 feature, use the **key config-key password-encryption** and **password encryption aes** commands. 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](http://www.cisco.com/en/US/tech/tk583/tk372/technologies_configuration_example09186a00801f2336.shtml).

**Caution**

If you enable the Encrypted Preshared Key feature and then remove it, all type 6 encrypted keys immediately become unusable because the master key is deleted—type 6 passwords cannot be unencrypted and used by the router. A warning message displays that details this and confirms the master key deletion.

**Note**

The map server must be preconfigured with IPv4 EID prefixes that match the IPv4 EID-prefixes configured on this ETR using the **database-mapping** command, and a password matching the one provided with the **key** keyword on this ETR.

**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
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
```

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.
<b>key config-key password-encryption</b>	Enables storage of a type 6 encryption key in private NVRAM.

Command	Description
<b>password encryption aes</b>	Enables a type 6 encrypted preshared key.

# ipv4 itr

To configure a router to act as an IPv4 Locator/ID Separation Protocol (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.

**ipv4 itr**  
**no ipv4 itr**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide ITR functionality.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(1)XB	This command was introduced.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines** Use this command to enable the router to perform IPv4 LISP ITR functionality.

If a router configured as an ITR receives a packet for which no IPv4 destination address prefix match exists in the routing table and for which 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 a candidate for LISP routing. In this case, the ITR sends a LISP map request to the map resolver configured using the **ipv4 itr map-resolver** command. Next, the ITR caches the IPv4 endpoint identifier-to-routing locator (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**

Devices are often configured as an ITR and as an Egress Tunnel Router (ETR). However, the LISP architecture does not require this and the functionality can occur in a different device.

**Examples**

The following example shows how to configure IPv4 LISP ITR functionality on the router:

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 alt-vrf</b>	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.
<b>ipv4 itr map-resolver</b>	Configures the IPv4 locator address of the LISP map resolver to which the ITR sends IPv4 map-request messages.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-prefix to locator map-cache entry.

# ipv4 itr map-resolver

To configure the IPv4 locator address of the Locator/ID Separation Protocol (LISP) map resolver to be used by the Ingress Tunnel Router (ITR) when sending map requests for IPv4 endpoint identifier-to-routing locator (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.

**ipv4 itr map-resolver** *map-resolver-address*  
**no ipv4 itr map-resolver** *map-resolver-address*

## Syntax Description

<i>map-resolver-address</i>	The IPv4 locator addresses of the map resolver.
-----------------------------	---

## Command Default

No LISP map resolver locator address is configured by default.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

## 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.

A LISP ITR that needs to resolve an IPv4 EID-to-RLOC mapping for a destination EID 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 Alternative Logical Topology (ALT) using the **ipv4 alt-vrf** command. If 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 are sent directly over the ALT without the additional LISP ECM header (the destination of the map request is the EID being queried).

### Examples

The following example shows how to configure an ITR to use the map resolver located at 10.1.1.1 when sending map-request messages:

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

### Related Commands

Command	Description
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv4 map-request-source</b>	Configures the source IPv4 address to be used in IPv4 LISP map request messages.

## ipv4 map-cache-limit

To configure the maximum number of IPv4 Locator/ID Separation Protocol (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.

**ipv4 map-cache-limit** *cache-limit* [**reserve-list** *list*]

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

### Syntax Description

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

### Command Default

The default map-cache limit is 1000 entries.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

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

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 **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 so that the cache-limit is maintained. The dynamic entry deleted will be either a nonreserve idle map-cache entry, nonreserve 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 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

If the **reserve-list** keyword is used, be sure that the prefix list includes entries that match all entries for which you expect to receive a map reply, 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 **show ip lisp map-cache detail** command provides additional details about the endpoint identifier-to-routing locator (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 shows how to configure a LISP cache limit of 2000 entries and a reserve list that references the IPv4 prefix-list LISP-v4-always:

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

**Related Commands**

Command	Description
<b>clear ip lisp map-cache</b>	Clears the LISP IPv4 or IPv6 map-cache on the local router.
<b>ip prefix-list lisp-list</b>	
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID prefix to a locator map-cache entry.
<b>show ip lisp map-cache detail</b>	Displays detailed information about the current dynamic and static IPv4 EID-to-RLOC map-cache entries.

# ipv4 map-cache-persistent

To configure how often, in minutes, that an Ingress Tunnel Router (ITR) should save its dynamically learned map-cache entries to a file in flash, use the **ipv4 map-cache-persistent** command in Locator/ID Separation Protocol (LISP) configuration mode. To return to the default save interval setting, use the **default** form of the command. To disable this automatic save of dynamically learned map-cache entries, use the **no** form of this command.

**ipv4 map-cache-persistent interval** *minutes*

**no ipv4 map-cache-persistent**

**default ipv4 map-cache-persistent**

## Syntax Description

<b>interval</b> <i>minutes</i>	Specifies how often, in minutes, the ITR should save its dynamically learned map-cache entries to a file in flash memory. Default is 60, range 1 to 1440.
--------------------------------	---

## Command Default

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

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB3	This command was introduced.
Cisco IOS XE Release 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

An ITR forwards LISP packets based on endpoint identifier-to-routing locator (EID-to-RLOC) mapping policy data obtained from destination Egress Tunnel Routers (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 short 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. This ensures that packet loss after an xTR comes up is minimal because data-driven triggers are not required to repopulate 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 always contains fresh information upon reload.

Use the **ipv4 map-cache-persistent** command to control how often, in minutes, the ITR or PITR should save dynamically learned IPv4 map-cache entries to a file in flash. By default, map-cache persistence is set at 10 minutes. Use the **no** form of the command to disable LISP map-cache persistence. Alternatively, if the default value is changed, you can use the **default** form of this command to return the save interval setting to the default value.

**Note**

Use the **show run | include persistent** command 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 shows how to configure the **ipv6 map-cache-persistent** command to save dynamically learned EID prefixes every 30 minutes:

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

**Related Commands**

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



## ipv4 map-request-source

To configure an IPv4 address to be used as the source address for Locator/ID Separation Protocol (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.

**ipv4 map-request-source** *source-address*

**no ipv4 map-request-source**

### Syntax Description

<i>source-address</i>	The IPv4 source address to be used in LISP IPv4 map-request messages.
-----------------------	---

### Command Default

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 (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

Use this command to configure the IPv4 source address to be used by the Ingress Tunnel Router (ITR) for LISP IPv4 map-request messages. Typically, a locator address configured in the **database-mapping** command is used as the source address for LISP IPv4 map-request messages. There are cases, however, where it may be desirable to configure the specified source address for these map-request messages. For example, when the ITR is behind a network address translation (NAT) device, you may have to specify a source address that matches the NAT configuration to properly allow for return traffic.

## Examples

The following example shows how to configure an ITR to use the source IP address 172.16.1.7 in its IPv4 map-request messages:

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

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

# ipv4 map-resolver

To configure a router to act as an IPv4 Locator/ID Separation Protocol (LISP) map resolver, use the **ipv4 map-resolver** command in LISP configuration mode. To remove LISP map-resolver functionality, use the **no** form of this command.

**ipv4 map-resolver**

**no ipv4 map-resolver**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide map-resolver functionality.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(1)XB2	This command was introduced.
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines** Use this command to enable the router to perform IPv4 LISP map-resolver functionality. A LISP map resolver is deployed as a LISP Infrastructure component.

A map resolver receives LISP Encapsulated Control Messages (ECMs) containing map requests from LISP Ingress Tunnel Routers (ITRs) directly over the underlying locator-based network. The map-resolver decapsulates these messages and forwards them on the LISP Alternative Logical Topology (ALT), where they are delivered either to:

- An Egress Tunnel Router (ETR) that is directly connected to the LISP ALT and that is authoritative for the endpoint identifier (EID) being queried by the map request.
- The map server that is injecting EID prefixes into the LISP ALT on behalf of the authoritative ETR.

Map resolvers also send negative map replies directly back to an Ingress Tunnel Router (ITR) in response to queries for non-LISP addresses.



**Note**

For a router configured as an IPv4 map resolver, you must configure the **ipv4 alt-vrf** command regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone map resolver. Refer to the **ipv4 alt-vrf** for related configuration information.

**Examples**

The following example shows how to configure IPv4 LISP map-resolver functionality on the router.

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

**Related Commands**

Command	Description
<b>ipv4 alt-vrf</b>	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 map-server

To configure a router to act as an IPv4 Locator/ID Separation Protocol (LISP) map server, use the **ipv4 map-server** command in LISP configuration mode. To remove LISP map-server functionality, use the **no** form of this command.

**ipv4 map-server**

**no ipv4 map-server**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide map-server functionality.

**Command Modes** LISP configuration (config-router-lisp)

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.
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines** Use this command to enable the router to perform IPv4 LISP map-server functionality. A LISP map server is deployed as a LISP infrastructure component. LISP site commands are configured on the map server for a LISP Egress Tunnel Router (ETR) that registers to the map server. The authentication key on the map server must match the one configured on the ETR. A map server receives map-register control packets from ETRs. A map server configured with a service interface to the LISP Alternative Logical Topology (ALT) injects aggregates for the registered EID prefixes into the LISP ALT.

The map-server also receives map-request control packets from the LISP-ALT, which it then forwards as a LISP encapsulated control messages (ECMs) to the registered ETR that is authoritative for the EID prefix being queried. The ETR returns a map-reply message directly back to the Ingress Tunnel Router (ITR).



**Note**

For a router configured as a IPv4 map server, you must configure the **ipv4 alt-vrf** command regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone map server. Refer to the **ipv4 alt-vrf** command for related configuration information.

**Examples**

The following example shows how to configure IPv4 LISP map-server functionality on the router:

```
Device(config)# device lisp
Device(config-router-lisp)# ipv4 map-server
```

**Related Commands**

Command	Description
<b>ipv4 alt-vrf</b>	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 path-mtu-discovery

To configure the upper and lower bounds to be considered by IPv4 path maximum transmission unit (MTU) discovery (PMTUD), use the **ipv4 path-mtu-discovery** command in Locator/ID Separation Protocol (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.

**ipv4 path-mtu-discovery** [**min** *lower-bound* | **max** *upper-bound*]

**no ipv4 path-mtu-discovery**

### Syntax Description

<b>min</b> <i>lower-bound</i>	(Optional) Specifies lower bound on path MTU accepted, in bytes. Valid range is 68 to 65535.
<b>max</b> <i>upper-bound</i>	(Optional) Specifies upper bound on path MTU accepted, in bytes. Valid range is 68 to 65535.

### Command Default

By default, LISP participates in IPv4 PMTUD can adjust the MTU used by LISP on a per-destination locator basis. The default minimum and maximum MTU boundaries are 576 bytes and 65,535 bytes, respectively.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

By default, IPv4 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 Internet Control Message Protocol (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** keywords MTU boundaries.

IPv4 PMTUD can be disabled for LISP using the **no ipv4 path-mtu-discovery** command in LISP 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 **ipv4 path-mtu-discovery** command in LISP configuration mode without any additional parameters.

### Examples

The following example shows how to modify PMTUD for LISP to accept only ICMP Type 3 Code 4 messages requesting an MTU of at least 1200 bytes (the maximum of 65,535 bytes remains unchanged).

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

### Related Commands

Command	Description
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.



## ipv4 proxy-etr

To configure a router to act as an IPv4 Locator/ID Separation Protocol (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.

**ipv4 proxy-etr**

**no ipv4 proxy-etr**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide PETR functionality.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(1)XB1	This command was introduced.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

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

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

destination address) so that packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR. As a second example, if a LISP IPv6 (EID) site wants to communicate with a non-LISP IPv6 site and some portion of the intermediate network does not support an IPv6 (it is IPv4 only). Assuming that the PETR has both IPv4 and IPv6 connectivity, the ITR can LISP-encapsulate the IPv6 EIDs with IPv4 locators destined for the PETR, which decapsulates the packets and forwards them natively to the non-LISP IPv6 site over its IPv6 connection. That is, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv4 portion of the network using the LISP mixed protocol encapsulation support.



**Note**

An Cisco IOS or Cisco IOS XE router cannot be configured to perform ETR and PETR functions at the same time. It must be configured for one or the other purpose. 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. If a router is configured as an ETR using the **ipv4 etr** command and an attempt is made to also configure PETR functionality, and an error indicating that ITR functionality must first be disabled will be issued.



**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 shows how to configure IPv4 LISP PETR functionality on the router.

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

**Related Commands**

Command	Description
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.
<b>ipv4 use-petr</b>	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 Locator/ID Separation Protocol (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.

**ipv4 proxy-itr** *ipv4-local-locator*

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

### Syntax Description

<i>ipv4-local-locator</i>	The IPv4 locator address used as a source address for encapsulation of data packets, a data probe, or a map-request message.
---------------------------	--

### Command Default

By default, the router does not provide PITR functionality.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB1	This command was introduced.
15.1(1)XB2	This command was modified.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 2.5.1XB	This command was modified.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.

### 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 Ingress Tunnel Router (ITR) functionality where the router receives native packets from non-LISP sites that are destined for LISP sites, encapsulates them, and forwards them to the Egress Tunnel Router (ETR) that is authoritative for the destination LISP site endpoint identifier (EID).

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 (that is, the Internet) and act as an ITR for traffic received from the public Internet.

If PITR services are enabled using the **ipv4 proxy-itr** command, the PITR creates LISP-encapsulated packets when it sends a data packet to a LISP site, sends a Data Probe, or sends a map-request message. The outer (LISP) header address-family and source address are determined as follows:

- When the locator-hash function returns a destination routing locator (RLOC) in the following ways:
  - A destination RLOC is returned within the IPv4 address-family, then the address *ipv4-local-locator* is used as the source address from the locator namespace.
  - A destination RLOC is returned within the IPv6 address-family (assuming the optional address *ipv6-local-locator* is entered), it will be used as a source locator for encapsulation.
- When configuring a router as a LISP PITR, you must configure the **ipv4 alt-vrf** command (or **ipv6 alt-vrf** command for IPv6 EID mapping) regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone PITR on the same device as a LISP MS/MR.

**Note**

A 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, and an error indicating that ITR functionality must first be disabled is issued.

**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 map-cache** 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.

**Examples**

The following example shows how to configure LISP PITR functionality on the router and encapsulate packets using a source locator of 10.1.1.1.

```
Router(config)# router lisp
Router(config-router-lisp)# ipv4 proxy-itr 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 Map-Resolver 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 itr map-resolver 10.2.1.1
Router(config-router-lisp)# map-cache 192.168.0.0/16 map-request
Router(config-router-lisp)# exit
```

**Related Commands**

Command	Description
<b>ipv4 alt-vrf</b>	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.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv6 alt-vrf</b>	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.

# ipv4 route-import map-cache

To configure a Proxy Ingress Tunnel Router (PITR) to dynamically import IPv4 Locator/ID Separation Protocol (LISP) endpoint identifier (EID) space for which it is proxying, use the **ipv4 route-import map-cache** command in LISP EID table configuration mode. To remove dynamic import for IPv6 LISP EID space, use the **no** form of this command.

```

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

## Syntax Description

<b>bgp</b> <i>as-number</i>	Specifies that IPv4 prefixes known to the local BGP process autonomous system (AS) number should be imported to dynamically define the EID address space for which it is proxying.
<b>static</b>	Specifies that IPv4 prefixes known via static routes should be imported to define the EID address space for which it is proxying.
<b>route-map</b> <i>route-map-name</i>	(Optional) Specifies that imported IPv4 prefixes should be filtered according to the specified route map name.

## Command Default

Dynamic import for IPv4 LISP EID space is disabled.

## Command Modes

LISP EID table configuration (config-router-lisp-eid-table)

## Command History

Release	Modification
15.2(3)T	This command was introduced.

## Usage Guidelines

When a device is configured as a PITR, it must be informed about the extent of the IPv4 LISP EID space for which it is proxying 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.

If the PITR is configured to connect to an ALT infrastructure (see the **ipv4 alt-vrf** command), it will have full knowledge of the LISP IPv4 EID address space for which it is proxying. However, when a PITR is configured to use a map resolver for map-cache resolution, the LISP EID space for which it is proxying must be defined for the PITR to send map requests for destinations needed to determine IPv4 EID-to-RLOC mappings or negative mapping results.

The **ipv4 route-import map-cache** command provides a simple mechanism to define the extent of IPv4 LISP EID space for the PITR by taking advantage of the existing static or BGP-based routing infrastructure. (Prior to the **ipv4 route-import map-cache** command, static **map-cache** entries with the **map-request** keyword were required in order to drive the LISP control plane.)

The type of the IPv4 LISP EID space can be configured using the **ipv4 route-import map-cache** command using the **bgp as-number** keyword and argument or **static** keyword to import all appropriate IPv4 EID prefixes. In both cases, an optional **route-map** keyword can be added to provide filtering to selective import appropriate EID prefixes. The **route-map** keyword can match on any useful criteria such as community, tag, or local preference.

**Note**

If the **ipv4 route-import map-cache** command is configured to use BGP and then BGP is removed (using the **no router bgp autonomous-system-number** command), the corresponding **ipv4 route-import map-cache bgp** configuration is not automatically removed.

**Note**

See the **clear ipv4 lisp route-import** command for information about reimporting prefixes.

**Examples**

In the following example, a PITR is configured to import IPv4 static routes representing EID prefixes to be used for signaling the LISP control plane to send a Map-Request message 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-import** command, illustrating that only those static prefixes that match tag 123 are imported.

```
Router(config)# route-map static-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# ip route 10.0.1.0 255.255.255.0 null0 tag 123
Router(config)# ip route 10.0.2.0 255.255.255.0 null0 tag 123
Router(config)# ip route 10.0.3.0 255.255.255.0 null0 tag 123
Router(config)# ip route 10.0.4.0 255.255.255.0 null0 tag 456
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv4 route-import map-cache static route-map static-lisp
Router(config-router-lisp-eid-table)# Ctrl-Z
Router# 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
Router#
```

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

```
Router(config)# route-map bgp-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv4 route-import map-cache bgp 123 route-map bgp-lisp
```

```

Router(config-router-lisp-eid-table)# Ctrl-Z
Router# 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  4d12h       bgp          installed
10.0.2.0/24  4d12h       bgp          installed
10.0.3.0/24  4d12h       bgp          installed
Router#

```

**Related Commands**

Command	Description
<b>clear ip lisp route-import</b>	Clears the table and forces a re-evaluation of all imported routes.
<b>ipv4 route-import maximum-prefix</b>	Configures the maximum number of IPv4 prefixes permitted to be dynamically imported into the Pitr map cache for use in defining proxy EID space.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or statically configures the packet handling behavior for a specified destination IPv4 or IPv6 EID prefix.
<b>show ip lisp route-import</b>	Displays all the routes that have been picked up from the Routing Information Base (RIB) for import.



## ipv4 route-import maximum-prefix

To configure a limit to the number of IPv4 Locator ID Separation Protocol (LISP) endpoint identifier (EID) prefixes that a Proxy Ingress Tunnel Router (PITR) can dynamically import, use the **ipv4 route-import maximum-prefix** command in LISP EID table configuration mode. To remove this limit, use the **no** form of this command.

**ipv4 route-import maximum-prefix** *max-limit* [*threshold*] [**warning-only**]

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

### Syntax Description

<i>max-limit</i>	Specifies the maximum number of IPv4 prefixes that can be imported to define the EID address space in the map cache.
<i>threshold</i>	(Optional) Specifies the threshold value (in percent) at which to generate a warning message while importing IPv4 prefixes.
<b>warning-only</b>	(Optional) Specifies that only a warning message is given and entries are not limited.

### Command Default

An IPv4 route-import maximum-prefix limit is not configured.

### Command Modes

LISP EID table configuration (config-router-lisp-eid-table)

### Command History

Release	Modification
15.2(3)T	This command was introduced.

### Usage Guidelines

When the **ipv4 route-import map-cache** command is configured, it may also be desired to configure a limit on the number of EID prefixes that can be imported by the PITR. This can be accomplished by configuring the **ipv4 route-import maximum-prefix** command. When the optional *threshold* value is specified, expressed as a percentage of the maximum limit, a warning message is generated when the number of IPv4 prefixes exceeds the threshold percentage. The **warning-only** keyword permits all prefixes to be imported but alerts the user when the threshold is exceeded.

### Examples

In the following example, a PITR is configured to import IPv4 BGP routes representing EID prefixes to be used for signaling the LISP control plane to send a Map Request message for EID-to-RLOC mapping resolution. A route map called *bgp-lisp* is also configured to filter on BGP routes matching the tag 123. In addition, a limit is placed on the number of IPv4 prefixes that can be imported using the **ipv4 route-import**

**maximum-prefix** command. In the example below, a limit of two is specified. The resultant imported BGP routes are then shown using the **show ip lisp route-import** command.

```
Router(config)# route-map bgp-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv4 route-import map-cache bgp 123 route-map bgp-lisp
Router(config-router-lisp-eid-table)# ipv4 route-import maximum-prefix 2
Router(config-router-lisp-eid-table)# Ctrl-Z
Router# 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  4d12h     bgp       installed
10.0.2.0/24  4d12h     bgp       installed
Router#
```

## Related Commands

Command	Description
<b>clear ip lisp route-import</b>	Clears the table and forces a re-evaluation of all imported routes.
<b>ipv4 route-import map-cache</b>	Configures a Proxy-ITR to dynamically import IPv4 LISP EID space for which it is proxying.
<b>show ip lisp route-import</b>	Displays all the routes that have been picked up from the Routing Information Base (RIB) for import.

## ipv4 solicit-map-request ignore

To configure an Ingress Tunnel Router (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 Locator/ID Separation Protocol (LISP) configuration mode. To disable the ignore setting for this feature, use the **no** form of this command.

**ipv4 solicit-map-request ignore**

**no ipv4 solicit-map-request ignore**

**Syntax Description** This command has no arguments or keywords.

**Command Default** A LISP ITR will respond to an IPv4 map-request message that has the SMR bit set when it has an existing IPv4 map-cache entry for the endpoint identifier (EID) in the SMR map-request.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(4)M	This command was introduced.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.

**Usage Guidelines** When a change occurs on an Egress Tunnel Router (ETR) for some attribute of an IPv4 EID prefix configured using the **database-mapping** command such as an associated routing locator (RLOC), priority, or weight, the ETR will automatically attempt to inform all LISP sites with which it has recently been communicating of this change. The ETR informs the other xTRs (with which it has recently been communicating) by sending a map request with the SMR bit in the header set to on to the RLOC addresses of those other xTRs. The ETR obtains the RLOC addresses by reviewing its own IPv4 LISP map cache, which contains these entries for the most recent conversations.

When an xTR receives the SMR map-request message from the ETR, the default response of the xTRs is to send a new map-request message with the SMR bit cleared through the Mapping System (such as through 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 by the ETR for the 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, xTRs process and respond to any map-request message that has the SMR bit set to on. Use the **ipv4 solicit-map-request ignore** command to disable this behavior, causing xTRs to ignore all map-request messages that have the SMR bit set to on. To restore SMR map request handling capabilities, use the **no** form of this command.

**Note**

A LISP ITR will only respond to an SMR map request only 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 shows how to configure the xTR to ignore map-request messages that have the SMR bit set.

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.

## ipv4 use-petr

To configure a router to use an IPv4 Locator/ID Separation Protocol (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.

**ipv4 use-petr** *locator-address* [**priority** *priority* **weight** *weight*]

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

### Syntax Description

<i>locator-address</i>	IPv4 locator address of the PETR.
<b>priority</b> <i>priority</i>	(Optional) Specifies the priority (value between 0 and 255) assigned to this PETR. A lower value indicates a higher priority.
<b>weight</b> <i>weight</i>	(Optional) Specifies the percentage of traffic to be load-shared (value between 0 and 100).

### Command Default

The router does not use PETR services.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 3.3S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>ip</b> keyword was changed to <b>ipv4</b> , and the <b>lisp</b> keyword was removed from the command syntax.
Cisco IOS XE Release 3.6S	This command was modified. The <b>priority</b> <i>priority</i> and <b>weight</b> <i>weight</i> keywords and arguments were added.
15.2(3)T	This command was modified. The <b>priority</b> <i>priority</i> and <b>weight</b> <i>weight</i> keywords and arguments were added.

## Usage Guidelines

Use the **ipv4 use-petr** command to enable an Ingress Tunnel Router (ITR) or Proxy Ingress Tunnel Router (PITR) to use IPv4 Proxy Egress Tunnel Router (PETR) services. When the use of PETR services is enabled, instead of natively forwarding LISP endpoint identifier (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.

PETR services may be necessary in several cases:

- 1 By default when a LISP site 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

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 needs to connect 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 traverse (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 site packets to traverse 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 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. The **priority** configuration is used to determine load-sharing among PETR resources when multiple PETRs are specified. The **weight** configuration is used to determine how to loadshare traffic between multiple PETRs of identical priority when multiple PETRs are specified. The value represents the percentage of traffic to be load-shared.

**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 shows how to configure 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 are encapsulated in an IPv4 LISP header destined to the PETR located at 10.1.1.1:


```
Router(config)# router lisp
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
<b>ipv4 proxy-etr</b>	Configures the router to act as an IPv4 LISP PETR.
<b>ipv6 use-petr</b>	Configures a router to use an IPv6 LISP PETR.

 `ipv4 use-petr`





## LISP Router IPv6 Configuration Commands

---

- [ipv6 alt-vrf, page 218](#)
- [ipv6 etr, page 220](#)
- [ipv6 etr accept-map-request-mapping, page 222](#)
- [ipv6 etr map-cache-ttl, page 224](#)
- [ipv6 etr map-server, page 226](#)
- [ipv6 itr, page 229](#)
- [ipv6 itr map-resolver, page 231](#)
- [ipv6 map-cache-limit, page 233](#)
- [ipv6 map-cache-persistent, page 236](#)
- [ipv6 map-request-source, page 238](#)
- [ipv6 map-resolver, page 240](#)
- [ipv6 map-server, page 242](#)
- [ipv6 path-mtu-discovery, page 244](#)
- [ipv6 proxy-etr, page 246](#)
- [ipv6 proxy-itr, page 248](#)
- [ipv6 route-import map-cache, page 251](#)
- [ipv6 route-import maximum-prefix, page 254](#)
- [ipv6 solicit-map-request ignore, page 256](#)
- [ipv6 use-petr, page 258](#)

# ipv6 alt-vrf

To configure which virtual routing and forwarding (VRF) instance supporting the IPv6 address-family Locator/ID Separation Protocol (LISP) should use when sending map requests for an IPv6 endpoint identifier-to-routing locator (EID-to-RLOC) mapping directly over the Alternative Logical Topology (ALT), use the **ipv6 alt-vrf** command in LISP configuration mode. To remove this reference to a VRF, use the **no** form of this command.

```

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

## Syntax Description

<i>vrf-name</i>	Name assigned to the ALT VRF.
-----------------	-------------------------------

## Command Default

By default, no ALT VRF is referenced by LISP.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

The **ipv6 alt-vrf** command is required for all LISP devices that are connected to the ALT for exchange of LISP control plane messages for IPv6 EID mapping resolution. The VRF instance specified using the **ipv6 alt-vrf** command is used to segment EID prefixes from the global table and must be configured to enable the IPv6 address family (use the **ipv4 alt-vrf** command to enable the IPv4 address family).

Additionally, you must use the **ipv6 alt-vrf** command (or **ipv4 alt-vrf** command for IPv4 EID mapping resolution) when configuring any LISP device as a map resolver (MR), map server (MS), or proxy ingress tunnel router (PITR). For these LISP devices, configuring the **ipv6 alt-vrf** or **ipv4 alt-vrf** command is required regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a

stand-alone MR, MS, PITR, or any combination of the three (such as when a LISP MS/MR device has full knowledge of the LISP mapping system for a private LISP deployment and is not connected to any ALT).

When configuring a device as a LISP ingress tunnel router (ITR) to resolve IPv6 EID-to-RLOC mappings for destination EIDs, you can configure the device to use one of the following two options:

- Send map requests to a map resolver—the ITR sends map requests in a LISP encapsulated control message (ECM) header with either an IPv6 or IPv4 map-resolver RLOC as its destination address (depending on the configuration). For this option, use the **ipv6 map-resolver** command instead of the **ipv6 alt-vrf** command.
- Send map requests directly over the LISP ALT using the VRF instance specified when configuring this command—the ITR sends map requests directly over the ALT (without the additional LISP ECM header). The destination of the map request is the EID being queried. For this option, use the **ipv6 alt-vrf** command

When using the ALT, you must configure the correct address family (IPv6 or IPv4) for resolving EID-to-RLOC mappings. If an IPv4 EID mapping is required, configure the **ipv6 alt-vrf** command and specify a VRF that enables the IPv6 address-family and connects to an IPv6-capable ALT.



#### Note

Before this command is used, the referenced VRF must already have been created using the **vrf definition** command. In addition, the corresponding configurations for connecting the LISP device to the ALT, including the GRE tunnel interfaces and any routing associated with the VRF (static or dynamic) must also have been created.

#### Examples

The following example shows how to configure the VRF named lisp and how to configure LISP to use this VRF when resolving IPv6 EID-to-RLOC mappings:

```
Router(config)# vrf definition lisp
Router(config-vrf)# rd 65100:100
Router(config-vrf)# address-family ipv6
Router(config-vrf-af)# exit-address-family
Router(config-vrf)# exit
Router(config)# ipv6 alt-vrf lisp
```

#### Related Commands

Command	Description
<b>ipv4 alt-vrf</b>	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.
<b>ipv6 itr</b>	Configures the router to act as a LISP ITR.
<b>ipv6 itr map-resolver</b>	Configures the IPv6 locator address of the LISP map resolver to which the ITR sends IPv6 map-request messages.
<b>ipv6 lisp pitr</b>	Configures the router to act as a LISP PITR.

# ipv6 etr

To configure a router to act as an IPv6 Locator/ID Separation Protocol (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.

**ipv6 etr**

**no ipv6 etr**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The router does not provide ETR functionality.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Use this command to enable the router to perform IPv6 LISP Egress Tunnel Router (ETR) functionality. A router configured as an IPv6 ETR is typically configured with the **database-mapping** command so that the ETR knows what IPv6 EID-prefix blocks and corresponding locators are used for the LISP site. The ETR should be configured to register with a map server with the **ipv6 etr map-server** command, or to use static LISP endpoint identifier-to-routing locator (EID-to-RLOC) mappings with the **map-cache** command in order to participate in LISP networking.



### Note

A device configured as an ETR can also be configured as an Ingress Tunnel Router (ITR). However, the LISP architecture does not require this and ETR and ITR functionality can occur in different devices.

## Examples

The following example shows how to configure IPv6 LISP ETR functionality on the router.

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

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv6 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv6 EID prefixes.
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.
<b>map-cache</b>	Configures a static IPv6 EID prefix to a locator map-cache entry.

# ipv6 etr accept-map-request-mapping

To configure an Egress Tunnel Router (ETR) to cache IPv6 mapping data contained in a map-request message, use the **ipv6 etr accept-map-request-mapping** command in Locator/ID Separation Protocol (LISP) configuration mode. To remove this functionality, use the **no** form of this command.

```

ipv6 etr accept-map-request-mapping [verify]
no ipv6 etr accept-map-request-mapping [verify]
```

## Syntax Description

<b>verify</b>	(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.
---------------	--

## Command Default

The router does not cache mapping data contained in a map-request message.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

If an ETR receives a map-request message that contains mapping data for the invoking IPv6 source-EID's packet, the ETR, by default, ignores the mapping data. However, if you configure 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.

If you enter the **verify** keyword, the ETR still caches 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.

If this command is enabled and then later disabled, issuing the command **clear map-cache** is required to clear any map-cache entries that are in the “tentative” state. Map-cache entries can remain in the “tentative” state for up to one minute so you might want to clear these entries manually when this command is removed.

### Examples

The following example shows how to configure the ETR to cache IPv6 mapping data included in map-request messages and verify the accuracy of the data prior to using this data to forward packet:.

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

### Related Commands

Command	Description
<b>clear ipv6 lisp map-cache</b>	Clear the LISP IPv6 map-cache on the local router.
<b>ipv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.

# ipv6 etr map-cache-ttl

To configure the time-to-live (TTL) value inserted into Locator/ID Separation Protocol (LISP) IPv6 map-reply messages, use the **ipv6 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.

```

ipv6 etr map-cache-ttl minutes
no ipv6 etr map-cache-ttl minutes
    
```

## Syntax Description

<i>minutes</i>	A value, in minutes, to be inserted in the TTL field in map-reply messages. Valid entries are between 60 (1 hour) and 10080 (1 week).
----------------	---

## Command Default

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

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Use this command to change the default value associated with the Time-to-Live (TTL) field in IPv6 map-reply messages. Entering this command changes the default TTL that remote ITRs will cache and use for your site's IPv4 endpoint identifier (EID) prefix. The default value is 1440 minutes (24 hours), and the minimum value is 60 minutes.



### Examples

The following example shows how to configure the Egress Tunnel Router (ETR) to use a TTL of 120 minutes in IPv6 map-reply messages:

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

### Related Commands

Command	Description
<b>ipv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.

# ipv6 etr map-server

To configure the IPv4 or IPv6 locator address of the Locator/ID Separation Protocol (LISP) map server to be used by the Egress Tunnel Router (ETR) when registering for IPv6 endpoint identifiers (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.

```

ipv6 etr map-server map-server-address {key {0| 6} authentication-key | proxy-reply}
no ipv6 etr map-server map-server-address {key {0| 6} authentication-key | proxy-reply}
    
```

## Syntax Description

<i>map-server-address</i>	Specifies the IPv4 or IPv6 locator addresses of the map server.
<b>key</b>	Specifies the key-type.
<b>0</b>	Indicates that the password is entered as cleartext.
<b>6</b>	Indicates that the password is in the AES encrypted form.
<i>authentication-key</i>	Specifies the password used for computing the SHA-1 HMAC hash that is included in the header of the Map-Register message.
<b>proxy-reply</b>	

## Command Default

No LISP map server locator addresses are configured by default.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## 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 EIDs. A password used for a SHA-1 HMAC hash that is included in the header of the Map-Register message is provided with the **key** keyword. You can configure the ETR to register with at most two map servers. Once the ETR registers with the map servers, the map servers will begin to advertise the IPv6 EID-prefix blocks and RLOCs 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 0. To enter an AES encrypted password, specify 6.



### 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 feature, use the **key config-key password-encryption** and **password encryption aes** commands. 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](http://www.cisco.com/en/US/tech/tk583/tk372/technologies_configuration_example09186a00801f2336.shtml).



### Caution

If you enable the Encrypted Preshared Key feature and then remove it, all type 6 encrypted keys immediately become unusable because the master key is deleted—type 6 passwords cannot be unencrypted and used by the router. A warning message displays that details this and confirms the master key deletion.



### Note

The map server must be preconfigured with IPv6 EID prefixes that match the IPv6 EID prefixes configured on this ETR using the **database-mapping** command, and a password matching the one provided with the **key** keyword on this ETR.

## 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
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
```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.
<b>key config-key password-encryption</b>	Enables storage of a type 6 encryption key in private NVRAM.

Command	Description
password encryption aes	Enables a type 6 encrypted preshared key.

# ipv6 itr

To configure a router to act as an IPv6 Locator/ID Separation Protocol (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.

**ipv6 itr**

**no ipv6 itr**

## Syntax Description

This command has no arguments or keywords.

## Command Default

By default, the router does not provide ITR functionality.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Use this command to enable the router to perform IPv6 LISP ITR functionality.

When a router is configured as an ITR, if a packet is received for which no IPv6 destination address prefix match exists in the routing table and for which the source address of the packet matches an IPv6 EID-prefix block configured using the **database-mapping** or **map-cache** command, then the packet is a candidate for LISP routing. In this case, the ITR sends LISP map request to the map resolver configured by the **ipv6 itr map-resolver** command. Next, the ITR caches the resultant IPv6 endpoint identifier-to-routing locator (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**

Devices are often configured as an ITR and as an Egress Tunnel Router (ETR). However, the LISP architecture does not require this and the functionality can occur in a different device.

**Examples**

The following example shows how to configure IPv6 LISP ITR functionality on the router.

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv6 alt-vrf</b>	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.
<b>ipv6 itr map-resolver</b>	Configures the IPv6 locator address of the LISP map resolver to which the ITR sends IPv6 map-request messages.
<b>map-cache</b>	Configures a static IPv6 EID-prefix to locator map-cache entry.

## ipv6 itr map-resolver

To configure the IPv6 locator address of the Locator/ID Separation Protocol (LISP) map resolver to be used by the Ingress Tunnel Router (ITR) when sending map requests for IPv6 endpoint identifier-to-routing locator (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.

**ipv6 itr map-resolver** *map-resolver-address*

**no ipv6 itr map-resolver** *map-resolver-address*

### Syntax Description

<i>map-resolver-address</i>	The IPv6 locator addresses of the map resolver.
-----------------------------	---

### Command Default

No LISP map resolver locator address is configured by default.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

### 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.

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 Alternative Logical Topology (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 are sent directly over the ALT without the additional LISP ECM header (the destination of the map request is the EID being queried).

## Examples

The following example shows how to configure an ITR to use the map resolver located at 2001:DB8:0A::1 when sending its map-request messages:

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

## Related Commands

Command	Description
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.
<b>ipv6 map-request-source</b>	Configures the source IPv6 address to be used in IPv6 LISP map-request messages.



## ipv6 map-cache-limit

To configure the maximum number of IPv6 Locator/ID Separation Protocol (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.

**ipv6 map-cache-limit** *cache-limit* [**reserve-list** *list*]

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

### Syntax Description

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

### Command Default

The default map-cache limit is 1000 entries.

### Command Modes

LISP configuration (config-router-lisp)

### Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

### Usage Guidelines

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

LISP map-cache entries are added 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 **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 so 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 defined as having 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 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

If you enter the **reserve-list** keyword, be sure that the prefix list includes entries that match all entries for which you expect to receive a map reply, 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 specific"s 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 **show ipv6 lisp map-cache detail** command 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 shows how to configure a LISP cache limit of 2000 entries and a reserve list referencing the IPv6 prefix-list LISP-v6-always:

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

**Related Commands**

Command	Description
<b>clear ipv6 lisp map-cache</b>	Clear the LISP IPv6 map cache on the local router.
<b>ipv6 prefix-list lisp-list</b>	
<b>map-cache</b>	Configures a static IPv6 EID prefix to a locator map-cache entry.
<b>how ipv6 lisp map-cache detail</b>	

# ipv6 map-cache-persistent

To configure how often, in minutes, that an Ingress Tunnel Router (ITR) should save its dynamically learned map-cache entries to a file in flash, use the **ipv6 map-cache-persistent** command in Locator/ID Separation Protocol (LISP) configuration mode. To return to the default save interval setting, use the **default** form of the command. To disable this automatic save of dynamically-learned map-cache entries, use the **no** form of this command.

```

ipv6 map-cache-persistent interval minutes
no ipv6 map-cache-persistent interval minutes
default ipv6 map-cache-persistent
    
```

## Syntax Description

<b>interval</b> <i>minutes</i>	Specifies how often, in minutes, the ITR should save its dynamically learned map-cache entries to a file in flash memory. Default is 60 minutes, range is 1-1440).
--------------------------------	--

## Command Default

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

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB3	This command was introduced.
Cisco IOS XE 2.5.1XC	This command was integrated into Cisco IOS XE Release 2.5.1XC.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

An ITR forwards LISP packets based on endpoint identifier-to-routing locator (EID-to-RLOC) mapping policy data obtained from destination Egress Tunnel Routers (ETRs) and stored in its local map cache. If 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. This ensures that packet loss after an xTR comes up is minimal because 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 always contains fresh information upon reload.

Use the **ipv4 map-cache-persistent** command to control how often, in minutes, the ITR or PITR should save dynamically learned IPv6 map-cache entries to a file in flash. By default, map-cache persistence is set at 10 minutes. Use the **no** form of the command to disable LISP map-cache persistence. Alternatively, if the default value is changed, you can use the **default** form of this command to return the save interval setting to the default value.

**Note**

Use **show run | include persistent** command 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 shows how to configure the **ipv6 map-cache-persistent** command to save dynamically learned EID prefixes every 30 minutes.

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

**Related Commands**

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

# ipv6 map-request-source

To configure an IPv6 address to be used as the source address for Locator/ID Separation Protocol (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.

```

ipv6 map-request-source source-address
no ipv6 map-request-source source-address
    
```

## Syntax Description

<i>source-address</i>	The IPv6 source address to be used in LISP IPv6 map-request messages.
-----------------------	---

## Command Default

The router uses one of the locator addresses configured with the **database-mapping** command as the default source address for LISP map-request messages.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Use this command to configure the IPv6 source address to be used by the Ingress Tunnel Router (ITR) for LISP IPv6 map-request messages. Typically, a locator address configured using the **database-mapping** command is used as the source address for LISP IPv6 map-request messages. There are cases, however, where you may want to configure the specified source address for these map-request messages. For example, when the ITR is behind a network address translation (NAT) device, you should specify a source address that matches the NAT configuration to properly allow for return traffic.

## Examples

The following example shows how to configure an ITR to use the source IPv6 address 2001:DB8:0A::1 in its IPv6 map-request messages:

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

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

# ipv6 map-resolver

To configure a router to act as an IPv6 Locator/ID Separation Protocol (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.

**ipv6 map-resolver**  
**no ipv6 map-resolver**

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide map-resolver functionality.

**Command Modes** LISP configuration (config-router-lisp)

Command History	Release	Modification
	15.1(1)XB2	This command was introduced .
	Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
	Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
	15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines** Use this command to enable the router to perform IPv6 LISP map-resolver functionality. A LISP map-resolver is deployed as a LISP infrastructure component.

A map-resolver receives LISP encapsulated control messages (ECMs) containing map requests from LISP Ingress Tunnel Routers (ITRs) directly over the underlying locator-based network. The map resolver decapsulates these messages and forwards them on the LISP Alternative Logical Topology (ALT) topology, where they are then delivered either to an Egress Tunnel Router (ETR) that is directly connected to the LISP ALT and that is authoritative for the endpoint identifier (EID) being queried by the map request, or to the map server that is injecting EID-prefixes into the LISP ALT on behalf of the authoritative ETR.

Map-resolvers also send negative map replies directly back to an Ingress Tunnel Router (ITR) in response to queries for non-LISP addresses.



**Note**

For a router configured as an IPv6 map resolver, you must configure the **ipv6 alt-vrf** command regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone map resolver. Refer to the **ipv6 alt-vrf** command for related configuration information.

**Examples**

The following example shows how to configure IPv6 LISP map-resolver functionality on the router.

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

**Related Commands**

Command	Description
<b>ipv6 alt-vrf</b>	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.

# ipv6 map-server

To configure a router to act as an IPv6 Locator/ID Separation Protocol (LISP) map server, use the **ipv6 map-server** command in LISP configuration mode. To remove LISP map-server functionality, use the **no** form of this command.

```

ipv6 map-server
no ipv6 map-server
    
```

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide map-server functionality.

**Command Modes** LISP configuration (config-router-lisp)

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines**

Use this command to enable the router to perform IPv6 LISP map-server functionality. A LISP map server is deployed as a LISP Infrastructure component. LISP site commands are configured on the map server for a LISP Egress Tunnel Router (ETR) that registers to the map server. The authentication key on the map server must match the one configured on the ETR. A map server receives map-register control packets from ETRs. A map server configured with a service interface to the LISP Alternative Logical Topology (ALT) injects aggregates for the registered EID prefixes into the LISP ALT.

The map server also receives map-request control packets from the LISP ALT, which it then forwards as a LISP encapsulated control messages (ECMs) to the registered ETR that is authoritative for the EID prefix being queried. The ETR returns a map-reply message directly back to the Ingress Tunnel Router (ITR).

**Note**

For a router configured as an IPv6 map server, you must configure the `ipv6 alt-vrf` command regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone map server. Refer to the **ipv6 alt-vrf** command for related configuration information.

**Examples**

The following example shows how to configure IPv6 LISP map-server functionality on the router:

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

**Related Commands**

Command	Description
<b>ipv6 alt-vrf</b>	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.

# ipv6 path-mtu-discovery

To configure upper and lower bounds to be considered by IPv6 path maximum transmission unit (MTU) discovery (PMTUD), use the **ipv6 path-mtu-discovery** command in Locator/ID Separation Protocol (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.

**ipv6 path-mtu-discovery** {*minbytes*|*maxbytes*}

## Syntax Description

<b>min</b> <i>bytes</i>	(Optional) Specifies the lower bound on path MTU accepted, in bytes. Valid range is 1280 to 65535.
<b>max</b> <i>bytes</i>	(Optional) Specifies the upper bound on path MTU accepted. Valid range is 1280 to 65535.

## Command Default

By IPv6 standards requirements, IPv6 always participates in PMTUD and hence, so 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 65,535 bytes respectively.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## 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 accept only ICMP “Packet Too Big” messages requesting an MTU of at least 1300 bytes (the maximum of 65,535 bytes remains unchanged).

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

**Related Commands**

Command	Description
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.

# ipv6 proxy-etr

To configure a router to act as an IPv6 Locator/ID Separation Protocol (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.

```

ipv6 proxy-etr
no ipv6 proxy-etr

```

**Syntax Description** This command has no arguments or keywords.

**Command Default** By default, the router does not provide PETR functionality.

**Command Modes** LISP configuration (config-router-lisp)

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

**Usage Guidelines**

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

PETR services may be necessary in several cases. For example, by default, when a LISP site forwards packets to a non-LISP site natively (not LISP encapsulated), the source IP address of the packet is that of a site endpoint identifiers (EIDs). If the provider side of the access network is configured with strict unicast reverse path forwarding (uRPF) the packets are considered to be spoofed and dropped because EIDs are not advertised in the provider default free zone (DFZ).

Instead of natively forwarding packets intended for non-LISP sites, the ITR encapsulates the packets (using the site locator as the source address and the PETR as the destination address) so that packets destined for LISP sites will follow normal LISP forwarding processes and be sent directly to the destination ETR. As a second example, suppose a LISP IPv6 (EID) site wants to communicate with a non-LISP IPv6 site and some

portion of the intermediate network does not support an IPv6 (it is IPv4 only). Assuming that the PETR has both IPv4 and IPv6 connectivity, the ITR can LISP-encapsulate the ipv6 proxy-etr 63 Cisco IOS LISP Command Reference IPv6 EIDs with IPv4 locators destined for the PETR, which decapsulates the packets and forwards them natively to the non-LISP IPv6 site over its IPv6 connection. That is, the use of the PETR effectively allows the LISP sites packets to traverse (hop over) the IPv4 portion of the network using the LISP mixed protocol encapsulation support.

**Note**

A Cisco IOS or Cisco IOS XE router cannot be configured to perform ETR and PETR functions at the same time. It must be configured for one or the other purpose. 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. If a router is configured as an ETR using the **ipv6 etr** command and an attempt is made to also configure PETR functionality, an error indicating that ITR functionality must first be disabled will be issued.

**Note**

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

**Examples**

The following example shows how to configure IPv6 LISP PETR functionality on the router.

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

**Related Commands**

Command	Description
<b>ipv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.
<b>ipv6 use-petr</b>	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 Locator/ID Separation Protocol (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.

```

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

## Syntax Description

<i>ipv6-local-locator</i>	The IPv6 locator address used as a source address for encapsulation of data packets, a data probe, or a map-request message.
<i>ipv4-local-locator</i>	(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 IPv4 address-family.

## Command Default

By default, the router does not provide PITR functionality.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
15.1(1)XB2	This command was modified.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 2.5.1XB	This command was modified.
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.



## 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 Ingress Tunnel Router (ITR) functionality where the router receives native packets from non-LISP sites that are destined for LISP sites, encapsulates them, and forwards them to the Egress Tunnel Router (ETR) that is authoritative for the destination LISP site endpoint identifier (EID).

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) and act as an ITR for traffic received from the public Internet.

If you configure the **ipv6 proxy-itr** command to enable PITR services, the PITR creates LISP-encapsulated packets when it sends a data packet to a LISP site, sends a data probe, or sends a map-request message. The outer (LISP) header address-family and source address are determined as follows:

- When the locator-hash function returns a destination (RLOC) in the following ways:
  - When a destination RLOC is returned within the IPv6 address family, then the address *ipv6-local-locator* value is used as the source address from the locator namespace.
  - When a destination RLOC is returned within the IPv4 address-family (assuming the optional address *ipv4-local-locator* is entered), it will be used as a source locator for encapsulation.
- When configuring a router as a LISP PITR, you must configure the **ipv6 alt-vrf** command (or **ipv4 alt-vrf** command for IPv4 EID mapping) regardless whether the device is connected to an ALT for the exchange of map requests or is configured as a standalone PITR on the same device as a LISP MS/MR.



### Note

A 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 is issued.



### 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 map-cache** 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.

## Examples

The following example shows how to configure LISP PITR functionality on the router and to encapsulate packets using a source locator of 2001:db8:bb::1.

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

## Related Commands

Command	Description
<b>ipv4 alt-vrf</b>	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.
<b>ipv6 alt-vrf</b>	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.
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.
<b>ipv4 route-import map-cache</b>	Configure a Proxy-ITR to dynamically import IPv6 LISP EID space for which it is proxying.

## ipv6 route-import map-cache

To configure a Proxy Ingress Tunnel Router (PITR) to dynamically import IPv6 Locator/ID Separation Protocol (LISP) endpoint identifier (EID) space for which it is proxying, use the **ipv6 route-import map-cache** command in LISP EID table configuration mode. To remove dynamic import for IPv6 LISP EID space, use the **no** form of this command.

**ipv6 route-import map-cache**{**bgp** *as-number*| **static**} [**route-map** *route-map-name*]

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

### Syntax Description

<b>bgp</b> <i>as-number</i>	Specifies that IPv6 prefixes known to the local BGP process autonomous system (AS) number should be imported to dynamically define the EID address space for which it is proxying.
<b>static</b>	Specifies that IPv6 prefixes known via static routes should be imported to define the EID address space for which it is proxying.
<b>route-map</b> <i>route-map-name</i>	(Optional) Specifies that imported IPv6 prefixes should be filtered according to the specified route-map name.

### Command Default

Dynamic import for IPv6 LISP EID space is not configured.

### Command Modes

LISP EID table configuration (config-router-lisp-eid-table)

### Command History

Release	Modification
15.2(3)T	This command was introduced.

### Usage Guidelines

When a device is configured as a PITR, it must be informed about the extent of the IPv6 LISP EID space for which it is proxying 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.

If the PITR is configured to connect to an ALT infrastructure (see the **ipv6 alt-vrf** command), it will have full knowledge of the LISP IPv6 EID address space for which it is proxying. However, when a PITR is configured to use a map resolver for map-cache resolution, the LISP EID space for which it is proxying must be defined for the PITR to send map request messages for destinations needed to determine IPv6 EID-to-RLOC mappings or negative mapping results.

The **ipv6 route-import map-cache** command provides a simple mechanism to define the extent of IPv6 LISP EID space for the PITR by taking advantage of the existing static or BGP-based routing infrastructure. (Prior to the **ipv6 route-import map-cache** command, static **map-cache** entries with the **map-request** keyword were required in order to drive the LISP control plane.)

The type of the IPv6 LISP EID space can be configured using the **ipv6 route-import map-cache** command using the **bgp as-number** keyword and argument or **static** keyword to import all appropriate IPv6 EID prefixes. In both cases, an optional **route-map** keyword can be added to provide filtering to selective import appropriate EID prefixes. The **route-map** keyword can match on any useful criteria such as community, tag, or local preference.

**Note**

If the **ipv6 route-import map-cache** command is configured to use BGP and then BGP is removed (using the **no router bgp autonomous-system-number** command), the corresponding **ipv6 route-import map-cache bgp** configuration is not automatically removed.

**Note**

See the **clear ipv6 lisp route-import** command for information about reimporting prefixes.

**Examples**

In the following example, a PITR is configured to import IPv6 static routes representing EID prefixes to be used for signaling the LISP control plane to send a Map Request message 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-import** command, illustrating that only those static prefixes that match tag 123 are imported.

```
Router(config)# route-map static-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# ipv6 route 2001:db8:a::/48 null0 tag 123
Router(config)# ipv6 route 2001:db8:b::/48 null0 tag 123
Router(config)# ipv6 route 2001:db8:c::/48 null0 tag 123
Router(config)# ipv6 route 2001:db8:d::/48 null0 tag 456
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv6 route-import map-cache static route-map static-lisp
Router(config-router-lisp-eid-table)# Ctrl-Z
Router# show ipv6 lisp route-import
LISP IPv6 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
Router#
```

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

```
Router(config)# route-map bgp-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv6 route-import map-cache bgp 123 route-map bgp-lisp
Router(config-router-lisp-eid-table)# Ctrl-Z
```

```

Router# show ipv6 lisp route-import
LISP IPv6 imported routes for EID-table default (IID 0)
Config: 1, Entries: 3
Prefix          Uptime      Source      Map-cache State
2001:DB8:A::/48  4d12h      bgp         installed
2001:DB8:B::/48  4d12h      bgp         installed
2001:DB8:C::/48  4d12h      bgp         installed
Router#

```

**Related Commands**

Command	Description
<b>clear ipv6 lisp route-import</b>	Clears the current IPv6 Routing Information Base (RIB) routes imported into LISP.
<b>ipv6 route-import maximum-prefix</b>	Configures the maximum number of IPv6 prefixes permitted to be dynamically imported into the Pitr map cache for use in defining proxy EID space.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or statically configures the packet handling behavior associated for a specified destination IPv4 or IPv6 EID prefix.
<b>show ipv6 lisp route-import</b>	Displays the current IPv6 RIB routes imported into LISP.

# ipv6 route-import maximum-prefix

To configure a limit to the number of IPv6 Locator ID Separation Protocol (LISP) endpoint identifier (EID) prefixes that a Proxy Ingress Tunnel Router (PITR) can dynamically import, use the **ipv6 route-import maximum-prefix** command in LISP EID table configuration mode. To remove this limit, use the **no** form of this command.

```

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

## Syntax Description

<i>max-limit</i>	Specifies the maximum number of IPv6 prefixes that can be imported to define EID address space in the map cache.
<i>threshold</i>	(Optional) Specifies the threshold value (in percent) at which to generate a warning message while importing IPv6 prefixes.
<b>warning-only</b>	(Optional) Specifies that only a warning message is given and entries are not limited.

## Command Default

An IPv6 route-import maximum-prefix limit is not configured.

## Command Modes

LISP EID table configuration (config-router-lisp-eid-table)

## Command History

Release	Modification
15.2(3)T	This command was introduced.

## Usage Guidelines

When the **ipv6 route-import map-cache** command is configured, it may also be desired to configure a limit on the number of EID prefixes that can be imported by the PITR. This can be accomplished by configuring the **ipv6 route-import maximum-prefix** command. When the optional *threshold* value is specified, expressed as a percentage of the maximum limit, a warning message is generated when the number of IPv6 prefixes exceeds the threshold percentage. The **warning-only** keyword permits all prefixes to be imported but alerts the user when the threshold is exceeded.

## Examples

In the following example, a PITR is configured to import IPv6 BGP routes representing EID prefixes to be used for signaling the LISP control plane to send a Map Request message for EID-to-RLOC mapping resolution. A route map called *bgp-lisp* is also configured to filter on BGP routes matching the tag 123. In addition, a limit is placed on the number of IPv6 prefixes that can be imported using the **ipv6 route-import**

**maximum-prefix** command. In the example below, a limit of two is specified. The resultant imported BGP routes are then shown using the **show ipv6 lisp route-import** command.

```
Router(config)# route-map bgp-lisp permit 10
Router(config-route-map)# match tag 123
Router(config-route-map)# exit
Router(config)# router lisp
Router(config-router-lisp)# eid-table default instance-id 0
Router(config-router-lisp-eid-table)# ipv6 route-import map-cache bgp 123 route-map bgp-lisp
Router(config-router-lisp-eid-table)# ipv6 route-import maximum-prefix 2
Router(config-router-lisp-eid-table)# Ctrl-Z
Router# 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:A::/48  4d12h      bgp         installed
2001:DB8:B::/48  4d12h      bgp         installed
Router#
```

## Related Commands

Command	Description
<b>clear ipv6 lisp route-import</b>	Clears the current IPv6 Routing Information Base (RIB) routes imported into LISP.
<b>ipv6 route-import map-cache</b>	Configures a Proxy ITR to dynamically import IPv6 LISP EID space for which it is proxying.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or statically configures the packet handling behavior for a specified destination IPv4 or IPv6 EID-prefix.
<b>show ipv6 lisp route-import</b>	Displays the current IPv6 RIB routes imported into LISP.

# ipv6 solicit-map-request ignore

To configure an Ingress Tunnel Router (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 Locator/ID Separation Protocol (LISP) configuration mode. To disable the ignore setting for this feature, use the **no** form of this command.

**ipv6 solicit-map-request ignore**

**no ipv6 solicit-map-request ignore**

## Syntax Description

This command has no arguments or keywords.

## Command Default

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

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
Cisco IOS XE Release 3.3.0S	This command was introduced.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

When a change occurs on an Egress Tunnel Router (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. The ETR informs the other xTRs (with which it has recently been communicating) by sending a map request with the SMR bit in the header set to on to the RLOC addresses of those other xTRs. The ETR obtains the RLOC addresses by reviewing its own IPv6 LISP map cache, which contains these entries for the most recent conversations.

When an xTR receives the SMR map-request message from the ETR, the default response of the xTRs is to send a new map-request message with the SMR bit cleared through the Mapping System (such as through the configured map resolver) to get an up-to-date mapping for the EID indicated in the SMR map request.

After the map reply is received by the ETR for the new map request, the xTR has 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, xTRs process and respond to any map-request message that has the SMR bit set to on. Use the **ipv6 solicit-map-request ignore** command to disable this behavior, causing xTRs to ignore all map-request messages that have the SMR bit set to on. To restore SMR map-request handling capabilities, use the **no** form of this command.



**Note**

A LISP ITR responds to an SMR map request only 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 shows how to configure the xTR to ignore map-request messages that have the SMR bit set:

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

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>IPv6 etr</b>	Configures the router to act as an IPv6 LISP ETR.
<b>IPv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.

# ipv6 use-petr

To configure a router to use an IPv6 Locator/ID Separation Protocol (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.

```

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

## Syntax Description

<i>locator-address</i>	IPv6 locator address of the PETR.
<b>priority</b> <i>priority</i>	(Optional) Specifies the priority (value between 0 and 255) assigned to this PETR. A lower value indicates a higher priority.
<b>weight</b> <i>weight</i>	(Optional) Specifies the percentage of traffic to be load-shared (value between 0 and 100).

## Command Default

The router does not use PETR services.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 3.3S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
Cisco IOS XE Release 3.6S	This command was modified. The <b>priority</b> <i>priority</i> and <b>weight</b> <i>weight</i> keywords and arguments were added.
15.2(3)T	This command was modified. The <b>priority</b> <i>priority</i> and <b>weight</b> <i>weight</i> keywords and arguments were added.

## Usage Guidelines

Use the **ipv6 use-petr** command to enable an Ingress Tunnel Router (ITR) or Proxy Ingress Tunnel Router (PITR) to use IPv6 PETR services. When the use of PETR services is enabled, instead of natively forwarding LISP endpoint identifier (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:

- 1 By default when a LISP site 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

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 needs to connect 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 traverse (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 device to traverse the IPv6 portion of a 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 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. The **priority** configuration is used to determine load-sharing among PETR resources when multiple PETRs are specified. The **weight** configuration is used to determine how to loadshare traffic between multiple PETRs of identical priority when multiple PETRs are specified. The value represents the percentage of traffic to be load-shared.



**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 shows how to configure an ITR to use the PETR with the IPv4 locator of 10.1.1.1. 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 strip the IPv4 LISP encapsulation and natively forward the IPv6 packets toward their IPv6 non-LISP destination. (This assumes that the PETR supports dual-stack connectivity.)

```
Router(config)# router lisp
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
<b>ipv4 use-petr</b>	Configures a router to use an IPv4 LISP PETR.
<b>ipv6 proxy-etr</b>	Configures the router to act as an IPv6 LISP PETR.



## LISP Site Configuration Commands

---

- [site](#), page 262
- [allowed-locator \(LISP site\)](#), page 264
- [authentication-key \(LISP site\)](#), page 266
- [description \(LISP site\)](#), page 269
- [eid-prefix \(LISP site\)](#), page 271

# site

To configure a Locator/ID Separation Protocol (LISP) site and enter LISP 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.

**site** *site-name*

**no site** *site-name*

## Syntax Description

<i>site-name</i>	Locally significant name assigned to a LISP site.
------------------	---

## Command Default

By default, no LISP sites are assigned.

## Command Modes

LISP configuration (config-router-lisp)

## Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
Cisco IOS XE Release 3.3.0S	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.
15.1(4)M	This command was modified. Support for this command was removed at the global configuration level and added for LISP configuration mode. Also, the <b>lisp</b> keyword was removed from the command syntax.

## Usage Guidelines

Before a LISP Egress Tunnel Router (ETR) registers with a map server, the map server must already be configured with certain LISP site attributes that match those of the ETR. At a minimum, this includes the endpoint identifier (EID) prefixes to be registered by the ETR and a shared authentication key. On the ETR, these attributes are configured using the **database-mapping**, **ipv4 etr map-server**, and **ipv6 etr map-server** commands.

When the **site** command is entered, the referenced LISP site is created and the router is placed in the site configuration mode. In this mode, all attributes associated with the referenced LISP site can be entered.

## Examples

The following example shows how to configure a LISP site named 'Customer-1' and enters LISP site configuration mode.

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

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv4 EID prefixes.
<b>ipv6 etr map- server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv6 EID prefixes.

## allowed-locator (LISP site)

To configure a list of locators to be verified in a map-register message sent by an Egress Tunnel Router (ETR) when registering to the map server, use the **allowed-locator** command in Locator/ID Separation Protocol (LISP) site configuration mode. To remove locators from the list, use the **no** form of this command.

**allowed-locator** *rloc*

**no allowed-locator** *rloc*

### Syntax Description

<i>rloc</i>	IPv4 or IPv6 routing locator (RLOC) allowed within a Map-Registration message.
-------------	--

### Command Default

By default, allowable locators are not defined and the map server will accept any locators.

### Command Modes

LISP site configuration (config-router-lisp-site)

### Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### Usage Guidelines

When a LISP ETR registers with a map server, it sends a map-register message that contains one or more endpoint identifier (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 register only 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) can be configured.



**Note**

When the **allowed-locator** command 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 shows how to configure the LISP site named Customer-1 and then enter LISP site command mode. The IPv4 address 172.16.1.1 and the IPv6 address 2001:db8:bb::1 are configured 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
<b>site</b>	Configures a LISP site and enters LISP site configuration mode on a map server.

## authentication-key (LISP site)

To configure the password used to create the SHA-1 HMAC hash for authenticating the map-register message sent by an Egress Tunnel Router (ETR) when registering to the map server, use the **authentication-key** command in Locator/ID Separation Protocol (LISP) site configuration mode. To remove the password, use the **no** form of this command.

**authentication-key** {0| 6| 7}*password*

**no authentication-key**

### Syntax Description

<b>0</b>	The key type that indicates that the following SHA-1 password is encoded using a cleartext password.
<b>6</b>	The key type that indicates that the following SHA-1 password is encoded using an AES encrypted key.
<b>7</b>	The key type that indicates that the following SHA-1 password is encoded using a Cisco-encrypted key.
<i>password</i>	The password used to create the SHA-1 HMAC hash when authenticating the map-register message sent by the ETR.

### Command Default

By default, no LISP sites authentication key is configured.

### Command Modes

LISP site configuration (config-router-lisp-site)

### Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### Usage Guidelines

Before a LISP ETR registers with a map server, the map server must already be configured with certain LISP site attributes that match those of the ETR, including 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 the ETR, this password is configured with the **[ip|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 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. 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 plaintext passwords in type 6 (AES encryption) format in NVRAM. To enable this feature, use the **key config-key password-encryption** and **password encryption aes** commands. 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](http://www.cisco.com/en/US/tech/tk583/tk372/technologies_configuration_example09186a00801f2336.shtml).

**Caution**

If you enable the Encrypted Preshared Key feature and then remove it, all type 6 encrypted keys immediately become unusable because the master key is deleted—type 6 passwords cannot be unencrypted and used by the router. A warning message displays that details this and confirms the master key deletion.

**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 shows how to configure the LISP site named 'Customer-1' and enter the LISP site configuration mode. The shared password *s0m3-s3cr3t-k3y* is then entered in cleartext form:

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

**Related Commands**

Command	Description
<b>ipv4 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv4 EID prefixes.
<b>ipv6 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to which an ETR should register for its IPv6 EID prefixes.
<b>key config-key password-encryption</b>	Enables storage of a type 6 encryption key in private NVRAM.
<b>password encryption aes</b>	Enables a type 6 encrypted preshared key.

Command	Description
<b>show lisp site</b>	Displays registered LISP sites on a map server.
<b>site</b>	Configures a LISP site and enter LISP site configuration mode on a map server.

## description (LISP site)

To configure a description for a Locator/ID Separation Protocol (LISP) site, use the **description** command in LISP site configuration mode. To remove the description for a LISP site, use the **no** form of this command.

**description** *description*

**no description**

### Syntax Description

<i>description</i>	Description associated with the LISP site.
--------------------	--

### Command Default

By default, no LISP site description is defined.

### Command Modes

LISP site configuration (config-router-lisp-site)

### Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### Usage Guidelines

When you enter the **site** command in a map server, the router enters LISP site configuration mode. In this mode, you can associate a description with the referenced LISP site using the **description** command. This description is displayed in the output of the **show lisp site** command.

### Examples

The following example shows how to configure the LISP site named 'Customer-1' and enter LISP site configuration mode. The description string for Customer-1 is then entered:

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

### Related Commands

Command	Description
<b>show lisp site</b>	Displays registered LISP sites on a map server.

Command	Description
<b>site</b>	Configures a LISP site and enter LISP site configuration mode on a map server.

## eid-prefix (LISP site)

To configure a list of endpoint identifier (EID) prefixes that are allowed in a Map-Register message sent by an Egress Tunnel Router (ETR) when registering to the map server, use the **eid-prefix** command in Locator/ID Separation Protocol (LISP) site configuration mode. To remove the locators, use the **no** form of this command.

**eid-prefix** *EID-prefix* [**route-tag** *tag*][**accept-more-specifics**]

**no eid-prefix** *EID-prefix* [**route-tag** *tag*]

### Syntax Description

<i>EID-prefix</i>	IPv4 or IPv6 EID prefix associated with the LISP site.
<b>route-tag</b> <i>tag</i>	(Optional) Defines the route tag associated with this EID prefix.
<b>accept-more-specifics</b>	(Optional) Specifies that any EID prefix that is more specific than the EID prefix configured is accepted and tracked.

### Command Default

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

### Command Modes

LISP site configuration (config-router-lisp-site).

### Command History

Release	Modification
15.1(1)XB2	This command was introduced.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

### 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.

The same EID prefixes must be configured on the 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 can be displayed by the **show lisp site** command. If the map-registration process is unsuccessful, the site will not be displayed.

When the **route-tag** keyword 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 routing information base (RIB). For example, a route-map policy can be defined to match this tag for Border Gateway Protocol (BGP) redistribution of these EID prefixes into the virtual routing and forwarding (VRF) used by the LISP Alternative Logical Topology (ALT).

**Examples**

The following example shows how to configure 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
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
```

**Related Commands**

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



Command	Description
<b>ipv6 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP Map-Server to which an ETR should register for its IPv6 EID prefixes.
<b>show lisp site</b>	
<b>site</b>	Configures a LISP site and enters LISP site configuration mode on a Map-Server.

 eid-prefix (LISP site)



## LISP Show Commands

---

- [show ip lisp, page 276](#)
- [show ip lisp database, page 281](#)
- [show ip lisp forwarding, page 282](#)
- [show ip lisp instance-id, page 285](#)
- [show ip lisp locator-table, page 286](#)
- [show ip lisp map-cache, page 288](#)
- [show ip lisp route-import, page 291](#)
- [show ip lisp statistics, page 293](#)
- [show ipv6 lisp, page 295](#)
- [show ipv6 lisp database, page 300](#)
- [show ipv6 lisp forwarding, page 302](#)
- [show ipv6 lisp instance-id, page 305](#)
- [show ipv6 lisp locator-table, page 306](#)
- [show ipv6 lisp map-cache, page 308](#)
- [show ipv6 lisp route-import, page 310](#)
- [show ipv6 lisp statistics, page 312](#)
- [show lisp, page 314](#)
- [show lisp ddt, page 316](#)
- [show lisp locator-table, page 318](#)
- [show lisp site, page 320](#)

# show ip lisp

To display the IPv4 Locator ID Separation Protocol (LISP) configuration status, use the **show ip lisp** command in privileged EXEC mode.

**show ip lisp** [*router-lisp-id*]

## Syntax Description

<i>router-lisp-id</i>	(Optional) Router LISP instantiation ID. Valid values are 0 to 15.
-----------------------	--

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
15.1(1)XB2	This command was modified.
Cisco IOS XE Release 2.5.1XB	This command was modified.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M and modified to include the <b>locator-table</b> keyword.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S and modified to include the <b>locator-table</b> keyword.

## Usage Guidelines

When used without the optional router LISP ID value, the **show ip lisp** command displays the IPv4 LISP configuration status for the local device for the default router LISP instantiation. When the *router-lisp-id* argument is used, the command displays the IPv4 LISP configuration status for the specified router LISP instantiation.

## 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#

```

The table below describes the significant fields shown in the display.

**Table 1: show ip lisp Field Descriptions**

Field	Description
Ingress Tunnel Router (ITR)	Indicates whether the router is configured as an ITR. See the <b>ipv4 itr</b> command.
Egress Tunnel Router (ETR)	Indicates whether the router is configured as an ETR. See the <b>ipv4 etr</b> command.
Proxy-ITR (PITR)	Indicates whether the router is configured as a PITR. See the <b>ipv4 proxy-itr</b> command.
Proxy-ETR (PETR)	Indicates whether the router is configured as a PETR. See the <b>ipv4 proxy-etr</b> command.
Map Server (MS)	Indicates whether the router is configured as a map server. See the <b>ipv4 map-server</b> command.
Map Resolver (MR)	Indicates whether the router is configured as a map resolver. See the <b>ipv4 map-resolver</b> command. .
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 the <b>ipv4map-resolver</b> command.
ETR Map-Server(s)	Identifies the configured ETR map servers. See the <b>ipv4 map-server</b> command.
ITR Solicit Map Request (SMR)	Indicates whether SMRs are accepted and processed. See the <b>ipv4 solicit-map-request</b> command.

Field	Description
ETR accept mapping data	Indicates whether the ETR is configured to cache the mapping data contained in a map request. See the <b>ipv4 etr accept-map-request-mapping</b> command.
ETR map-cache TTL	Identifies the current ETR map cache time-to-live (TTL) value. See the <b>ipv4 etr map-cache-ttl</b> command.
Locator Status Algorithms	Indicates whether the locator reachability algorithm routing locator (RLOC) probing is enabled. See the <b>loc-reach-algorithm</b> command.
Static mappings configured	Indicates the number of static cache-map entries configured. See the <b>map-cache</b> command.
Map-cache size/limit	Indicates the number of entries currently in the map cache and indicates the limit value. See the <b>ipv4 map-cache-limit</b> command.
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 the <b>database-mapping</b> .
Persistent map-cache	Indicates the persistent map-cache timer interval, next use, and storage location. See the <b>ipv4 map-cache-persistent</b> command.
ITR use proxy ETR RLOC configuration	Indicates that the router uses PETR services, and lists the PETR locator. See the <b>ipv4 use-petr</b> command.

The following sample output from the **show ip lisp** command displays information about the current IPv4 LISP configuration status when a LISP instantiation has been created using the **router lisp id** command and the **locator-table** command. Below, the results shown are based on router lisp 6 and locator-table vrf Cust-1. (Other output varies depending on the LISP features configured.)

```
Router# show ip lisp 6

Information applicable to all EID instances:
Router-lisp ID:          6
Locator table:           vrf Cust-1
Ingress Tunnel Router (ITR): enabled
Egress Tunnel Router (ETR): enabled
---<more>---
```

**Related Commands**

Command	Description
<b>database-mapping</b>	Configure an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy for LISP.
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.
<b>ip lisp source-locator</b>	Configures a source locator to be used for an IPv4 LISP-encapsulated packets.
<b>ipv4 etr</b>	Configures the router to act as an IPv4 LISP ETR.
<b>ipv4 etr accept-map-request-mapping</b>	Configures an ETR to cache IPv4 mapping data contained in a map-request message.
<b>ipv4 etr map-cache-ttl</b>	Configures the TTL value inserted into LISP IPv4 map-reply messages.
<b>ipv4 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to be used by the ETR when registering for IPv4 EIDs.
<b>ipv4 itr</b>	Configures the router to act as an IPv4 LISP ITR.
<b>ipv4 itr map-resolver</b>	Configures the IPv4 locator address of the LISP map resolver to be used by the ITR when sending map requests for IPv4 EID-to-RLOC mapping resolution.
<b>ipv4 map-cache-limit</b>	Configures the maximum number of IPv4 LISP map-cache entries allowed to be stored by the router.
<b>ipv4 map-cache-persistent</b>	Configures how often, in minutes, that an ITR should save its dynamically learned map-cache entries to a file in flash.
<b>ipv4 map-resolver</b>	Configures a router to act as an IPv4 LISP map resolver.
<b>ipv4 map-server</b>	Configures a router to act as an IPv4 LISP map server.
<b>ipv4 solicit-map-request ignore</b>	Configures an ITR to ignore an IPv4 Map Request message that has the solicit-map-request (SMR) bit set.
<b>ipv4 proxy-etr</b>	Configures the router to act as an IPv4 LISP PETR.
<b>ipv4 proxy-itr</b>	Configures the router to act as an IPv4 LISP PITR.

Command	Description
<b>ipv4 use-petr</b>	Configures a router to use a LISP PETR.
<b>locator-table</b>	Configure the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or statically configures the packet handling behavior associated with a specified destination IPv4 or IPv6 EID prefix.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.
<b>show ip lisp locator-table</b>	Displays the IPv4 LISP ETR configured local IPv4 EID prefixes and associated locator sets.



# show ip lisp database

To display Locator/ID Separation Protocol (LISP) Egress Tunnel Router (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]*

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

This command is used on LISP ETR devices to display the configured local IPv4 EID prefixes and associated locator sets.

## Examples

The following sample output from the **show ip lisp database** command displays the configured IPv4 EID-prefix blocks and associated locator sets. The output of this command shows the configured IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) database mappings.

```
Router# show running-config
.
.
.
!
database-mapping 172.16.21.0/24 192.168.156.222 priority 1 weight 100

Router# show ip lisp database

LISP ETR IPv4 Mapping Database

EID-prefix: 172.16.21.0/28
  192.168.156.222, priority: 1, weight: 100, state: up, local
```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

# show ip lisp forwarding

To display Locator/ID Separation Protocol (LISP) IPv4 EID-prefix information, use the **show ip lisp forwarding** command in privileged EXEC mode.

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

## Syntax Description

<b>eid</b>	Displays information related to EID prefixes (local or remote)
<b>local</b>	Displays locally configured EID prefixes.
<b>remote</b>	Displays forwarding action and locator status bits for dynamically learned EID-prefix blocks, and the number of packets and total bytes encapsulated
<i>eid-prefix</i>	(Optional) The specific remote EID prefix for which associated detailed information is displayed.
<b>detail</b>	(Optional) Displays detailed information associated with each remote EID prefix.
<b>state</b>	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.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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 **database-mapping** command. Remote

IPv4 EID prefixes are for remote sites and learned dynamically through map-reply information or via map-request messages when the **ipv4 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
```

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 and 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
```

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 and 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
```

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

```
Router# show ip lisp forwarding state
```

```
LISP forwarding state for EID table IPv4:Default
EID VRF          Default (0x0)
IPv4
  Configured roles  ITR|ETR
  Active roles      ITR|ETR
```

## show ip lisp forwarding

```

      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

```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv4 etr accept-map- request-mapping</b>	Configures an ETR to cache IPv4 mapping data contained in a map-request message.
<b>show ip lisp map-cache</b>	Displays the current dynamic and static IPv4 EID-to-RLOC map-cache entries.

## show ip lisp instance-id

To display the negative prefix hole in the LISP ALT for an EID within a specified instance-id, use the **show ip lisp instance-id** command in privileged EXEC mode.

**show ip lisp instance-id *iid* alt negative-prefix *EID-prefix***

### Syntax Description

<i>iid</i>	EID instance-id.
<i>EID-prefix</i>	IPv4 EID address covered by negative ALT prefix.

### 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 2.5.1XC.

### Usage Guidelines

This command is only used on LISP Map-Server (MS) devices to display the negative prefix hole in the LISP ALT for an EID within a specified instance-id.

### Examples

The following sample output from the show ip lisp instance-id command for the instance-id 123 and EID 172.16.0.1.

```
Router# show ip lisp instance-id 123 alt negative-prefix 172.16.0.1
Negative mapping system prefix 128.0.0.0/2
Router#
```

### Related Commands

Command	Description
<b>eid-prefix (LISP site)</b>	Configures the EID-prefix associated with a LISP site on a Map-Server as part of the LISP Site configuration process.

# show ip lisp locator-table

To display Locator/ID Separation Protocol (LISP) IPv4 configurations associated with a specific locator table, use the **show ip lisp locator-table** command in privileged EXEC mode.

**show ip lisp locator-table** {default| vrf *vrf-name*}

## Syntax Description

<b>default</b>	Displays IPv4 LISP information and configuration status related to the default table.
<b>vrf <i>vrf-name</i></b>	Displays IPv4 LISP information and configuration status related to the specified virtual routing and forwarding (VRF) table.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB6	This command was introduced.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S.

## Usage Guidelines

The **locator-table** command creates an association between a LISP instantiation and a virtual routing and forwarding (VRF) table through which the routing locator address space is reachable. The **show ip lisp locator-table** command displays the IPv4 LISP configuration status for a specific locator table. A locator table can be the default, meaning the global routing table, or id can be a specific VRF.

## Examples

The following shows sample output from the **show ip lisp locator-table** command for the vrf Cust-1:

```
Router# show ip lisp locator-table Cust-1

Information applicable to all EID instances:
Router-lisp ID:                1
Locator table:                 vrf Cust-1
Ingress Tunnel Router (ITR):    disabled
Egress Tunnel Router (ETR):     disabled
Proxy-ITR Router (PITR):       enabled RLOCs: 10.100.8.2
Proxy-ETR Router (PETR):       enabled
Map Server (MS):               disabled
Map Resolver (MR):             disabled
Delegated Database Tree (DDT):  disabled
ITR Map-Resolver(s):           10.100.1.2
ITR Solicit Map Request (SMR):  accept and process
```

```
      Max SMRs per map-cache entry: 8 more specifics
      Multiple SMR suppression time: 20 secs
      ETR accept mapping data: disabled, verify disabled
      ETR map-cache TTL: 1d00h
      Locator Status Algorithms:
        RLOC-probe algorithm: disabled
        LSB reports: process
      Map-cache limit: 1000
      Map-cache activity check period: 60 secs
      Persistent map-cache: disabled
Router#
```

**Related Commands**

Command	Description
<b>locator-table</b>	Configures the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.

# show ip lisp map-cache

To display the current dynamic and static IPv4 endpoint identifier-to-routing locator (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** {**default**| **vrfname**| **detail**}

## Syntax Description

<i>destination-EID</i>	(Optional) Destination EID for which to display mapping.
<i>destination-EID-prefix/prefix-length</i>	(Optional) Destination EID prefix for which to display mapping.
<b>eid-table</b>	(Optional) Specifies an EID table for which to display mapping.
<b>default</b>	(Optional) Displays detailed information for the default virtual routing and forwarding (VRF).
<b>vrf name</b>	(Optional) Displays detailed information for the identified VRF.
<b>detail</b>	(Optional) Displays 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.
Cisco IOS XE2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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 used, detailed (rather than summary) information related to all current dynamic and static IPv4 EID-to-RLOC map-cache entries is displayed.

## 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
```

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
```

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
```

**Related Commands**

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

# show ip lisp route-import

On a Proxy Ingress Tunnel Router (PITR), to display the current IPv4 endpoint identifier (EID) prefixes imported into Locator/ID Separation Protocol (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

<i>destination-eid</i>	(Optional) Destination EID for which to display mapping.
<i>destination-eid-prefix</i>	(Optional) Destination EID prefix for which to display mapping.
<b>eid-table</b> <b>vrf</b> <i>vrf-name</i>	(Optional) Limits the output of the command to the referenced EID table.
<b>instance-id</b> <i>iid</i>	(Optional) Limits the output of the command to the referenced instance ID.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.2(3)T	This command was introduced.

## Usage Guidelines

This command is used on a PITR to display the current IPv4 Routing Information Base (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 map-cache** command.

To restrict the output to a specific EID or EID prefix, add the *destination-eid* or *destination-eid-prefix* argument value to the command. To restrict the output to a specific EID table, add **eid-table** **vrf** *vrf-name* keywords and argument value to the command. To restrict the output to a specific LISP instance ID, add the **instance-id** *iid* keyword and argument value 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.

```
Router# 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           4d12h      bgp     installed
10.0.2.0/24           4d12h      bgp     installed
10.0.3.0/24           4d12h      bgp     installed
Router#

```

In the above output it can be seen that three BGP routes have been installed. The source of the routes is listed as bgp. 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 (for example, Pitr is not enabled).
- installed—The router has created the matching map-cache map-request entry.
- got-bumped—Another source of map-cache entry (for example, 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 reached.

#### Related Commands

Command	Description
<b>clear ip lisp route-import</b>	Clears the table and force a re-evaluation of all imported routes.
<b>debug lisp control-plane rib-route-import</b>	Displays LISP control plane activities related to the <b>ipv4 route-import</b> or <b>ipv6 route-import</b> commands.
<b>ipv4 route-import map-cache</b>	Configures a Proxy-ITR to dynamically import IPv4 LISP EID space for which it is proxying.

# show ip lisp statistics

To display Locator/ID Separation Protocol (LISP) IPv4 address-family packet count statistics, use the **show ip lisp statistics** command in privileged EXEC mode.

**show 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.
	Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
	Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
	15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

**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:                76/35
  Encapsulated Map-Requests in/out:   76/35
  RLOC-probe Map-Requests in/out:     0/0
  Map-Reply records in/out:           35/76
  Authoritative records in/out:       0/76
  Non-authoritative records in:       35
  Negative records in:                35
  RLOC-probe records in/out:          0/0
  Map-Registers out:                  626
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:      72/69
```

**show ip lisp statistics**

```
Number of EID-prefixes in map-cache:    3
Number of negative entries in map-cache: 3
Total number of RLOCs in map-cache:     0
Average RLOCs per EID-prefix:           0
Forwarding:
Number of data signals processed:        35 (+ dropped 0)
Number of reachability reports:          0 (+ dropped 0)
```

**Related Commands**

Command	Description
<b>show ip lisp</b>	Displays the IPv4 LISP configuration status for the local device.

# show ipv6 lisp

To display the Locator/ID Separation Protocol (LISP) IPv6 configuration status, use the **show ipv6 lisp** command in privileged EXEC mode.

**show ipv6 lisp** [*router-lisp-id*]

## Syntax Description

<i>router-lisp-id</i>	(Optional) router lisp instantiation id (0-15)
-----------------------	--

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB	This command was introduced.
15.1(1)XB1	This command was modified.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
15.1(1)XB2	This command was modified.
Cisco IOS XE Release 2.5.1XB	This command was modified.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M and modified to include the <b>locator-table</b> keyword.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S and modified to include the <b>locator-table</b> keyword.

## Usage Guidelines

When used without the optional router LISP ID value, the **show ipv6 lisp** command displays the IPv6 LISP configuration status for the local device for the default router LISP instantiation. When the *router-lisp-id* argument is used, the command displays the IPv6 LISP configuration status for the specified router LISP instantiation.

## 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)
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

```

The table below describes the significant fields shown in the display.

#### show ipv6 lisp Field Descriptors

**Table 2: ipv6 lisp Field Descriptions**

Field	Description
Ingress Tunnel Router (ITR)	Indicates whether the router is configured as an ITR. See the <b>ipv6 itr</b> command.
Egress Tunnel Router (ETR)	Indicates whether the router is configured as an ETR. See the <b>ipv6 etr</b> command.
Proxy-ITR (PITR)	Indicates whether the router is configured as a PITR. See the <b>ipv6 proxy-itr</b> command.
Proxy-ETR (PETR)	Indicates whether the router is configured as a PETR. See the <b>ipv6 proxy-etr</b> command.
Map Server (MS)	Indicates whether the router is configured as a map server. See the <b>ipv6 map-server</b> command.
Map Resolver (MR)	Indicates whether the router is configured as a map resolver. See the <b>ipv6 map-resolver</b> command.
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 the <b>ipv6 itr map-resolver</b> command.
ETR Map-Server(s)	Identifies the configured ETR map servers. See the <b>ipv6 etr map-server</b> command.
ITR Solicit Map Request (SMR)	Indicates whether SMRs are accepted and processed. See the <b>ipv6 solicit-map-request</b> command.
ETR accept mapping data	Indicates whether the ETR is configured to cache the mapping data contained in a map request. See the <b>ipv6 etr accept-map-request-mapping</b> command.



Field	Description
ETR map-cache TTL	Identifies the current ETR map-cache TTL. See the <b>ipv6 etr map-cache-ttl</b> command.
RLOC-probe algorithm	Indicates whether the locator reachability algorithm RLOC probing is enabled. See the <b>loc-reach-algorithm</b> command.
Static mappings configured	Indicates the number of static cache-map entries configured. See the <b>map-cache</b> command.
Map-cache size/limit	Indicates the number of entries currently in the map cache and indicates the limit value. See the <b>ipv6 map-cache-limit</b> command.
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 the <b>database-mapping</b> command.
Persistent map-cache	Indicates the persistent map-cache timer interval, next use, and storage location. See the <b>ipv6 map-cache-persistent</b> command.
ITR use proxy ETR RLOC configuration	When configured, indicates that the router uses PETR services and lists the PETR locator. See the <b>ipv6 use-petr</b> command.

The following sample output from the **show ipv6 lisp** command displays information about the current IPv6 LISP configuration status when a LISP instantiation has been created using the **router lisp router-lisp-id** command and the **locator-table** command. Below, the results shown are based on router LISP 6 and locator table VRF named Cust-1. (Other output varies depending on the LISP features configured.)

```
Router# show ipv6 lisp 6

Information applicable to all EID instances:
Router-lisp ID: 6
Locator table: vrf Cust-1
Ingress Tunnel Router (ITR): enabled
---<more>---
```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy for LISP.

Command	Description
<b>eid-table</b>	Configures a LISP instance-id for association with a VRF table or default table through which the EID address space is reachable.
<b>ipv6 etr</b>	Configures a router to act as an IPv6 LISP ETR.
<b>ipv6 etr map-cache-ttl</b>	Configures the TTL value inserted into LISP IPv6 map-reply messages.
<b>ipv6 etr map-server</b>	Configures the IPv4 or IPv6 locator address of the LISP map server to be used by the ETR when registering for IPv4 EIDs.
<b>ipv6 itr</b>	Configures the router to act as an IPv6 LISP ITR.
<b>ipv6 itr map-resolver</b>	Configures the 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.
<b>ipv6 lisp etr accept-map- request-mapping</b>	Configures an ETR to cache IPv6 mapping data contained in a map-request message.
<b>ipv6 lisp source- locator</b>	Configures a source locator to be used for IPv6 LISP encapsulated packets.
<b>ipv6 map-cache-limit</b>	Configures the maximum number of IPv6 LISP map-cache entries allowed to be stored by the router.
<b>ipv6 map-cache-persistent</b>	Configures how often, in minutes, an ITR should save its dynamically learned IPv6 map-cache entries to a file in flash.
<b>ipv6 map-resolver</b>	Configures the router to act as an IPv6 LISP map resolver.
<b>ipv6 map-server</b>	Configures the router to act as an IPv6 LISP map server.
<b>ipv6 solicit-map-request ignore</b>	Configures an ITR to ignore an IPv6 Map Request message that has the solicit-map-request (SMR) bit set.
<b>ipv6 proxy-etr</b>	Configures the router to act as an IPv6 LISP PETR.
<b>ipv6 proxy-itr</b>	Configures the router to act as an IPv6 LISP PITR.
<b>ipv6 use-petr</b>	Configures a router to use an IPv6 LISP PETR.

Command	Description
<b>locator-table</b>	Configures the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.
<b>map-cache</b>	Configures a static IPv4 or IPv6 EID-to-RLOC mapping relationship and its associated traffic policy, or statically configures the packet handling behavior associated with a specified destination IPv4 or IPv6 EID prefix.
<b>router lisp</b>	Enters LISP configuration mode and configures LISP commands on a router.
<b>show ipv6 lisp locator-table</b>	Displays the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.

# show ipv6 lisp database

To display Locator/ID Separation Protocol (LISP) Egress Tunnel Router (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]

## Syntax Description

<b>eid-prefix</b>	(Optional) Displays one of any IPv6 EID prefixes configured using the <b>database-mapping</b> command.
-------------------	--

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## Usage Guidelines

This command is used on LISP ETR devices to display the configured local IPv6 EID prefixes and associated locator sets.

## Examples

The following sample output from the **show ipv6 lisp database** command displays the configured IPv6 EID-prefix blocks and associated locator sets and the configured IPv6 endpoint identifier-to-routing locator (EID-to-RLOC) database mappings:

```
Router# show running-config
.
.
!
database-mapping 2610:D0:1209::/48 172.16.156.222 priority 1 weight 100
!
Router# show ipv6 lisp database

LISP ETR IPv6 Mapping Database, LSBs: 0x1

EID-prefix: 2610:D0:1209::/48
  172.16.156.222, priority: 1, weight: 100, state: up, local
```

**Related Commands**

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.

# show ipv6 lisp forwarding

To display Locator/ID Separation Protocol (LISP) IPv6 endpoint identifier (EID)-prefix forwarding information, use the **show ipv6 lisp forwarding** command in privileged EXEC mode.

**show ipv6 lisp forwarding {eid {local| remote [detail]}}| state}**

## Syntax Description

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

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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
```

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 the EID prefix, associated locator status bits, and total encapsulated packets and 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
```

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 the 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
```

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
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
```

## show ipv6 lisp forwarding

```

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

```

## Related Commands

Command	Description
<b>database-mapping</b>	Configures an IPv6 EID-to-RLOC mapping relationship and its associated traffic policy.
<b>ipv6 lisp etr accept-map- request-mapping</b>	Configures an ETR to cache IPv6 mapping data contained in a map-request message.
<b>show ipv6 lisp map-cache</b>	Displays the current dynamic and static IPv6 EID-to-RLOC map-cache entries.



## show ipv6 lisp instance-id

To display the negative prefix hole in the LISP ALT for an EID within a specified instance-id, use the **show ipv6 lisp instance-id** command in privileged EXEC mode.

**show ipv6 lisp instance-id** *iid alt negative-prefix EID-prefix*

### Syntax Description

<i>iid</i>	EID instance-id.
<i>EID-prefix</i>	IPv4 EID address covered by negative ALT prefix.

### 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 2.5.1XC.

### Usage Guidelines

This command is only used on LISP Map-Server (MS) devices to display the negative prefix hole in the LISP ALT for an EID within a specified instance-id.

### Examples

The following sample output from the show ip lisp instance-id command for the instance-id 123 and EID 2001:db8:c::1.

```
Router# show ipv6 lisp instance-id 123 alt negative-prefix 2001:db8:c::1
Negative mapping system prefix 2001:DB8:C::/46
Router#
```

### Related Commands

Command	Description
<b>eid-prefix (LISP site)</b>	Configures the EID-prefix associated with a LISP site on a Map-Server as part of the LISP Site configuration process.

# show ipv6 lisp locator-table

To display Locator/ID Separation Protocol (LISP) IPv6 configurations associated with a specific locator table, use the **show ipv6 lisp locator-table** command in privileged EXEC mode.

**show ipv6 lisp locator-table** {default| vrf *vrf-name*}

## Syntax Description

<b>default</b>	Displays IPv6 LISP information and configuration status related to the default table.
<b>vrf</b> <i>vrf-name</i>	Displays IPv6 LISP information and configuration status related to the specified VRF name.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
15.1(1)XB6	This command was introduced.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S.

## Usage Guidelines

The **locator-table** command creates an association between a LISP instantiation and a virtual routing and forwarding (VRF) table through which the routing locator address space is reachable. The **show ipv6 lisp locator-table** command is used to display the IPv6 LISP configuration status for a specific locator table. A locator table can be the default, meaning the global routing table, or a specific VRF.

## Examples

The following is sample output from the **show ipv6 lisp locator-table** command for the VRF named Cust-1:

```
Router# show ipv6 lisp locator-table Cust-1

Information applicable to all EID instances:
Router-lisp ID:                1
Locator table:                 vrf Cust-1
Ingress Tunnel Router (ITR):   disabled
Egress Tunnel Router (ETR):    disabled
Proxy-ITR Router (PITR):      enabled RLOCs: 2001:db8:1:1::1
Proxy-ETR Router (PETR):       enabled
Map Server (MS):               disabled
Map Resolver (MR):             disabled
Delegated Database Tree (DDT): disabled
ITR Map-Resolver(s):           10.100.1.2
ITR Solicit Map Request (SMR): accept and process
  Max SMRs per map-cache entry: 8 more specifics
  Multiple SMR suppression time: 20 secs
```

```
ETR accept mapping data:      disabled, verify disabled
ETR map-cache TTL:            1d00h
Locator Status Algorithms:
  RLOC-probe algorithm:       disabled
  LSB reports:                process
Map-cache limit:              1000
Map-cache activity check period: 60 secs
Persistent map-cache:         disabled
Router#
```

**Related Commands**

Command	Description
<b>locator-table</b>	Configure the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.

# show ipv6 lisp map-cache

To display the current dynamic and static IPv6 endpoint identifier-to-routing locator (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*] **detail**

## Syntax Description

<i>destination-EID</i>	(Optional) Destination EID for which to display mapping information.
<i>destination-EID-prefix/prefix-length</i>	(Optional) Destination EID prefix for which to display mapping information.
<b>detail</b>	(Optional) Displays detailed EID-to-RLOC cache mapping information.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB1	This command was introduced.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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 used, detailed (rather than summary) information related to all current dynamic and static IPv4 or IPv6 EID-to-RLOC map-cache entries is displayed.

## 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 the 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

```

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

```

## Related Commands

Command	Description
<b>show ipv6 lisp forwarding</b>	Displays LISP local or remote IPv6 EID-prefix information.

## show ipv6 lisp route-import

On a Proxy Ingress Tunnel Router (PITR), to display the current IPv6 endpoint identifier (EID) prefixes imported into Locator/ID Separation Protocol (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

<i>destination-eid</i>	(Optional) Destination EID for which to display mapping.
<i>destination-eid-prefix</i>	(Optional) Destination EID prefix for which to display mapping.
<b>eid-table vrf</b> <i>vrf-name</i>	(Optional) Limits the output of the command to the referenced EID table.
<b>instance-id</b> <i>iid</i>	(Optional) Limits the output of the command to the referenced instance ID.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
15.2(3)T	This command was introduced.

### Usage Guidelines

This command is used on a PITR to display the current IPv6 Routing Information Base (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 map-cache** command.

To restrict the output to a specific EID or EID prefix, add the *destination-eid* or *destination-eid-prefix* argument value to the command. To restrict the output to a specific EID table, add **eid-table vrf** *vrf-name* keywords and argument value to the command. To restrict the output to a specific LISP instance ID, add the **instance-id** *iid* keyword and argument value 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.

```
Router# 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       4d12h      bgp     installed
2001:DB8:B::/48       4d12h      bgp     installed
2001:DB8:C::/48       4d12h      bgp     installed
Router#

```

In the above output it can be seen that three BGP routes have been installed. The source of the routes is listed as bgp. 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 (for example, Pitr is not enabled).
- installed—The router has created the matching map-cache map-request entry.
- got-bumped—Another source of map-cache entry (for example, 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 reached.

#### Related Commands

Command	Description
<b>clear ipv6 lisp route-import</b>	Clears the current IPv6 RIB routes imported into LISP.
<b>debug lisp control-plane rib-route-import</b>	Displays LISP control plane activities related to the <b>ipv4 route-import</b> or <b>ipv6 route-import</b> commands.
<b>ipv6 route-import map-cache</b>	Configures a Pitr to dynamically import IPv6 LISP EID space for which it is proxying.

# show ipv6 lisp statistics

To display Locator/ID Separation Protocol (LISP) IPv6 address-family statistics, use the **show ipv6 lisp statistics** command in privileged EXEC mode.

**show 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.
Cisco IOS XE Release 2.5.1XA	This command was integrated into Cisco IOS XE Release 2.5.1XA.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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: 00:56:49
Control Packets:
  Map-Requests in/out:                0/15
  Encapsulated Map-Requests in/out:    0/15
  RLOC-probe Map-Requests in/out:      0/0
  Map-Reply records in/out:            4/0
  Authoritative records in/out:        4/0
  Non-authoritative records in:         0
  Negative records in:                 0
  RLOC-probe records in/out:           1/0
  Map-Registers out:                  114
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:       8/7
```



```
Number of EID-prefixes in map-cache:      3
Number of negative entries in map-cache:  2
Total number of RLOCs in map-cache:       2
Average RLOCs per EID-prefix:             2
Forwarding:
Number of data signals processed:          0 (+ dropped 0)
Number of reachability reports:           0 (+ dropped 0)
```

**Related Commands**

Command	Description
<b>show ipv6 lisp</b>	Displays the IPv6 LISP configuration status for the local device.

# show lisp

To display summary information related to the Locator/ID Separation Protocol (LISP) configuration, use the **show lisp** command in privileged EXEC mode.

**show lisp** [*router-lisp-id*]

## Syntax Description

<i>router-lisp-id</i>	(Optional) Router LISP instantiation ID. Valid values are 0 to 15.
-----------------------	--

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB6	This command was introduced.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M and modified to include the <b>locator-table</b> keyword.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S and modified to include the <b>locator-table</b> keyword.

## Usage Guidelines

When used without the optional router LISP ID value, the **show lisp** command displays summary information about the default router LISP process, including any associated locator table or EID instance IDs. When the optional *router-lisp-id* argument is used, the **show lisp** command displays the summary locator table or EID instance IDs related to the specified router LISP instantiation.

## Examples

The following is sample output from the **show lisp** command:

```
Router# show lisp
```

```
Router-lisp ID:      0
Locator table:      default
EID instance count:  1
Router#
```

The following is sample output from the **show lisp** command when using the optional router LISP ID (and a configuration exists for this router LISP instantiation):

```
Router# show lisp 1
```

```
Router-lisp ID:      1
Locator table:      vrf Cust-1
EID instance count:  1
Router#
```

**Related Commands**

Command	Description
<b>router lisp</b>	Configures a LISP instantiation on the device.

# show lisp ddt

To display the configured DDT root(s) and/or DDT delegation nodes on a router enabled for LISP DDT, use the **show lisp ddt** command in privileged EXEC mode.

**show lisp ddt** [*negative-prefix* | *referral-cache* | {*eid-address*| *iid*}] **queue**

## Syntax Description

<b>negative-prefix</b>	(Optional) Displays the DDT node delegation hole.
<b>referral-cache</b>	(Optional) Displays the DDT referral cache contents.
<i>eid-address</i>	(Optional) IPv4/IPv6 EID address or prefix.
<i>iid</i>	(Optional) EID instance ID.
<b>queue</b>	(Optional) Displays the DDT request queue.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

Use this command to display the configured DDT root(s) and/or DDT delegation nodes on a device that is enabled for LISP DDT node.

## Examples

The following example shows the output of the **show lisp ddt** command for a LISP DDT node configured as a map resolver that refers to three LISP DDT root nodes with locators (10.1.1.1, 10.2.1.1, and 10.3.1.1) and configured as a map server for the EID prefixes 172.16.0.0/16 and 2001:db8:eeee::/48 in the default (0) instance ID for its own locator (10.1.10.10) and a peer map server locator (10.2.10.10).

```
Device> enable
Device# show lisp ddt

LISP-DDT Configuration in VRF "default"
  DDT IP Map-Resolver configured
  DDT IPv6 Map-Resolver configured
  DDT IP Map-Server configured
  DDT IPv6 Map-Server configured
Configured DDT roots: 10.1.1.1 10.2.1.1 10.3.1.1
Configured DDT delegated nodes/map-servers:
  [0] 172.16.0.0/16 -> 10.1.10.10, p/w: 0/0, map-server-peer
  [0] 172.16.0.0/16 -> 10.2.10.10, p/w: 0/0, map-server-peer
  [0] 2001:db8:eeee::/48 -> 10.1.10.10, p/w: 0/0, map-server-peer
```

```
[0] 2001:db8:eeee::/48 -> 10.2.10.10, p/w: 0/0, map-server-peer  
Configured authoritative EID-prefixes:  
[0] 172.16.0.0/16  
[0] 2001:db8:eeee::/48
```

**Related Commands**

Command	Description
<b>clear lisp ddt</b>	Clears the DDT referral cache stored on a DDT-enabled map resolver.
<b>ddt</b>	Configures a device to enable LISP DDT functionality.

# show lisp locator-table

To display summary information related to the Locator/ID Separation Protocol (LISP) configuration, use the **show lisp locator-table** command in privileged EXEC mode.

**show lisp locator-table** {**default**|**vrf** *vrf-name*}

## Syntax Description

<b>default</b>	Displays summary information related to the default table.
<b>vrf</b> <i>vrf-name</i>	Displays summary information related to the specified virtual routing and forwarding (VRF) table.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
15.1(1)XB6	This command was introduced.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M and modified to include the <b>locator-table</b> keyword.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S and modified to include the <b>locator-table</b> keyword.

## Usage Guidelines

The **locator-table** command creates an association between a LISP instantiation and a VRF table through which the routing locator address space is reachable. When used with the **default** keyword, the **show lisp locator-table** command displays summary information about the default locator table, including any associated locator table or EID instance IDs. When the optional **vrf** *vrf-name* keyword and argument is included, the **show lisp** command displays summary information related to the specified locator table, including any associated locator table or EID instance IDs.

## Examples

The following is sample output from the **show lisp locator-table default** command:

```
Router# show lisp locator-table default

Router-lisp ID:      0
Locator table:      default
EID instance count:  1
Router#
```

The following is sample output from the **show lisp locator-table vrf** command when using the locator-table VRF option (and a configuration exists for the specified locator table and VRF):

```
Router# show lisp locator-table vrf Cust-1
```

```
Router-lisp ID:      1
Locator table:       vrf Cust-1
EID instance count:  1
Router#
```

#### Related Commands

Command	Description
<b>locator-table</b>	Configures the association of a VRF table through which the routing locator address space is reachable to a router LISP instantiation.

# show lisp site

To display configured LISP sites on a Locator/ID Separation Protocol (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*][**name** *site-name*][**detail**]

## Syntax Description

<i>IPv4-dest-EID</i>	(Optional) Displays LISP site information matching this destination endpoint identifier (EID).
<i>IPv4-dest-EID-prefix</i>	(Optional) Displays LISP site information matching this destination EID prefix.
<i>IPv6-dest-EID</i>	(Optional) Displays LISP site information matching this destination EID.
<i>IPv6-dest-EID-prefix</i>	(Optional) Displays LISP site information matching this destination EID prefix.
<b>name</b> <i>site-name</i>	(Optional) Displays LISP site information matching this site name.
<b>detail</b>	(Optional) Increases 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.
Cisco IOS XE Release 2.5.1XB	This command was integrated into Cisco IOS XE Release 2.5.1XB.
Cisco IOS XE Release 3.3.0S	This command was integrated into Cisco IOS XE Release 3.3.0S.
15.1(4)M	This command was integrated into Cisco IOS Release 15.1(4)M.

## 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, an 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 Register	Up	Who Last Registered	EID Prefix
site1-xtr	00:00:04	yes	10.0.2.1	192.168.1.0/24
	00:00:04	yes	10.0.2.1	2001:DB8:A::/48
site2-xtr	00:00:35	yes	10.0.9.1	192.168.11.0/24
	00:00:35	yes	10.0.10.1	2001:DB8:B::/48


The following sample output from the **show lisp site dmm-xtr-1** command displays detailed information related specifically to the LISP sites dmm-xtr-1.

```
Map-Server# show lisp site name sitel-xtr
```

```
Description: LISP Site 1
Allowed configured locators: any
Allowed EID-prefixes:
  EID-prefix: 192.168.1.0/24
    First registered: 00:17:15
    Routing table tag: 0x0
    ETR 10.0.3.1, last registered 00:00:01, no proxy-reply
      Locator Local State Pri/Wgt
      10.0.2.1 no up 1/50
      10.0.3.1 yes up 1/50
    ETR 10.0.2.1, last registered 00:00:24, no proxy-reply
      Locator Local State Pri/Wgt
      10.0.2.1 yes up 1/50
      10.0.3.1 no up 1/50
  EID-prefix: 2001:DB8:A::/48
    First registered: 00:17:14
    Routing table tag: 0x0
    ETR 10.0.2.1, last registered 00:00:23, no proxy-reply
      Locator Local State Pri/Wgt
      10.0.2.1 yes up 1/50
      10.0.3.1 no up 1/50
    ETR 10.0.3.1, last registered 00:00:58, no proxy-reply
      Locator Local State Pri/Wgt
      10.0.2.1 no up 1/50
      10.0.3.1 yes up 1/50
```

## Related Commands

Command	Description
<b>show ip lisp</b>	Displays the IPv4 LISP configuration status for the local device.

 show lisp site



## LISP VM-Mobility Commands

---

- [database-mapping \(LISP dynamic-EID\), page 324](#)
- [dynamic-eid, page 326](#)
- [map-notify-group, page 329](#)
- [map-server, page 331](#)

## database-mapping (LISP dynamic-EID)

To configure an IPv4 mapping relationship and an associated traffic policy for Locator/ID Separation Protocol (LISP) Virtual Machine (VM)-mobility (dynamic-EID) policy, enter dynamic-EID configuration mode, use the **database-mapping** command in LISP dynamic-EID EID-table configuration mode. To remove the configured database mapping, use the **no** form of this command.

**database-mapping** *dynamic-eid-prefix/prefix-length* **locator-set** *name*

**no database-mapping**

### Syntax Description

<i>dynamic-eid-prefix/prefix-length</i>	IPv4 dynamic-EID prefix and length to be registered as a roaming EID for the policy.
<b>locator-set</b>	Specifies the IPv4 routing locator (RLOC) associated with the EID prefix.
<i>name</i>	Name of the existing locator set.

### Command Default

No dynamic-EID database entries are defined.

### Command Modes

LISP dynamic-EID EID-table configuration (config-router-lisp-eid-table-dynamic-eid)

### Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

### Usage Guidelines

When a dynamic-EID policy is configured, you must specify the dynamic-EID-to-RLOC mapping relationship and its associated traffic policy to use for each permitted prefix. When a packet is received on an interface on which the **lisp mobility** command has been applied, the source address of the packet is compared against the EID configured in the **database-mapping** (LISP dynamic-eid) entry (or entries) of the referenced LISP **dynamic-eid** *dynamic-eid-policy-name* that matches the **lisp mobility** *dynamic-eid-policy-name*.

When a dynamic-EID match is discovered, the dynamic-EID will be registered to the map server with a locator set. Only one **database-mapping** (LISP dynamic-EID) entry command is allowed per **dynamic-eid** *dynamic-eid-policy-name*. Both *dynamic-eid-prefix* and *locator-set* can be IPv4 addresses.

**Note**

All **database-mapping** dynamic-EID commands must be consistent on all LISP-VM routers supporting the same roaming dynamic EID.

**Examples**

The following example shows how to configure the dynamic EID prefix to describe attributes about the dynamic EID prefix and its range in comparison to any static entries configured. It must use the locator set functionality because it cannot use a RLOC address directly. It enters the LISP dynamic-EID EID-table configuration mode and configures the **database-mapping** command with the dynamic-EID prefix 172.15.1.0/24.

```
Device> enable
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# locator-set Site-1
Device(config-router-lisp-locator-set)# 172.16.1.1 priority 0 weight 0
R1(config-router-lisp-locator-set)# exit
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# dynamic-eid Roamer-1
Device(config-router-lisp-eid-table-dynamic-eid)# database-mapping 172.15.1.0/24 locator-set
Site-1
```

**Related Commands**

Command	Description
<b>database-mapping</b> (LISP EID-table)	Configures an IPv4 EID-to-RLOC mapping relationship and an associated traffic policy for LISP.
<b>dynamic-eid</b>	Configures a LISP VM-mobility (dynamic-EID roaming) policy and enters dynamic-EID configuration mode on an xTR.
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.

## dynamic-eid

To configure a Locator/ID Separation Protocol (LISP) virtual machine (VM)-mobility (dynamic-EID roaming) policy, enter dynamic-EID configuration mode on an xTR and use the **dynamic-eid** command in LISP EID-table configuration mode. To remove the LISP VM-mobility dynamic-EID policy, use the **no** form of this command.

**dynamic-eid** *dynamic-eid-name*

**no dynamic-eid** *dynamic-eid-name*

### Syntax Description

<i>dynamic-eid-name</i>	Name of a LISP dynamic-EID.
-------------------------	-----------------------------

### Command Default

No LISP dynamic-EID policies are configured.

### Command Modes

LISP EID-table configuration (config-router-lisp-eid-table)

### Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

### Usage Guidelines

To configure LISP VM-mobility, you must create a dynamic-EID roaming policy that can be referenced by the **lisp mobility** *dynamic-eid-name* interface command. When the **dynamic-eid** *dynamic-eid-name* command is entered, the referenced LISP dynamic-EID policy is created and you enter the dynamic-EID configuration mode. In this mode, all attributes associated with the referenced LISP dynamic-EID policy can be entered.

**Note**

The following caveats apply for LISP VM-mobility requirements across subnet modes (ASM):

- When a dynamic EID roams across subnets, the dynamic-EID prefix must be more specific or equal to the subnet configured on the interface.
- xTR should be the first Layer-3 hop.
- Proxy-arp should be enabled on the xTR's gateway interface.
- Gateway Mac addresses for xTRs should be the same on all roaming sites.
- All roaming sites xTRs should register with the same set of map servers.
- Mobility hosts should not be “silent” after they move.
- Multicast on xTRs is required if a site has multiple xTRs.
- North-South traffic has vmotion/live host mobility support; for East-West traffic, LISP mobility ESM should be used.
- All LISP VM-router interfaces (the interface the dynamic EID will roam to) must have the same MAC address. Interfaces can be configured with the following command: **mac-address 0000.0e1d.010c**

Note that any MAC address can be used; the MAC address in the example above, which approximates EID (0e1d) and LOC (010c), is an example.

**Note**

This feature is available only for IPv4 at this time. Support for IPv6, including necessary changes for IPv6 neighbor discovery (ND) has not yet been implemented.

**Note**

When the **lisp extended-subnet-mode** command is configured on an interface, any dynamic-EID prefixes configured using **lisp mobility** commands on the same interface must be equal or more specific prefixes than any overlapping subnet prefixes. For example, if the **lisp extended-subnet-mode** command is configured on an interface that has a base subnet of a /24, then when the **lisp mobility dyn-eid-name** command is configured, the EID prefix for dynamic EID *dyn-eid-name* must be /24 or greater.

**Examples**

The following example shows how to enter EID-table mode and configure the **dynamic-eid** command:

```
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# eid-table default instance-id 0
Device(config-router-lisp-eid-table)# dynamic-eid Site-1
```

**Related Commands**

Command	Description
<b>eid-table</b>	Configures a LISP instance ID for association with a VRF table or default table through which the EID address space is reachable.

Command	Description
<b>lisp extended-subnet-mode</b>	Configures an interface to create a dynamic-EID state for hosts attached on their own subnet to track EID movement from one part of the subnet to another part of the same subnet.
<b>lisp mobility</b>	Configures an interface on an ITR to participate in LISP VM-mobility (dynamic-EID roaming).



# map-notify-group

To enable a router to send map-notify messages to other Locator/ID Separation Protocol-virtual machine (LISP-VM) routers, use the **map-notify-group** command in dynamic-EID configuration mode. To remove this functionality, use the **no** form of this command.

**map-notify-group** {*ipv4-group-address*| *ipv6-group-address*}

**no map-notify-group**

## Syntax Description

<i>ipv4-group-address</i>	IPv4 multicast group address used for sending and receiving site-based map-notify multicast messages.
<i>ipv6-group-address</i>	IPv6 multicast group address used for sending and receiving site-based map-notify multicast messages.

## Command Default

No map-notify message is sent to other LISP-VM routers.

## Command Modes

Dynamic-EID configuration (config-router-lisp-dynamic-eid)

## Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

## Usage Guidelines

This command is used when dynamic-EID discovery is necessary in a multihomed data center. When a dynamic EID has been configured with more than one locator in the locator set, any locator can decapsulate LISP packets that enter the data center. Because unicast packets that egress the data center go out a single LISP-VM router, this router is the only one that can discover the location of a roaming dynamic EID. By using this command, the discovering LISP-VM router will send map-notify messages to other LISP-VM routers (via the configured *ipv4-group-address* multicast group address) at the data center site, so that they can determine the location of the dynamic EID.

The multicast group address is used for sending and receiving site-based map-notify multicast messages. The interface for which this multicast map-notify messages are received on is the interface used to send decapsulated packets to the dynamic EID. This feature is disabled by default.

## Examples

The following example shows how to configure a LISP dynamic-EID policy named Site-1, enter dynamic-EID configuration mode, and configure the **map-notify-group** command.

```
Device(config)# router lisp  
Device(config-router-lisp)# lisp dynamic-eid Site-1  
Device(config-router-lisp-dynamic-eid)# map-notify-group 239.1.1.254
```

## Related Commands

Command	Description
<b>lisp mobility</b>	Configures an interface on an ITR to participate in LISP VM-mobility (dynamic-EID roaming).

## map-server

To configure the map server to which the dynamic EID registers to when this policy is invoked, use the **map-server** command in dynamic-EID configuration mode. To remove the configured reference to the map server, use the **no** form of this command.

**map-server** *address* {**key** *key-type* *password*| **proxy-reply**}

**no map-server** *address* {**key** *key-type* *password*| **proxy-reply**}

### Syntax Description

<i>address</i>	IPv4 or IPv6 address of the map server
<b>key</b> <i>key-type</i>	Specifies how the key-type that the following SHA-1 password (key) is encoded. Type (0) indicates that a cleartext password follows; Type (3) indicates that a 3DES encrypted key follows; Type (7) indicates that a Cisco Type 7 encrypted password follows.
<i>password</i>	Password used to create the SHA-1 HMAC hash when authenticating the map-register message sent by the ETR.
<b>proxy-reply</b>	Specifies that the map register sent to the map server requests that the map server proxy map reply on behalf of dynamic EIDs included in this policy.

### Command Default

No map server is configured within a dynamic-EID policy and the configured map-server on the LISP-VM router (from the {**ip**|**ipv6**} **lisp etr map-server** command) will be used to register the dynamic EID.

### Command Modes

Dynamic-EID configuration (config-router-lisp-dynamic-eid)

### Command History

Release	Modification
15.3(1)T	This command was introduced.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.

### Usage Guidelines

In LISP virtual machine (VM) Mobility, when a dynamic-EID roams to this LISP-VM router, the dynamic EID must be registered to a map server with its new attributes (the 3-tuple of (*locator*, *priority*, *weight*) according to the **database-mapping** dynamic-EID command). This **map-server** dynamic-EID command configures the map server to which the dynamic EID registers. The locator value specified in the **map-server** command can be either an IPv4 or IPv6 address in locator space.

Multiple **map-server** commands can be configured so that registration can occur to different map servers with either the same or different authentication keys.

**Note**

Typically, the home map server (that is, the one that the dynamic EID initially registered to) should be configured as the dynamic-EID map server.

When the **map-server** dynamic EID command is not configured, the configured map server on the LISP-VM router (from the **{ip|ipv6} lisp etr map-server** command) will be used to register the dynamic EID.

When the **proxy-reply** keyword is configured, the map-register sent to the map-server requests that the map-server proxy map-reply on behalf of dynamic-EIDs when it receives a Map-Request for the dynamic-EID prefix.

**Examples**

The following example shows how to configure the LISP dynamic EID policy named Roamer-1, enter dynamic EID configuration mode, and then configure the map server with IPv4 locator 10.1.1.1 for dynamic EIDs matching this policy to register. The map server is also specified to proxy-reply on behalf of the dynamic EID.

```
Device# configure terminal
Device(config)# router lisp
Device(config-router-lisp)# dynamic-eid Roamer-1
Device(config-router-lisp-dynamic-eid)# map-server 10.1.1.1 key some-password
Device(config-router-lisp-dynamic-eid)# map-server 10.1.1.1 proxy-reply
```

**Related Commands**

Command	Description
<b>lisp mobility</b>	Configures an interface on an ITR to participate in LISP VM-mobility (dynamic-EID roaming).