Hewlett Packard Enterprise

HPE FlexNetwork MSR Router Series

Comware 7 LISP Configuration Guide

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Acknowledgments

Contents

Configuring LISP

Overview

The Locator/Identifier Separation Protocol (LISP) replaces the IP address space with the following two independent address spaces for traffic transmission:

- **EIDs**—Endpoint Identifiers, assigned to end hosts, define the source and destination of packets.
- **RLOCs**—Routing Locators, assigned to LISP routers, define how packets are forwarded and routed.

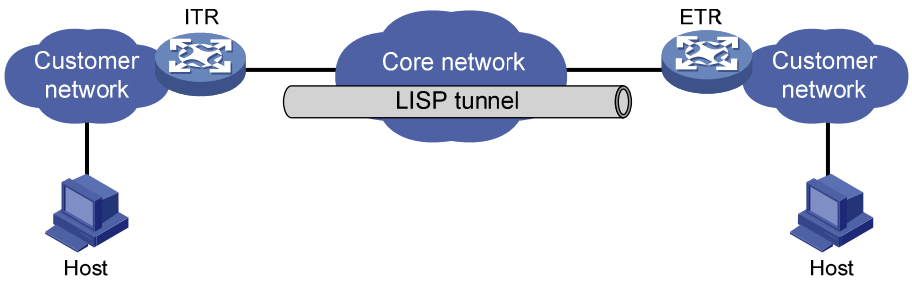
LISP has the following features:

- Reduction in traditional network diameter and routing table size.
- End host mobility. The end hosts can roam without changing their EIDs.
- Virtualization and multi-tenant.

LISP network framework

Figure 1 shows a basic LISP network framework.

Figure 1 LISP network framework



The LISP network includes the following elements:

- **Core network**—Uses Provider-Assigned (PA) addresses for traffic host identification and internal routing.
- **Customer network**—Uses Provider-Independent (PI) addresses to identify the end hosts and for addressing.
- **ITR**—Ingress Tunnel Router. An ITR encapsulates packets received from the end hosts and sends them to the ETR.
- **ETR**—Egress Tunnel Router. An ETR decapsulates packets received from an ITR and sends the packets to their destination EIDs.
- **xTR**—A tunnel router that has the functionalities of both ITR and ETR.
- **FHR**—First Hop Router. In a Layer 2 multihop mobility topology, an FHR detects the existence of end hosts and notifies the Site GW xTR.
- **Site GW xTR**—Site Gateway xTR. In a Layer 2 multihop mobility topology, a Site GW xTR encapsulates and decapsulates the traffic.

How LISP works

LISP routes and forwards traffic from an end host to a remote site by using the following process:

1. An end host performs a DNS lookup to obtain the destination EID for the remote site's domain name.
2. The end host adds an inner header to the packet with the source and destination EIDs and forwards the packet to an ITR.
3. The ITR searches the destination RLOC in the EID-to-RLOC mappings for the destination EID of the received packet.
4. The ITR encapsulates the packet in a UDP datagram and adds an outer header to the packet with the source and destination RLOCs.
5. The ITR sends the UDP datagram to the ETR.
6. When the ETR receives the UDP datagram, it decapsulates the datagram and removes the outer header.
7. The ETR forwards the packet to the remote site.

LISP data plane

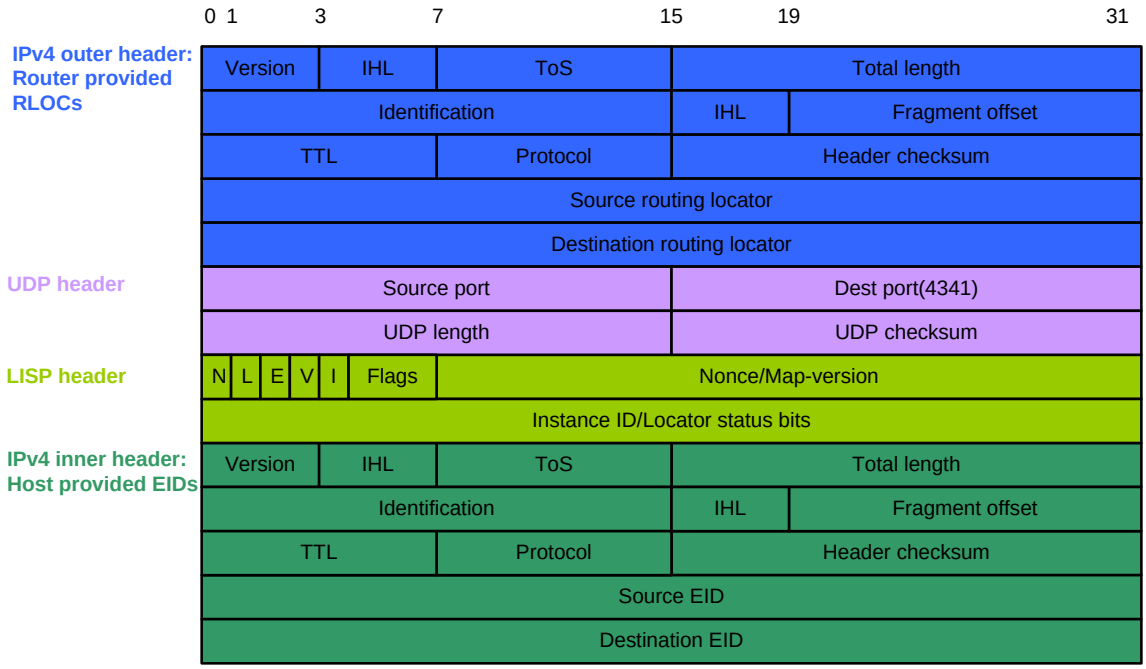
LISP encapsulates traffic sourced from the end hosts in the data plane. LISP supports IPv4-in-IPv4, IPv4-in-IPv6, IPv6-in-IPv4, and IPv6-in-IPv6 encapsulations.

NOTE:

HPE LISP supports only IPv4-in-IPv4 encapsulation.

Before entering the LISP tunnel, the traffic is added with a UDP header, a LISP header, and an outer header, with a total length of 36 to 56 bytes. Figure 2 shows the LISP IPv4-in-IPv4 header format.

Figure 2 LISP IPv4-in-IPv4 header format



LISP control plane

LISP manages the EID-to-RLOC mapping information in the control plane.

- **EID-to-RLOC mapping database**—A database used by each ETR to store EID-to-RLOC mappings. All ETRs in a LISP site share the mapping information for this site.
- **MS**—Map-Server. A Map-Server learns and maintains the EID-to-RLOC mapping information in the Map-Register messages received from ETRs.
- **MR**—Map-Resolver. A Map-Resolver processes Map-Request messages sent by ITRs.

NOTE:

An MS also acts as an MR.

LISP messages

The LISP control plane uses the following types of UDP-based messages:

- **Map-Request**—Sent by an ITR to an MR or an ETR to request EID-to-RLOC mapping information. The UDP source port number of the message is random and the destination port number is 4342.
- **Map-Reply**—Used by an ETR to respond to a Map-Request. The UDP source port number of the message is 4342. The UDP destination port number is the source port of the Map-Request message.
- **Map-Register**—Periodically sent by an ETR to register EID-to-RLOC mappings with an MS. The UDP source port number of the message is random and the destination port number is 4342.
- **ECM**—Encapsulated Control Message. A Map-Request message is encapsulated into an ECM message before it is sent from an ITR to MR or forwarded from an MS to ETR. During the encapsulation, an additional LISP header is added to the Map-Request message with the global source and destination RLOCs. The UDP source port number of the ECM message is random and the destination port number is 4342.
- **Map-Notify**—Used by an MS to notify the ETR that the Map-Register message is received and processed.
- **Map-ACK**—Used by an ETR to acknowledge the receipt of a Map-Notify message.

EID-to-RLOC mapping registration

An ETR registers EID-to-RLOC mapping information with an MS as follows:

1. The ETR periodically sends a Map-Register message to the MS. The Map-Register message carries the EID-to-RLOC mapping information for the local LISP site.
2. When the MS receives the Map-Register message, it records the EID-to-RLOC mappings for the LISP site.
3. The MS sends a Map-Notify message to the ETR.
4. When the ETR receives the Map-Notify message, it sends a Map-ACK message to the MS.

ITR EID-to-RLOC mapping resolution

After receiving a packet from an end host in the LISP site, an ITR performs a lookup in its local mapping cache for the destination EID of the packet. If no mapping is found, a mapping resolution is initiated as follows:

1. The ITR encapsulates a Map-Request in an ECM message and sends the ECM message to the MR for EID-to-RLOC mapping resolution.
2. When the MR receives the ECM message, it performs the following operations:
   a. Decapsulates the ECM message.
   b. Forwards the Map-Request to the MS.

3. When the MS receives the Map-Request, it performs the following operations:
   a. Searches its mapping database for an ETR that has registered mapping information for the requested EID.
   b. Encapsulates the Map-Request in an ECM message.
   c. Sends the ECM message to the ETR.
4. When the ETR receives the ECM message, it performs the following operations:
   a. Decapsulates the ECM message.
   b. Searches its mapping database for the RLOC of the requested EID.
   c. Returns the RLOC in a Map-Reply to the ITR.
5. When the ITR receives the Map-Reply, it checks the information in the message and updates its mapping cache.
6. For subsequent packets addressed to the same EID, ITR performs a LISP encapsulation and directly forwards the packets to the ETR according to the information in its mapping cache.

LISP multi-instance

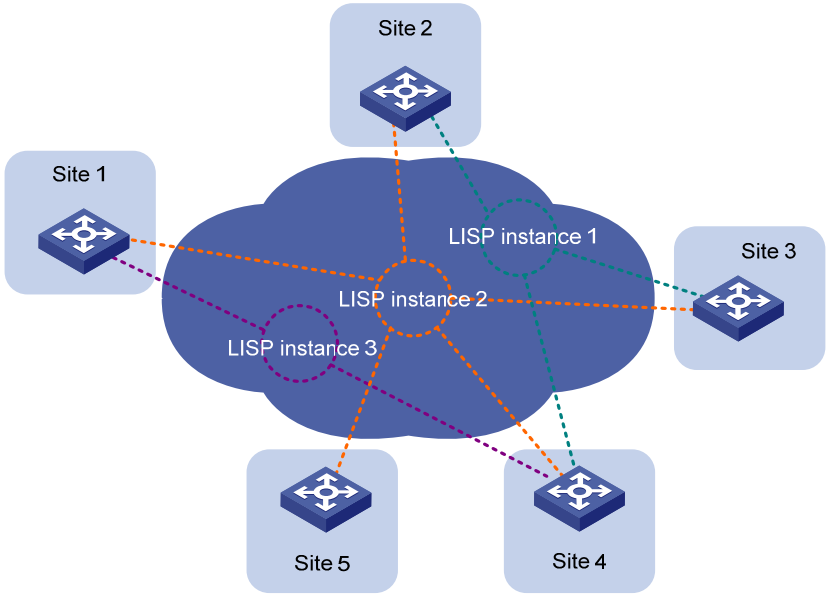
The LISP network supports multiple instances. LISP uses multiple instances to separate traffic from different tenants and route the traffic between different LISP sites.

LISP multi-instance implements the following functions:

- LISP supports virtualization by adding a 24-bit unique instance ID to both control messages and data packets.
- The control information, data flows, and EID-to-RLOC mappings in the database and mapping cache are all marked by instance IDs.
- Each instance ID can be mapped to a VPN Routing & Forwarding (VRF) instance ID to implement multiple mapping caches on an edge device.
- LISP can implement virtualization at two levels. EIDs and RLOCs can be separately marked by different instance IDs.

Figure 3 shows three instances configured in a LISP network.

Figure 3 LISP multi-instance topology

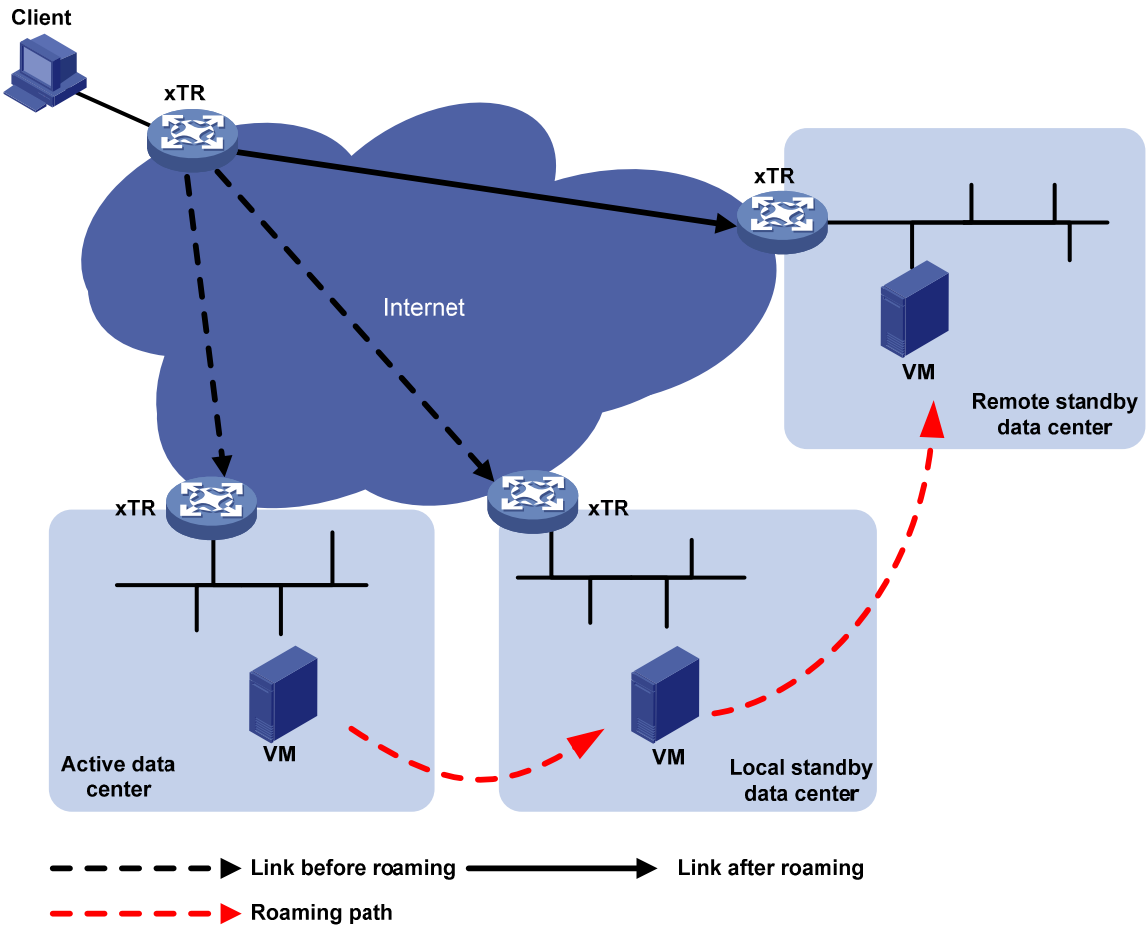


Virtual machine mobility

Virtual machine mobility across subnets

Virtual machine mobility across subnets applies to active-standby data centers, as shown in Figure 4.

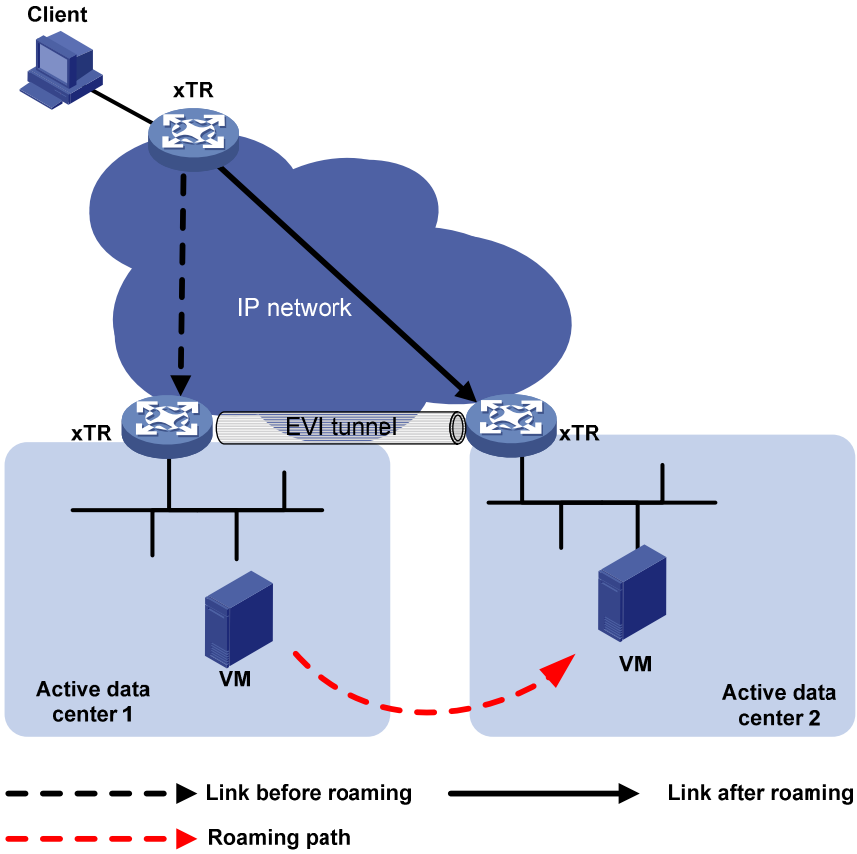
Figure 4 Virtual machine mobility across subnets



Virtual machine mobility within a subnet

Layer 2 virtual machine mobility and multi-hop mobility, which must be collaborated with Ethernet Virtual Interconnect (EVI), apply to active-active data centers, as shown in Figure 5.

Figure 5 Virtual machine mobility within a subnet



Protocols and standards

- RFC 6830, *The Locator/ID Separation Protocol (LISP)*
- RFC 6833, *Locator/ID Separation Protocol (LISP) Map-Server Interface*
- RFC 6835, *The Locator/ID Separation Protocol Internet Groper (LIG)*

LISP configuration task list

Tasks at a glance
Configuring basic LISP: • (Required.) Enabling LISP • (Optional.) Creating a LISP VRF instance • (Required.) Enabling the ITR or ETR feature • (Required.) Configuring an MR • (Required.) Configuring an MS
Configuring LISP EID-to-RLOC mapping control: • (Optional.) Configuring an ETR to accept mapping information in Map-Request messages • (Optional.) Setting the TTL value in Map-Register and Map-Reply messages • (Optional.) Setting the maximum number of mapping cache entries • (Optional.) Configuring an MS to permit only the specified RLOC
(Optional.) Configuring virtual machine mobility

Tasks at a glance
(Optional.) Configuring LIG

Configuring basic LISP

Before you configure basic LISP settings, complete the following tasks:

- Configure the link layer protocol.
- Configure IP addresses for interfaces to ensure IP connectivity between neighboring nodes.

Enabling LISP

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enable LISP and enter its view.	**lisp**	By default, LISP is disabled.

Creating a LISP VRF instance

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view.	**lisp**	N/A
3. Create a LISP VRF instance and enter its view.	**vrf** *vrf-name*	By default, no LISP VRF instances exist.

Enabling the ITR or ETR feature

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a.** **lisp** **b.** **vrf** *vrf-name*	N/A
3. Enable the IPv4 LISP tunnel router feature.	• Enable the IPv4 ETR feature: **etr** • Enable the IPv4 ITR feature: **itr**	By default, the IPv4 ITR or ETR feature is disabled. Execute both the **etr** and **itr** commands on a device to configure it as an IPv4 xTR.
4. Configure an EID-to-RLOC mapping.	**database-mapping** *eid-prefix prefix-length locator* **priority** *priority* **weight** *weight*	By default, no EID-to-RLOC mapping is configured.
5. (Optional.) Configure an RLOC address in the	**locator-down** *eid-prefix prefix-length locator*	By default, no RLOC address in the mapping database is

Step	Command	Remarks
mapping database as unreachable.		configured as unreachable.
6. Specify an MS address for the IPv4 ETR.	• Set the ETR to directly accept the Map-Reply messages from an MS: **etr map-server** *map-server-address* **authentication-mode none** [**proxy-reply**] • Set the ETR to use SHA-1 to authenticate the Map-Reply messages from an MS: **etr map-server** *map-server-address* **authentication-mode sha-1 authentication-key** { **ciphertext** | **plaintext** } *string* [**proxy-reply**]	By default, no MS address is specified for an IPv4 ETR. You can specify a maximum of two MS addresses for an IPv4 ETR.
7. Specify an MR address for the IPv4 ITR.	**itr map-resolver** *map-resolver-address*	By default, no MR address is specified for an IPv4 ITR. You can specify a maximum of two MR addresses for an IPv4 ITR.
8. (Optional.) Set the minimum length of EID prefixes permitted by an ITR in Map-Reply messages and permitted by an ETR in Map-Request messages.	**shortest-eid-prefix-length** *prefix-length*	By default, the minimum permitted length for the EID prefixes in Map-Reply messages and Map-Request messages is 16.
9. (Optional.) Specify an instance ID for EID prefixes.	**xtr instance-id** *instance-id*	By default, the instance ID for EID prefixes is 0.

Configuring an MR

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a.** **lisp** **b.** **vrf** *vrf-name*	N/A
3. Enable the IPv4 MR feature.	**map-resolver**	By default, the IPv4 MR feature is disabled.

Configuring an MS

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A

Step	Command	Remarks
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Enable the IPv4 MS feature.	**map-server**	By default, the IPv4 MS feature is disabled.
4. Create a LISP site and enter its view.	**site** *site-name*	By default, no LISP sites exist.
5. (Optional.) Configure a description for the LISP site.	**description** *text*	By default, the description for the LISP site is not configured.
6. (Optional.) Configure an MS to authenticate Map-Register messages and set the authentication mode.	• Configure the MS to accept SHA-1 authenticated Map-Register messages from ETRs: **authentication-mode sha-1 authentication-key** { **ciphertext** | **plaintext** } *string* • Configure the MS to accept Map-Register messages without authentication: **authentication-mode none**	By default, no authentication mode is set for an MS and the MS does not accept Map-Register messages. If you configure the MS to use SHA-1 to authenticate the Map-Register messages from an ETR, make sure you specify the same key as that configured on the ETR.
7. Configure the MS to permit an EID prefix for registration.	**eid-prefix** *eid-prefix prefix-len* [**instance-id** *id*] [**accept-more-specifics**]	By default, the MS does not permit any EID prefixes and does not process any Map-Register messages. For an ETR to successfully register with an MS, make sure the EID prefix permitted by the MS is the same as that configured on the ETR by using the **database-mapping** command. The instance ID must be the same as that specified by using the **xtr instance-id** command.

Configuring LISP EID-to-RLOC mapping control

Before you configure LISP EID-to-RLOC mapping control, complete the following tasks:

- Configure the link layer protocol.
- Configure IP addresses for interfaces to ensure IP connectivity between neighboring nodes.

Configuring an ETR to accept mapping information in Map-Request messages

An xTR can include its EID-to-RLOC mapping information in Map-Request messages. Perform this task to configure an ETR to accept and cache the mapping information in the Map-Request messages.

To configure the ETR to accept the mapping information in Map-Request messages:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Configure an ETR to accept the mapping information in Map-Request messages.	**etr accept-map-request-mapping** [**verify**]	By default, an ETR does not accept the mapping information in Map-Request messages.

Setting the TTL value in Map-Register and Map-Reply messages

An ETR sets a TTL value in LISP control messages when ETR performs either of the following operations:

- Sends Map-Register messages to register with an MS.
- Responds to an ITR with Map-Reply messages.

The MS and ITR set the TTL value for the cache entries according to the TTL value in these messages.

To set the TTL value in Map-Register and Map-Reply messages:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Set the TTL value in Map-Register and Map-Reply messages.	**etr map-cache-ttl** *ttl*	By default, the TTL value in Map-Register and Map-Reply messages is 1440 minutes.

Setting the maximum number of mapping cache entries

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Set the maximum number of EID-to-RLOC mapping	**map-cache-limit** *cache-limit*	By default, the maximum number of EID-to-RLOC mapping cache

Step	Command	Remarks
cache entries.		entries is not set.

Configuring an MS to permit only the specified RLOC address

This task allows an MS to permit only the specified RLOC addresses in Map-Register messages to be successfully registered.

To configure an MS to permit only the specified RLOC address:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Enter LISP site view.	**site** *site-name*	N/A
4. Configure the MS to permit only the specified RLOC address.	**allowed-locator** *rloc-address*	By default, the MS permits all RLOC addresses. You can configure the MS to permit a maximum of eight RLOC addresses.

Configuring virtual machine mobility

Before you configure virtual machine mobility, complete the following tasks:

- Configure IP addresses for interfaces to ensure IP connectivity between neighboring nodes.
- Configure basic LISP settings.

To configure virtual machine mobility:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter LISP view or enter LISP VRF instance view.	• Enter LISP view: **lisp** • Enter LISP VRF instance view: **a. lisp** **b. vrf** *vrf-name*	N/A
3. Create a dynamic EID detection policy and enter its view.	**dynamic-eid** *dynamic-eid-name*	By default, no dynamic EID policies exist.
4. Configure an EID-to-RLOC mapping.	**database-mapping** *eid-prefix prefix-length locator* **priority** *priority* **weight** *weight*	By default, no EID-to-RLOC mapping is configured.
5. Specify an MS address for the dynamic EID space	• Configure the MS to directly accept the Map-Register	By default, no MS address is specified for the dynamic EID

Step	Command	Remarks
and set the authentication mode.	messages from xTRs: **map-server** *map-server-address* **authentication-mode none** [**proxy-reply**] • Configure the MS to use SHA-1 to authenticate the Map-Register messages from xTRs: **map-server** *map-server-address* **authentication-mode sha-1 authentication-key** { **ciphertext** | **plaintext** } *string* [**proxy-reply**]	space. You can specify a maximum of two MS addresses.
6. (Optional.) Specify a multicast address for Map-Notify messages.	**map-notify-group** *map-notify-group-address*	By default, no multicast address is specified for Map-Notify messages.
7. Specify an address range in which the dynamic EIDs are allowed to join the EID address space.	**roaming-eid-prefix** *eid-prefix prefix-length*	By default, the address range in which the dynamic EIDs are allowed to join the dynamic EID space is 0.0.0.0/0.
8. (Optional.) Configure an FHR to send dynamic EID information and set the authentication mode.	**eid-notify** *xtr-address* **authentication-mode** { **none** | **sha-1 authentication-key** { **ciphertext** | **plaintext** } *string* }	By default, an FHR does not send dynamic EID information.
9. (Optional.) Configure an xTR to accept dynamic EID information and set the authentication mode.	**eid-notify authentication-mode** { **none** | **sha-1 authentication-key** { **ciphertext** | **plaintext** } *string* }	By default, an xTR does not accept dynamic EID information.
10. Enter interface view.	**interface** *interface-type interface-number*	N/A
11. Apply a dynamic EID detection policy to the interface.	**lisp mobility** *dynamic-eid-name*	By default, no dynamic EID detection policy is applied to an interface.
12. (Optional.) Enable support for extended subnets on an interface.	**lisp extended-subnet-mode**	By default, support for extended subnets is disabled.

Configuring LIG

LISP Internet Groper (LIG) allows the user to query mapping information in the LISP mapping database at the CLI. It obtains the EID-to-RLOC mappings by triggering an EID-to-RLOC mapping resolution. You can use LIG to query the following information:

- Mapping information for the EID of a host or router.
- Result of EID-to-RLOC mapping registration with the MS.

To configure LIG:

Step	Command	Remarks
Query the mapping information in the LISP mapping database.	**lig** { *destination-eid* | *hostname* | **self** } [**count** *count*] [**source** *source-eid*] [**to** *map-resolver*]	Execute this command in any view.

Step	Command	Remarks
	[**timer** *timeout*] [**vrf** *vrf-name*]	

Displaying and maintaining LISP

Execute **display** commands in any view and execute **reset** commands in user view.

Task	Command
Display IPv4 LISP configuration information.	**display lisp ipv4**
Display IPv4 LISP local EID prefix information.	**display lisp ipv4 database** [*destination-eid-prefix* [*prefix-length*]] [**default** | **vrf** *vrf-name*]
Display IPv4 LISP mapping cache entries.	**display lisp ipv4 map-cache** [*destination-eid-prefix* [*prefix-length*]] [**default** | **vrf** *vrf-name*] [**verbose**]
Display IPv4 LISP data cache entries.	**display lisp ipv4 data-cache** [*destination- eid*] [**default** | **vrf** *vrf-name*]
Display IPv4 LISP statistics.	**display lisp ipv4 statistics** [**default** | **vrf** *vrf-name*]
Display IPv4 LISP site information.	**display lisp site** [*destination-eid-prefix* [*prefix-length*] | **name** *site-name*] [**default** | **vrf** *vrf-name*] [**verbose**]
Display information about the LISP dynamic EID detection policies and the detected dynamic EIDs.	**display lisp dynamic-eid** [**name** *dynamic-eid-name*] [**default** | **vrf** *vrf-name*] [**verbose**]
Clear IPv4 LISP data cache entries.	**reset lisp ipv4 data-cache** [**default** | **vrf** *vrf-name*] [*destination-eid*]
Clear IPv4 LISP dynamic mapping cache entries.	**reset lisp ipv4 map-cache** [**default** | **vrf** *vrf-name*] [*destination-eid-prefix* [*prefix-length*]]
Clear IPv4 LISP statistics.	**reset lisp ipv4 statistics** [**default** | **vrf** *vrf-name*]
Clear IPv4 LISP site registration information.	**reset lisp site** [**default** | **vrf** *vrf-name*] [**name** *site-name*]
Clear the detected dynamic EID prefix information.	**reset lisp dynamic-eid** [**default** | **vrf** *vrf-name*] [*eid-prefix*]

LISP configuration examples

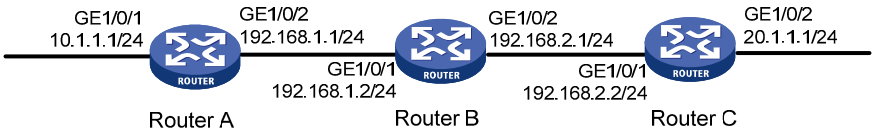
Basic LISP configuration example

Network requirements

As shown in Figure 6, make sure the following requirements are met:

- Router A, Router B, and Router C can communicate with each other after LISP is enabled on all of the routers.
- Router A and Router C are configured as xTRs.
- The MS and MR features are enabled on Router B.

Figure 6 Network diagram



Configuration procedure

1. Configure IP addresses for interfaces. (Details not shown.)
2. Configure the dynamic routing protocol and make sure the RLOC addresses are reachable. (Details not shown.)
3. Configure LISP:

   # Configure Router A as a xTR, and specify the MS and MR addresses.

```
<RouterA> system-view
[RouterA] lisp
[RouterA-lisp] itr
[RouterA-lisp] itr map-resolver 192.168.1.2
[RouterA-lisp] etr
[RouterA-lisp] database-mapping 10.1.1.0 24 192.168.1.1 priority 1 weight 1
[RouterA-lisp] etr map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext 123456
[RouterA-lisp] quit
```

   # Display IPv4 LISP configuration information on Router A.

```
[RouterA] display lisp ipv4

LISP IP Configuration Information for Public VRF (iid 0)
  Ingress Tunnel Router (ITR):    enabled
  Egress Tunnel Router (ETR):     enabled
  Proxy-ITR Router (PITR):        disabled
  Proxy-ETR Router (PETR):        disabled
  Locator VRF:                    default
  LISP-NAT Interworking:          disabled
  ITR send Map-Request:           disabled
  ITR send Data-Probe:            disabled
  LISP ALT-VRF:                   not configured
  ETR glean mapping:              disabled, verify disabled
  ETR accept mapping data:        disabled, verify disabled
  ETR Map-Cache TTL:              1440 minutes
  Shortest EID-prefix allowed:    /16
  Locator Reachability Algorithms:
    Echo-nonce algorithm:         disabled
    TCP-counts algorithm:         disabled
    RLOC-probe algorithm:         disabled
  Static mappings configured:     0
  Map-Cache limit:                0xFFFFFFFF
  Map-Cache size:                 0
  Map-Resolver (MR):              disabled
  Map-Server (MS):                disabled
```

   # Display IPv4 LISP local EID prefix information on Router A.

```
[RouterA] display lisp ipv4 database

LISP ETR IP Mapping Database for Public VRF (iid 0), 1 entries

EID-prefix: 10.1.1.0/24, instance-id: 0, LSBs: 0x00000001, Sync Flags: 0x0001
  Locator: 192.168.1.1, priority: 1, weight: 1
           Uptime: 00:00:20, state: up, local
           Data in/out: 0/0
```

Enable the MS and MR features on Router B.

```
<RouterB> system-view
[RouterB] lisp
[RouterB-lisp] map-resolver
[RouterB-lisp] map-server
[RouterB-lisp] site A
[RouterB-lisp-site-A] authentication-mode sha-1 authentication-key plaintext 123456
[RouterB-lisp-site-A] eid-prefix 10.1.1.0 24
[RouterB-lisp-site-A] quit
[RouterB-lisp] site C
[RouterB-lisp-site-C] authentication-mode sha-1 authentication-key plaintext 123456
[RouterB-lisp-site-C] eid-prefix 20.1.1.0 24
[RouterB-lisp-site-C] quit
[RouterB-lisp] quit
```

Display IPv4 LISP configuration information on Router B.

```
[RouterB] display lisp ipv4

LISP IP Configuration Information for Public VRF (iid 0)
  Ingress Tunnel Router (ITR):    disabled
  Egress Tunnel Router (ETR):     disabled
  Proxy-ITR Router (PITR):        disabled
  Proxy-ETR Router (PETR):        disabled
  Locator VRF:                    default
  LISP-NAT Interworking:          disabled
  ITR send Map-Request:           disabled
  ITR send Data-Probe:            disabled
  LISP ALT-VRF:                   not configured
  ETR glean mapping:              disabled, verify disabled
  ETR accept mapping data:        disabled, verify disabled
  ETR Map-Cache TTL:              1440 minutes
  Shortest EID-prefix allowed:    /16
  Locator Reachability Algorithms:
    Echo-nonce algorithm:         disabled
    TCP-counts algorithm:         disabled
    RLOC-probe algorithm:         disabled
  Static mappings configured:     0
  Map-Cache limit:                0xFFFFFFFF
  Map-Cache size:                 0
  Map-Resolver (MR):              enabled
  Map-Server (MS):                enabled
```

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site

LISP Site Registration Information for Public VRF

Site Name      Last       Actively   Who last        EID-prefix      Inst
               Registered Registered Registered                      ID
A              never      no         --              10.1.1.0/24     0
C              never      no         --              20.1.1.0/24     0
```

Configure Router C as a xTR, and specify the MS and MR addresses.

```
<RouterC> system-view
[RouterC] lisp
[RouterC-lisp] itr
[RouterC-lisp] itr map-resolver 192.168.1.2
[RouterC-lisp] etr
[RouterC-lisp] database-mapping 20.1.1.0 24 192.168.2.2 priority 1 weight 1
[RouterC-lisp] etr map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext 123456
[RouterC-lisp] quit
```

Display IPv4 LISP configuration information on Router C.

```
[RouterC] display lisp ipv4

LISP IP Configuration Information for Public VRF (iid 0)
  Ingress Tunnel Router (ITR):    enabled
  Egress Tunnel Router (ETR):     enabled
  Proxy-ITR Router (PITR):        disabled
  Proxy-ETR Router (PETR):        disabled
  Locator VRF:                    default
  LISP-NAT Interworking:          disabled
  ITR send Map-Request:           disabled
  ITR send Data-Probe:            disabled
  LISP ALT-VRF:                   not configured
  ETR glean mapping:              disabled, verify disabled
  ETR accept mapping data:        disabled, verify disabled
  ETR Map-Cache TTL:              1440 minutes
  Shortest EID-prefix allowed:    /16
  Locator Reachability Algorithms:
    Echo-nonce algorithm:         disabled
    TCP-counts algorithm:         disabled
    RLOC-probe algorithm:         disabled
  Static mappings configured:     0
  Map-Cache limit:                0xFFFFFFFF
  Map-Cache size:                 0
  Map-Resolver (MR):              disabled
  Map-Server (MS):                disabled
```

Display IPv4 LISP local EID prefix information on Router C.

```
[RouterC] display lisp ipv4 database
```

```
    LISP ETR IP Mapping Database for Public VRF (iid 0), 1 entries

    EID-prefix: 20.1.1.0/24, instance-id: 0, LSBs: 0x00000001, Sync Flags: 0x0001
      Locator: 192.168.2.2, priority: 1, weight: 1
               Uptime: 00:00:09, state: up, local
               Data in/out: 0/0
```

Verifying the configuration

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site

LISP Site Registration Information for Public VRF

Site Name      Last       Actively   Who last        EID-prefix      Inst
               Registered Registered Registered                      ID
A              00:00:09   yes        192.168.1.1     10.1.1.0/24     0
C              00:00:23   yes        192.168.2.2     20.1.1.0/24     0
```

Ping 20.1.1.1 from 10.1.1.1 on Router A.

```
[RouterA] ping -a 10.1.1.1 20.1.1.1
Ping 20.1.1.1 (20.1.1.1) from 10.1.1.1: 56 data bytes, press CTRL_C to break
Request time out
Request time out
56 bytes from 20.1.1.1: icmp_seq=0 ttl=254 time=3.364 ms
56 bytes from 20.1.1.1: icmp_seq=0 ttl=254 time=2.079 ms
56 bytes from 20.1.1.1: icmp_seq=0 ttl=254 time=2.019 ms
```

Display IPv4 LISP dynamic and static mapping cache entries on Router A.

```
[RouterA] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

20.1.1.0/24, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.2.2  01:48:31  up          1/1        6/7      1/0
```

Display IPv4 LISP dynamic and static mapping cache entries on Router C.

```
[RouterC] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

10.1.1.0/24, uptime: 00:00:13, expires: 23:59:47, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.1.1  00:00:13  up          1/1        0/0      1/0
```

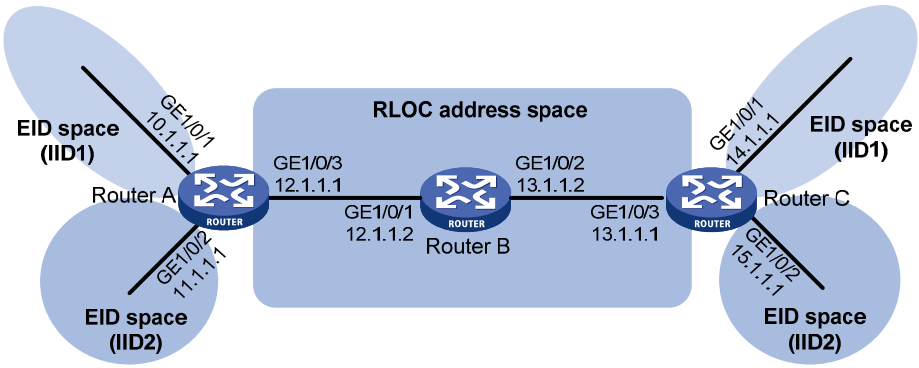
LISP multi-instance configuration example

Network requirements

As shown in Figure 7, after LISP is enabled on all devices, make sure the following requirements are met:

- Router A and Router C are configured as xTRs.
- The MR and MS features are enabled on Router B.
- Two LISP VRF instances are created to route traffic from different tenants.

Figure 7 Network diagram



Configuration procedure

1. Configure IP addresses for interfaces and create VPN instances. (Details not shown.)
2. Configure multi-VPN for interfaces:

   # Associate VPN instance 1, VPN instance 2, and VPN instance **locator** with GigabitEthernet 1/0/1, GigabitEthernet 1/0/2, and GigabitEthernet 1/0/3 of Router A, respectively.

```
<RouterA> system-view
[RouterA] interface gigabitethernet 1/0/1
[RouterA-GigabitEthernet1/0/1] ip binding vpn-instance 1
[RouterA-GigabitEthernet1/0/1] ip add 10.1.1.1 24
[RouterA-GigabitEthernet1/0/1] quit
[RouterA] interface gigabitethernet 1/0/2
[RouterA-GigabitEthernet1/0/2] ip binding vpn-instance 2
[RouterA-GigabitEthernet1/0/2] ip add 11.1.1.1 24
[RouterA-GigabitEthernet1/0/2] quit
[RouterA] interface gigabitethernet 1/0/3
[RouterA-GigabitEthernet1/0/3] ip binding vpn-instance locator
[RouterA-GigabitEthernet1/0/3] ip add 12.1.1.1 24
[RouterA-GigabitEthernet1/0/3] quit
```

   # Associate VPN instance 1, VPN instance 2, and VPN instance **locator** with GigabitEthernet 1/0/1, GigabitEthernet 1/0/2, and GigabitEthernet 1/0/3 of Router C, respectively.

```
<RouterC> system-view
[RouterC] interface gigabitethernet 1/0/1
[RouterC-GigabitEthernet1/0/1] ip binding vpn-instance 1
[RouterC-GigabitEthernet1/0/1] ip add 14.1.1.1 24
[RouterC-GigabitEthernet1/0/1] quit
[RouterC] interface gigabitethernet 1/0/2
[RouterC-GigabitEthernet1/0/2] ip binding vpn-instance 2
```

```
[RouterC-GigabitEthernet1/0/2] ip add 15.1.1.1 24
[RouterC-GigabitEthernet1/0/2] quit
[RouterC] interface gigabitethernet 1/0/3
[RouterC-GigabitEthernet1/0/3] ip binding vpn-instance locator
[RouterC-GigabitEthernet1/0/3] ip add 13.1.1.1 24
[RouterC-GigabitEthernet1/0/3] quit
```

3. Configure LISP multi-instance:

Configure Router A as a xTR and bind the IPv4 RLOC address space to the VRF instance **locator**.

```
[RouterA] lisp
[RouterA-lisp] vrf 1
[RouterA-lisp-vrf-1] itr
[RouterA-lisp-vrf-1] etr
[RouterA-lisp-vrf-1] locator-vrf vrf locator
```

Assign the instance ID 1 to the EID prefixes in LISP VRF instance 1, configure a EID-to-RLOC mapping, and specify the MS and MR addresses.

```
[RouterA-lisp-vrf-1] xtr instance-id 1
[RouterA-lisp-vrf-1] database-mapping 10.1.1.0 24 12.1.1.1 priority 10 weight 10
[RouterA-lisp-vrf-1] itr map-resolver 12.1.1.2
[RouterA-lisp-vrf-1] etr map-server 12.1.1.2 authentication-mode sha-1
authentication-key plaintext abc
[RouterA-lisp-vrf-1] quit
```

Configure Router A as a xTR and bind the IPv4 RLOC address space to the VRF instance **locator**.

```
[RouterA-lisp] vrf 2
[RouterA-lisp-vrf-2] itr
[RouterA-lisp-vrf-2] etr
[RouterA-lisp-vrf-2] locator-vrf vrf locator
```

Assign the instance ID 2 to the EID prefixes in LISP VRF instance 2, configure a EID-to-RLOC mapping, and specify the MS and MR addresses.

```
[RouterA-lisp-vrf-2] xtr instance-id 2
[RouterA-lisp-vrf-2] database-mapping 11.1.1.0 24 12.1.1.1 priority 10 weight 10
[RouterA-lisp-vrf-2] itr map-resolver 12.1.1.2
[RouterA-lisp-vrf-2] etr map-server 12.1.1.2 authentication-mode sha-1
authentication-key plaintext abc
[RouterA-lisp-vrf-2] quit
```

Enable the MS and MR features on Router B.

```
<RouterB> system-view
[RouterB] lisp
[RouterB-lisp] map-resolver
[RouterB-lisp] map-server
```

Create LISP site **123**, and permit the EID prefixes 10.1.1.0/24 and 14.1.1.0/24 with instance ID 1 and 11.1.1.0/24 and 15.1.1.0/24 with instance ID 2.

```
[RouterB-lisp] site 123
[RouterB-lisp-site-123] authentication-mode sha-1 authentication-key plaintext abc
[RouterB-lisp-site-123] eid-prefix 10.1.1.0 24 instance-id 1
[RouterB-lisp-site-123] eid-prefix 11.1.1.0 24 instance-id 2
[RouterB-lisp-site-123] eid-prefix 14.1.1.0 24 instance-id 1
[RouterB-lisp-site-123] eid-prefix 15.1.1.0 24 instance-id 2
```

Configure Router C as a xTR and bind IPv4 RLOC address space to VPN instance **locator**.

```
[RouterC] lisp
[RouterC-lisp] vrf 1
[RouterC-lisp-vrf-1] itr
[RouterC-lisp-vrf-1] etr
[RouterC-lisp-vrf-1] locator-vrf vrf locator
```

Assign the instance ID 1 to the EID prefixes in LISP VRF instance 1, configure a EID-to-RLOC mapping, and specify the MS and MR addresses.

```
[RouterC-lisp-vrf-1] xtr instance-id 1
[RouterC-lisp-vrf-1] database-mapping 14.1.1.0 24 13.1.1.1 priority 10 weight 10
[RouterC-lisp-vrf-1] itr map-resolver 12.1.1.2
[RouterC-lisp-vrf-1] etr map-server 12.1.1.2 authentication-mode sha-1
authentication-key plaintext abc
[RouterC-lisp-vrf-1] quit
```

Configure Router C as a xTR and bind IPv4 RLOC address space to VPN instance **locator**.

```
[RouterC-lisp] vrf 2
[RouterC-lisp-vrf-2] itr
[RouterC-lisp-vrf-2] etr
[RouterC-lisp-vrf-2] locator-vrf vrf locator
```

Assign the instance ID 2 to the EID prefixes in LISP VRF instance 2, configure a EID-to-RLOC mapping, and specify the MS and MR addresses.

```
[RouterC-lisp-vrf-2] xtr instance-id 2
[RouterC-lisp-vrf-2] database-mapping 15.1.1.0 24 13.1.1.1 priority 10 weight 10
[RouterC-lisp-vrf-2] itr map-resolver 12.1.1.2
[RouterC-lisp-vrf-2] etr map-server 12.1.1.2 authentication-mode sha-1
authentication-key plaintext abc
[RouterC-lisp-vrf-2] quit
```

Verifying the configuration

Ping 14.1.1.1 with instance ID 1 from 10.1.1.1 on Router A.

```
[RouterA] ping –vpn-instance 1 –a 10.1.1.1 14.1.1.1
Ping 14.1.1.1 (14.1.1.1) from 10.1.1.1: 56 data bytes, press CTRL_C to break
Request time out
Request time out
56 bytes from 14.1.1.1: icmp_seq=2 ttl=254 time=1.582 ms
56 bytes from 14.1.1.1: icmp_seq=3 ttl=254 time=2.199 ms
56 bytes from 14.1.1.1: icmp_seq=4 ttl=254 time=1.976 ms
```

Display IPv4 LISP mapping cache entries on Router A.

```
[RouterA] display lisp ipv4 map-cache
LISP IP Mapping Cache for VRF 1 (iid 1), 1 entries

14.1.1.0/24, uptime: 00:04:16, expires: 23:56:44, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  13.1.1.1  00:03:16  up          10/10      0/5      0/0
```

Ping 15.1.1.1 with instance ID 2 from 11.1.1.1 on Router A.

```
[RouterA] ping –vpn-instance 2 –a 11.1.1.1 15.1.1.1
Ping 15.1.1.1 (15.1.1.1) from 11.1.1.1: 56 data bytes, press CTRL_C to break
Request time out
```

```
Request time out
56 bytes from 15.1.1.1: icmp_seq=2 ttl=254 time=1.582 ms
56 bytes from 15.1.1.1: icmp_seq=3 ttl=254 time=2.199 ms
56 bytes from 15.1.1.1: icmp_seq=4 ttl=254 time=1.976 ms
```

Display IPv4 LISP mapping cache entries on Router A.

```
[RouterA] display lisp ipv4 map-cache
LISP IP Mapping Cache for VRF 2 (iid 2), 1 entries

15.1.1.0/24, uptime: 00:04:16, expires: 23:56:44, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  13.1.1.1  00:03:16  up          10/10      0/5      0/0
```

LISP multi-xTR configuration example

Network requirements

As shown in Figure 8, after LISP is enabled on all devices, make sure the following requirements are met:

- Router 1A and Router 2A are configured as xTRs to load share traffic from 10.1.1.0/24.
- Router 1C and Router 2C are configured as xTRs to load share traffic from 11.1.1.0/24.
- The MS and MR features are enabled on Router B.

Figure 8 Network diagram

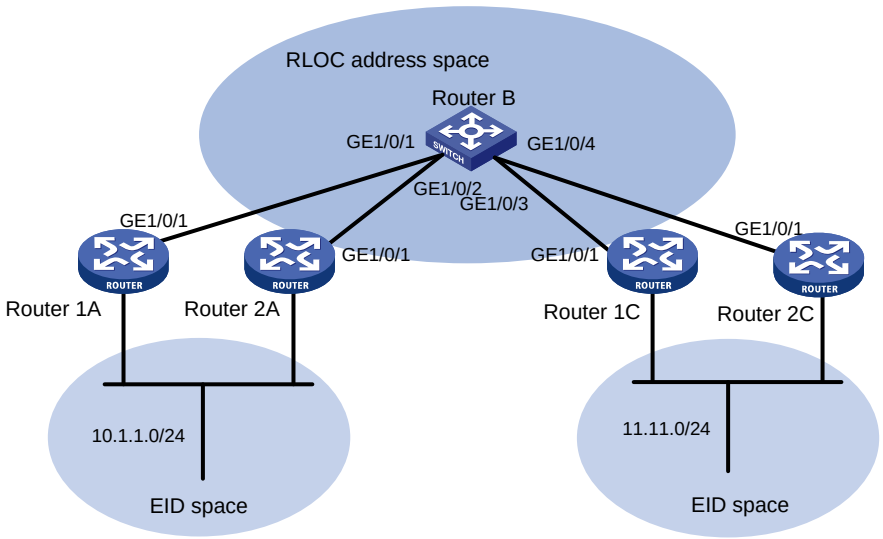


Table 1 Interface and IP address assignment

Device	Interface	IP address
Router 1A	GigabitEthernet 1/0/1	12.1.1.1/24
Router 2A	GigabitEthernet 1/0/1	22.1.1.1/24
Router 1C	GigabitEthernet 1/0/1	33.1.1.1/24
Router 2C	GigabitEthernet 1/0/1	13.1.1.1/24
Router B	GigabitEthernet 1/0/1	12.1.1.2/24

Device	Interface	IP address
Router B	GigabitEthernet 1/0/2	22.1.1.2/24
Router B	GigabitEthernet 1/0/3	33.1.1.2/24
Router B	GigabitEthernet 1/0/4	13.1.1.2/24

Configuration procedure

1. Configure IP addresses for interfaces. (Details not shown.)
2. Configure the dynamic routing protocol and make sure the RLOC addresses are reachable. (Details not shown.)
3. Configure LISP:

   # Configure Router 1A as a xTR.

```
<Router1A> system-view
[Router1A] lisp
[Router1A-lisp] itr
[Router1A-lisp] etr
[Router1A-lisp] database-mapping 10.1.1.0 24 12.1.1.1 priority 10 weight 10
[Router1A-lisp] database-mapping 10.1.1.0 24 22.1.1.1 priority 10 weight 10
[Router1A-lisp] itr map-resolver 12.1.1.2
[Router1A-lisp] itr map-resolver 22.1.1.2
[Router1A-lisp] etr map-server 12.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router1A-lisp] etr map-server 22.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router1A-lisp] quit
```

   # Configure Router 2A as a xTR.

```
<Router2A> system-view
[Router2A] lisp
[Router2A-lisp] itr
[Router2A-lisp] etr
[Router2A-lisp] database-mapping 10.1.1.0 24 12.1.1.1 priority 10 weight 10
[Router2A-lisp] database-mapping 10.1.1.0 24 22.1.1.1 priority 10 weight 10
[Router2A-lisp] itr map-resolver 12.1.1.2
[Router2A-lisp] itr map-resolver 22.1.1.2
[Router2A-lisp] etr map-server 12.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router2A-lisp] etr map-server 22.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router2A-lisp] quit
```

   # Enable the MS and MR features on Router B, create LISP site **123**, and permit the EID prefixes 10.1.1.0/24 and 11.1.1.0/24 for registration.

```
[RouterB] lisp
[RouterB-lisp] map-resolver
[RouterB-lisp] map-server
[RouterB-lisp] site 123
[RouterB-lisp-site-123] authentication-mode sha-1 authentication-key plaintext abc
[RouterB-lisp-site-123] eid-prefix 10.1.1.0 24
[RouterB-lisp-site-123] eid-prefix 11.1.1.0 24
```

```
[RouterB-lisp-site-123] quit
[RouterB-lisp] quit
```

Configure Router 1C as a xTR.

```
<Router1C> system-view
[Router1C] lisp
[Router1C-lisp] itr
[Router1C-lisp] etr
[Router1C-lisp] database-mapping 11.1.1.0 24 13.1.1.1 priority 10 weight 10
[Router1C-lisp] database-mapping 11.1.1.0 24 33.1.1.1 priority 10 weight 10
[Router1C-lisp] itr map-resolver 13.1.1.2
[Router1C-lisp] itr map-resolver 33.1.1.2
[Router1C-lisp] etr map-server 13.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router1C-lisp] etr map-server 33.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router1C-lisp] quit
```

Configure Router 2C as a xTR.

```
<Router2C> system-view
[Router2C] lisp
[Router2C-lisp] itr
[Router2C-lisp] etr
[Router2C-lisp] database-mapping 11.1.1.0 24 13.1.1.1 priority 10 weight 10
[Router2C-lisp] database-mapping 11.1.1.0 24 33.1.1.1 priority 10 weight 10
[Router2C-lisp] itr map-resolver 13.1.1.2
[Router2C-lisp] itr map-resolver 33.1.1.2
[Router2C-lisp] etr map-server 13.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router2C-lisp] etr map-server 33.1.1.2 authentication-mode sha-1 authentication-key
plaintext abc
[Router2C-lisp] quit
```

Verifying the configuration

Ping 11.1.1.1 from 10.1.1.1 on Router 1A.

```
[Router1A] ping –a 10.1.1.1 11.1.1.1
Ping 11.1.1.1 (11.1.1.1) from 10.1.1.1: 56 data bytes, press CTRL_C to break
Request time out
Request time out
56 bytes from 11.1.1.1: icmp_seq=2 ttl=254 time=1.582 ms
56 bytes from 11.1.1.1: icmp_seq=3 ttl=254 time=2.199 ms
56 bytes from 11.1.1.1: icmp_seq=4 ttl=254 time=1.976 ms
```

Display IPv4 LISP mapping cache entries on Router 1A.

```
[Router1A] display lisp ipv4 map-cache
LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

11.1.1.0/24, uptime: 00:04:16, expires: 23:56:44, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  13.1.1.1     00:03:16  up          10/10      0/5      0/0
  33.1.1.1     00:03:16  up          10/10      0/0      0/0
```

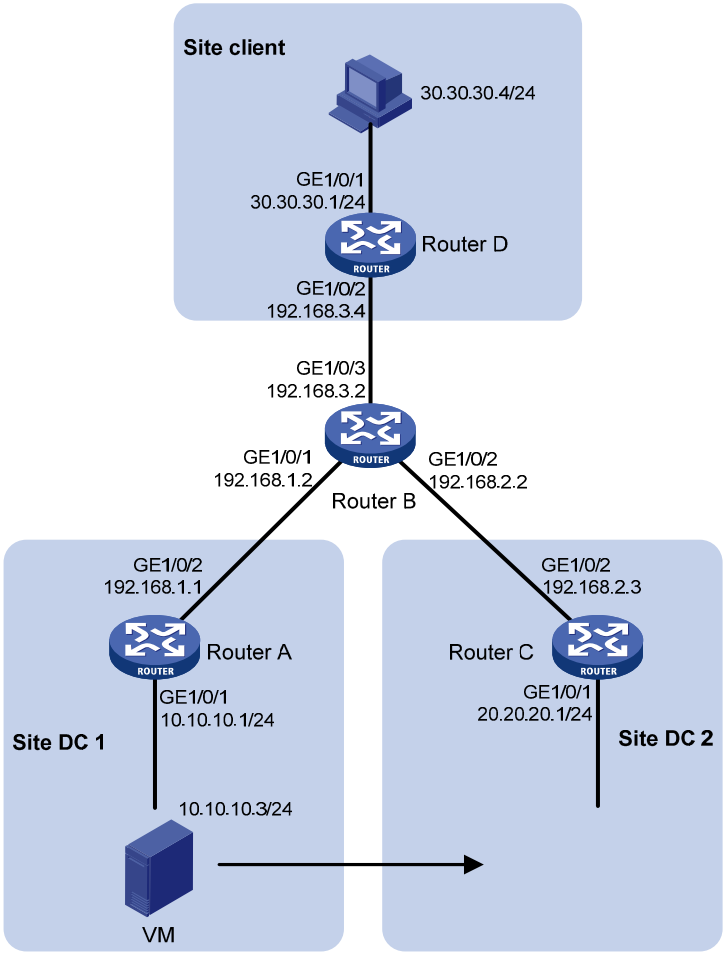
Virtual machine mobility across subnets configuration example

Network requirements

As shown in Figure 9, after LISP is enabled on all devices, make sure the following requirements are met:

- Router A, Router C, and Router D are configured as xTRs.
- The MR and MS features are enabled on Router B.
- Implement virtual machine mobility across subnets without changing the VM's IP address.

Figure 9 Network diagram



Configuration procedure

1. Configure IP addresses for interfaces. (Details not shown.)
2. Configure the dynamic routing protocol and make sure the RLOC addresses are reachable. (Details not shown.)
3. Configure virtual machine mobility across subnets:

   # Configure Router A as a xTR, create the dynamic EID detection policy **de1**, and apply the policy to GigabitEthernet 1/0/1.

   ```
   <RouterA> system-view
   [RouterA] lisp
   ```

```
[RouterA-lisp] itr
[RouterA-lisp] etr
[RouterA-lisp] database-mapping 10.10.10.0 24 192.168.1.1 priority 1 weight 1
[RouterA-lisp] itr map-resolver 192.168.1.2
[RouterA-lisp] etr map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp] dynamic-eid de1
[RouterA-lisp-dynamic-eid-de1] database-mapping 10.10.10.0 24 192.168.1.1 priority
1 weight 1
[RouterA-lisp-dynamic-eid-de1] map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp-dynamic-eid-de1] interface gigabitethernet 1/0/1
[RouterA-GigabitEthernet1/0/1] lisp mobility de1
```

Create IPv4 VRRP group 1 and enable proxy ARP on Router A.

```
[RouterA-GigabitEthernet1/0/1] vrrp vrid 1 virtual-ip 10.10.10.10
[RouterA-GigabitEthernet1/0/1] proxy-arp enable
[RouterA-GigabitEthernet1/0/1] quit
```

Enable the MS and MR features on Router B.

```
<RouterB> system-view
[RouterB] lisp
[RouterB-lisp] map-server
[RouterB-lisp] map-resolver
```

Create the LISP site **DC** on Router B, and permit 10.10.10.0/24, 20.20.20.0/24, and EID prefixes longer than 10.10.10.0/24 to register. Longer prefixes are specific than 10.10.10.0/24. If 10.10.10.0/24 specifies a range, a longer prefix might specify a node in the range, thus more specific.

```
[RouterB-lisp] site DC
[RouterB-lisp-site-DC] eid-prefix 10.10.10.0 24 accept-more-specifics
[RouterB-lisp-site-DC] eid-prefix 20.20.20.0 24
[RouterB-lisp-site-DC] authentication-mode sha-1 authentication-key plaintext aaa
[RouterB-lisp-site-DC] quit
```

Create the LISP site **client** on Router B, and permit the EID prefix 30.30.30.0/24 for registration.

```
[RouterB-lisp] site client
[RouterB-lisp-site-client] eid-prefix 30.30.30.0 24
[RouterB-lisp-site-client] authentication-mode sha-1 authentication-key plaintext
aaa
[RouterB-lisp-site-client] quit
[RouterB-lisp] quit
```

Configure Router C as a xTR, create the dynamic EID detection policy **de1**, and apply the policy to GigabitEthernet 1/0/1.

```
<RouterC> system-view
[RouterC-lisp] itr
[RouterC-lisp] etr
[RouterC-lisp] database-mapping 20.20.20.0 24 192.168.2.3 priority 1 weight 1
[RouterC-lisp] itr map-resolver 192.168.2.2
[RouterC-lisp] etr map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp] dynamic-eid de1
```

```
[RouterC-lisp-dynamic-eid-de1] database-mapping 10.10.10.0 24 192.168.2.3 priority
1 weight 1
[RouterC-lisp-dynamic-eid-de1] map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp-dynamic-eid-de1] interface gigabitethernet 1/0/1
[RouterC-GigabitEthernet1/0/1] lisp mobility de1
```

Create IPv4 VRRP group 1 and enable proxy ARP on Router C.

```
[RouterC-GigabitEthernet1/0/1] vrrp vrid 1 virtual-ip 20.20.20.20
[RouterC-GigabitEthernet1/0/1] proxy-arp enable
[RouterC-GigabitEthernet1/0/1] quit
```

Configure Router D as a xTR.

```
<RouterD> system-view
[RouterD] lisp
[RouterD-lisp] itr
[RouterD-lisp] etr
[RouterD-lisp] database-mapping 30.30.30.0 24 192.168.3.4 priority 1 weight 1
[RouterD-lisp] itr map-resolver 192.168.3.2
[RouterD-lisp] etr map-server 192.168.3.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterD-lisp] quit
```

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site

LISP Site Registration Information for public VRF

Site Name      Last       Actively   Who last        EID-prefix      Inst
               Registered Registered Registered                      ID
DC             00:00:41   yes        192.168.1.1     10.10.10.0/24-0   0
               00:00:32   yes        192.168.2.3     20.20.20.0/24     0
client         00:00:25   yes        192.168.3.4     30.30.30.0/24     0
```

Ping VM 10.10.10.3 in the LISP site **DC 1** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

10.10.10.0/24, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.1.1  01:48:31  up          1/1        6/7      1/0
```

Verifying the configuration

Move VM 10.10.10.3 from LISP site **DC 1** to LISP site **DC 2**. (Details not shown.)

Display the detected LISP dynamic EIDs on Router C.

```
[RouterC] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF
```

```
Dynamic EID name: de1
  Database-mapping EID-prefix: 10.10.10.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.2.3, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.2.2
  Site-based multicast Map-Notify group: none configured
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 10.10.10.3, 00:00:15 ago
  Roaming dynamic EIDs:
           10.10.10.3, GigabitEthernet1/0/1, uptime: 00:00:15
                       discovered by: ip packet reception
```

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site

LISP Site Registration Information for public VRF

Site Name      Last       Actively   Who last        EID-prefix      Inst
               Registered Registered Registered                      ID
DC             00:00:41   yes        192.168.1.1     10.10.10.0/24-1   0
               00:00:32   yes        192.168.2.3     20.20.20.0/24     0
client         00:00:25   yes        192.168.3.4     30.30.30.0/24     0
```

Ping VM 10.10.10.3 in the LISP site **DC 2** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

10.10.10.0/24, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.1.1  01:48:31  up          1/1        6/7      1/0
10.10.10.3/32, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.2.3  00:01:31  up          1/1        3/3      1/0
```

Virtual machine mobility within a subnet configuration example

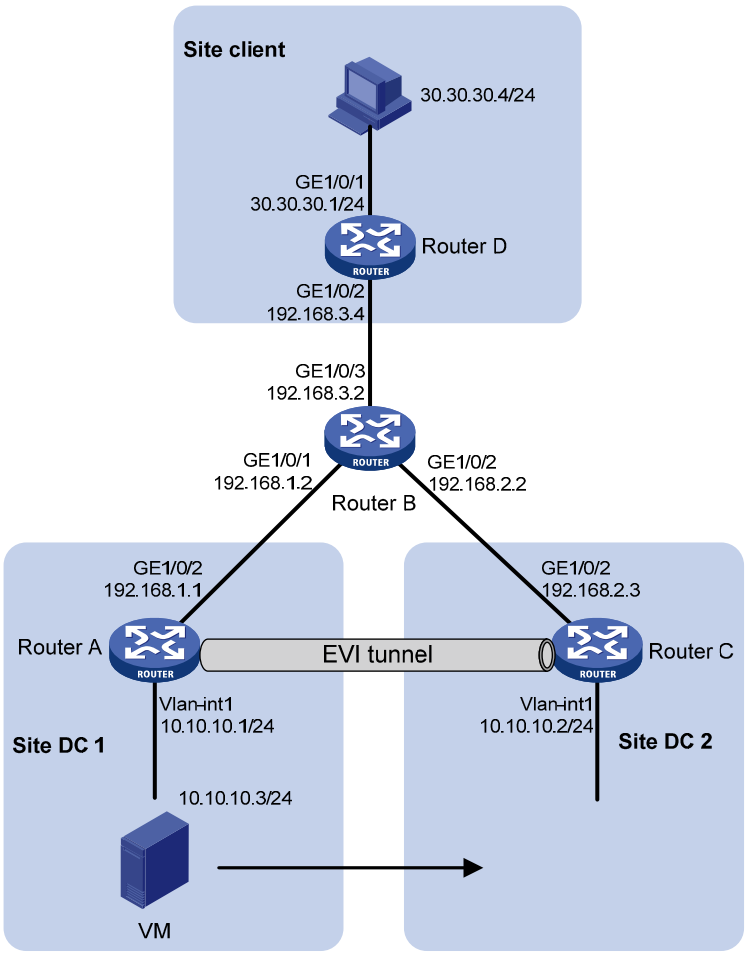
Network requirements

As shown in Figure 10, after LISP is enabled on all devices, make sure the following requirements are met:

- Router A, Router C, and Router D are configured as xTRs.
- The MR and MS features are enabled on Router B.

- Implement virtual machine mobility within a subnet without changing the VM's IP address. After the roaming, the VM can operate correctly.

Figure 10 Network diagram



Configuration procedure

1. Configure IP addresses for interfaces. (Details not shown.)
2. Configure EVI. (Details not shown.)
3. Configure the dynamic routing protocol and make sure the RLOC addresses are reachable. (Details not shown.)
4. Configure virtual machine mobility within a subnet:

   # Configure Router A as a xTR and to multicast Map-Notify messages to 239.0.0.2, create the dynamic EID detection policy **de1**, and apply the policy to VLAN-interface 1.

```
<RouterA> system-view
[RouterA] lisp
[RouterA-lisp] itr
[RouterA-lisp] etr
[RouterA-lisp] database-mapping 10.10.10.0 24 192.168.1.1 priority 1 weight 1
[RouterA-lisp] database-mapping 10.10.10.0 24 192.168.2.3 priority 1 weight 1
[RouterA-lisp] itr map-resolver 192.168.1.2
[RouterA-lisp] etr map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp] dynamic-eid de1
```

```
[RouterA-lisp-dynamic-eid-de1] database-mapping 10.10.10.0 24 192.168.1.1 priority
1 weight 1
[RouterA-lisp-dynamic-eid-de1] map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp-dynamic-eid-de1] map-notify-group 239.0.0.2
[RouterA-lisp-dynamic-eid-de1] interface vlan-interface 1
[RouterA-vlan-interface1] lisp mobility de1
[RouterA-vlan-interface1] lisp extended-subnet-mode
[RouterA-vlan-interface1] quit
```

Enable the MS and MR features on Router B.

```
<RouterB> system-view
[RouterB] lisp
[RouterB-lisp] map-server
[RouterB-lisp] map-resolver
```

Create the LISP site **DC** on Router B, and permit 10.10.10.0/24 and longer EID prefixes to register. Longer prefixes are specific than 10.10.10.0/24. If 10.10.10.0/24 specifies a range, a longer prefix might specify a node in the range, thus more specific.

```
[RouterB-lisp] site DC
[RouterB-lisp-site-DC] eid-prefix 10.10.10.0 24 accept-more-specifics
[RouterB-lisp-site-DC] authentication-mode sha-1 authentication-key plaintext aaa
[RouterB-lisp-site-DC] quit
```

Create the LISP site **client** on Router B, and permit the EID prefix 30.30.30.0/24 for registration.

```
[RouterB-lisp] site client
[RouterB-lisp-site-client] eid-prefix 30.30.30.0 24
[RouterB-lisp-site-client] authentication-mode sha-1 authentication-key plaintext
aaa
[RouterB-lisp-site-client] quit
[RouterB-lisp] quit
```

Configure Router C as a xTR and to multicast Map-Notify messages to 239.0.0.2, create the dynamic EID detection policy **de1**, and apply the policy to VLAN-interface 1.

```
<RouterC> system-view
[RouterC] lisp
[RouterC-lisp] itr
[RouterC-lisp] etr
[RouterC-lisp] database-mapping 10.10.10.0 24 192.168.1.1 priority 1 weight 1
[RouterC-lisp] database-mapping 10.10.10.0 24 192.168.2.3 priority 1 weight 1
[RouterC-lisp] itr map-resolver 192.168.2.2
[RouterC-lisp] etr map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp] dynamic-eid de1
[RouterC-lisp-dynamic-eid-de1] database-mapping 10.10.10.0 24 192.168.2.3 priority
1 weight 1
[RouterC-lisp-dynamic-eid-de1] map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp-dynamic-eid-de1] map-notify-group 239.0.0.2
[RouterC-lisp-dynamic-eid-de1] interface vlan-interface 1
[RouterC-vlan-interface1] lisp mobility de1
[RouterC-vlan-interface1] lisp extended-subnet-mode
[RouterC-vlan-interface1] quit
```

Configure Router D as a xTR.

```
<RouterD> system-view
[RouterD] lisp
[RouterD-lisp] itr
[RouterD-lisp] etr
[RouterD-lisp] database-mapping 30.30.30.0 24 192.168.3.4 priority 1 weight 1
[RouterD-lisp] itr map-resolver 192.168.3.2
[RouterD-lisp] etr map-server 192.168.3.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterD-lisp] quit
```

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site verbose

LISP Site Registration Information for public VRF

Site name:   DC
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 10.10.10.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.1.1 (LR), priority: 1, weight: 1
      192.168.2.3 (-), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
  More-specific EID-prefix: 10.10.10.3/32, instance-id: 0
    Currently registered:      yes
    First registered:          00:02:10
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.1.1 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

```
Site name:   client
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 30.30.30.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.3.4
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   no
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.3.4 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

Display information about the LISP dynamic EID detection policies and the detected dynamic EIDs on Router A.

```
[RouterA] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 10.10.10.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.1.1, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.1.2
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 10.10.10.3, 00:00:15 ago
  Roaming dynamic EIDs:
           10.10.10.3, GigabitEthernet1/0/1, uptime: 00:00:15
                       discovered by: ip packet reception
```

Ping VM 10.10.10.3 in the LISP site **DC 1** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

10.10.10.3/32, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
```

```
                                        Weight     in/out   in/out
      192.168.1.1  00:01:31  up          1/1        3/3      1/0
```

Verifying the configuration

Move VM 10.10.10.3 from the LISP site **DC 1** to LISP site **DC 2**. (Details not shown.)

Display detailed information about the LISP dynamic EIDs detected by Router C.

```
[RouterC-lisp] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 10.10.10.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.2.3, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.2.2
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 10.10.10.3, 00:00:15 ago
  Roaming dynamic EIDs:
           10.10.10.3, GigabitEthernet1/0/1, uptime: 00:00:15
                       discovered by: ip packet reception
```

Display IPv4 LISP site information on Router B.

```
<RouterB> display lisp site verbose

LISP Site Registration Information for public VRF

Site name:   DC
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 10.10.10.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.1.1 (LR), priority: 1, weight: 1
      192.168.2.3 (-), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

```
  More-specific EID-prefix: 10.10.10.3/32, instance-id: 0
    Currently registered:      yes
    First registered:          00:02:10
    Last registered:           00:00:25
    Who last registered:       192.168.2.3
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.2.3 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0

Site name:   client
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 30.30.30.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.3.4
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   no
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.3.4 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

Ping VM 10.10.10.3 in the LISP site **DC 2** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache

LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

10.10.10.3/32, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.2.3  00:01:31  up          1/1        3/3      1/0
```

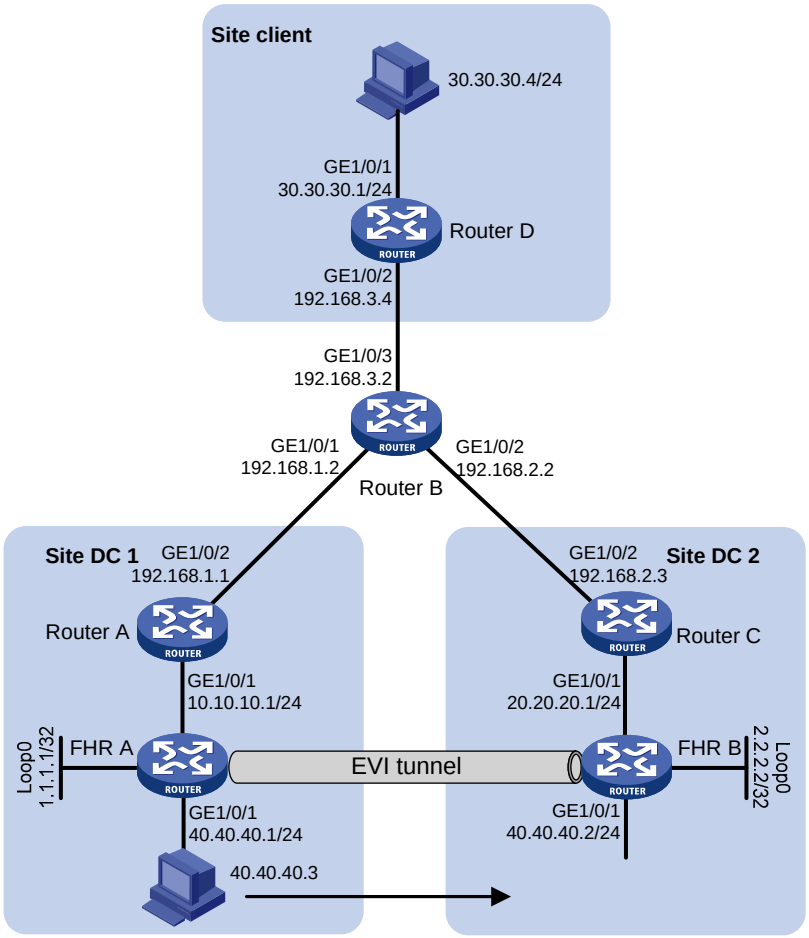
Virtual machine multi-hop mobility within a subnet configuration example

Network requirements

As shown in Figure 11, after LISP is enabled on all devices, make sure the following requirements are met:

- Router A, Router C, and Router D are configured as xTRs.
- The MR and MS features are enabled on Router B.
- FHR A and FHR B act as the First Hop Routers.
- The VM and the xTR are not directly connected. The VM can reach the xTR.
- Implement virtual machine multi-hop mobility within a subnet without changing the VM's IP address. After the roaming, the VM can operate correctly.

Figure 11 Network diagram



Configuration procedure

1. Configure IP addresses for interfaces. (Details not shown.)
2. Configure EVI. (Details not shown.)
3. Configure the dynamic routing protocol to make sure the RLOC addresses are reachable. (Details not shown.)
4. Configure the dynamic routing protocol in LISP sites **DC 1** and **DC 2** to make sure the EID addresses are reachable in the LISP sites. (Details not shown.)

5. Create a static route on Router A, whose destination address is 40.40.40.0/24 and the output interface is GigabitEthernet 1/0/1.
6. Create a static route on FHR A, whose destination address is 0.0.0.0/0 and the next hop address is 10.10.10.1.
7. Configure virtual machine multi-hop mobility within a subnet:

   # Configure Router A as a xTR, create the dynamic EID detection policy **de1**, and enable Router A to accept dynamic EID prefixes.

```
<RouterA> system-view
[RouterA] lisp
[RouterA-lisp] itr
[RouterA-lisp] etr
[RouterA-lisp] itr map-resolver 192.168.1.2
[RouterA-lisp] etr map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp] dynamic-eid de1
[RouterA-lisp-dynamic-eid-de1] database-mapping 40.40.40.0 24 192.168.1.1 priority
1 weight 1
[RouterA-lisp-dynamic-eid-de1] map-server 192.168.1.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterA-lisp-dynamic-eid-de1] eid-notify authentication-mode none
[RouterA-lisp-dynamic-eid-de1] quit
[RouterA-lisp] quit
```

   # Enable the MS and MR features on Router B.

```
<RouterB> system-view
[RouterB] lisp
[RouterB-lisp] map-server
[RouterB-lisp] map-resolver
```

   # Create the LISP site **DC** on Router B, and permit 40.40.40.0/24 and longer EID prefixes to register. Longer prefixes are specific than 40.40.40.0/24. If 40.40.40.0/24 specifies a range, a longer prefix might specify a node in the range, thus more specific.

```
[RouterB-lisp] site DC
[RouterB-lisp-site-DC] eid-prefix 40.40.40.0 24 accept-more-specifics
[RouterB-lisp-site-DC] authentication-mode sha-1 authentication-key plaintext aaa
[RouterB-lisp-site-DC] quit
```

   # Create the LISP site **client** on Router B, and permit the EID prefix 30.30.30.0/24 for registration.

```
[RouterB-lisp] site client
[RouterB-lisp-site-client] eid-prefix 30.30.30.0 24
[RouterB-lisp-site-client] authentication-mode sha-1 authentication-key plaintext
aaa
[RouterB-lisp-site-client] quit
[RouterB-lisp] quit
```

   # Configure Router C as a xTR, create the dynamic EID detection policy **de1**, and enable Router C to accept dynamic EID prefixes.

```
<RouterC> system-view
[RouterC] lisp
[RouterC-lisp] itr
[RouterC-lisp] etr
[RouterC-lisp] itr map-resolver 192.168.2.2
```

```
[RouterC-lisp] etr map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp] dynamic-eid de1
[RouterC-lisp-dynamic-eid-de1] database-mapping 40.40.40.0 24 192.168.2.3 priority
1 weight 1
[RouterC-lisp-dynamic-eid-de1] map-server 192.168.2.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterC-lisp-dynamic-eid-de1] eid-notify authentication-mode none
[RouterC-lisp-dynamic-eid-de1] quit
[RouterC-lisp] quit
```

Configure Router D as a xTR.

```
<RouterD> system-view
[RouterD] lisp
[RouterD-lisp] itr
[RouterD-lisp] etr
[RouterD-lisp] database-mapping 30.30.30.0 24 192.168.3.4 priority 1 weight 1
[RouterD-lisp] itr map-resolver 192.168.3.2
[RouterD-lisp] etr map-server 192.168.3.2 authentication-mode sha-1
authentication-key plaintext aaa
[RouterD-lisp] quit
```

Enable the ETR feature on FHR A, and create the dynamic EID detection policy **de1**.

```
<FHRA> system-view
[FHRA] lisp
[FHRA-lisp] etr
[FHRA-lisp] dynamic-eid de1
[FHRA-lisp-dynamic-eid-de1] database-mapping 40.40.40.0 24 1.1.1.1 priority 1 weight
1
```

Enable FHR A to notify Router A of the detected dynamic EID prefixes, and configure FHR A to multicast Map-Notify messages to 239.0.0.2.

```
[FHRA-lisp-dynamic-eid-de1] eid-notify 10.10.10.1 authentication-mode none
[FHRA-lisp-dynamic-eid-de1] map-notify-group 239.0.0.2
```

Apply the dynamic EID detection policy **de1** to GigabitEthernet 1/0/1 of FHR A.

```
[FHRA-lisp-dynamic-eid-de1] interface gigabitethernet 1/0/1
[FHRA-GE1/0/1] lisp mobility de1
[FHRA-GE1/0/1] lisp extended-subnet-mode
[FHRA-GE1/0/1] quit
```

Enable the ETR feature on FHR B, and create the dynamic EID detection policy **de1**.

```
<FHRB> system-view
[FHRB] lisp
[FHRB-lisp] etr
[FHRB-lisp] dynamic-eid de1
[FHRB-lisp-dynamic-eid-de1] database-mapping 40.40.40.0 24 2.2.2.2 priority 1 weight
1
```

Enable FHR B to notify Router B of the detected dynamic EID prefixes, and configure FHR B to multicast Map-Notify messages to 239.0.0.2.

```
[FHRB-lisp-dynamic-eid-de1] eid-notify 20.20.20.1 authentication-mode none
[FHRB-lisp-dynamic-eid-de1] map-notify-group 239.0.0.2
```

Apply the dynamic EID detection policy **de1** to GigabitEthernet 1/0/1 of FHR B.

```
[FHRB-lisp-dynamic-eid-de1] interface gigabitethernet 1/0/1
```

```
[FHRB-GE1/0/1] lisp mobility de1
[FHRB-GE1/0/1] lisp extended-subnet-mode
[FHRB-GE1/0/1] quit
```

Display IPv4 LISP site information on Router B.

```
[RouterB] display lisp site verbose

LISP Site Registration Information for public VRF

Site name:   DC
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 40.40.40.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.1.1 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
  More-specific EID-prefix: 40.40.40.3/32, instance-id: 0
    Currently registered:      yes
    First registered:          00:02:10
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.1.1 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0

Site name:   client
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 30.30.30.0/24, instance-id: 0
    More-specifics registered: 0
```

```
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.3.4
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   no
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.3.4 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

Display information about the LISP dynamic EID detection policies and the detected dynamic EIDs on Router A.

```
[RouterA] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 40.40.40.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.1.1, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.1.2
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 40.40.40.3, 00:00:15 ago
  Roaming dynamic EIDs:
           40.40.40.3, GigabitEthernet1/0/1, uptime: 00:00:15
                       discovered by: Eid-Notify
                       EID-Notify Locators:
1.1.1.1
```

Display detailed information about the LISP dynamic EID detection policies and the detected dynamic EIDs on FHR A.

```
[FHRA] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 40.40.40.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.1.1, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.1.2
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
```

```
  Last dynamic EID discovered: 40.40.40.3, 00:00:15 ago
  Roaming dynamic EIDs:
           40.40.40.3, NULL0, uptime: 00:00:15
                       discovered by: ip packet reception
```

Ping VM 40.40.40.3 in the LISP site **DC 1** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache
LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

40.40.40.3/32, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.1.1  00:01:31  up          1/1        3/3      1/0
```

Verifying the configuration

Move VM 40.40.40.3 from the LISP site **DC 1** to LISP site **DC 2**. (Details not shown.)

Display detailed information about the LISP dynamic EID detection policies and the detected dynamic EIDs on Router C.

```
[RouterC] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 40.40.40.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.2.3, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.2.2
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 40.40.40.3, 00:00:15 ago
  Roaming dynamic EIDs:
           40.40.40.3, GigabitEthernet1/0/1, uptime: 00:00:15
                       discovered by: Eid-Notify
                       EID-Notify Locators:
2.2.2.2
```

Display detailed information about the LISP dynamic EIDs detected by FHR B.

```
[FHRB] display lisp dynamic-eid verbose

LISP dynamic EID information for public VRF

Dynamic EID name: de1
  Database-mapping EID-prefix: 40.40.40.0/24, instance-id: 0, LSBs: 0x00000001
    Locator: 192.168.2.3, Priority: 1, Weight: 1
             Uptime: 00:00:15, State: up, local
  Registering more-specific dynamic-EIDs
Map servers: 192.168.2.2
```

```
  Site-based multicast Map-Notify group: 239.0.0.2
  Roaming dynamic EIDs allowed: 0.0.0.0/0
  Number of roaming dynamic EIDs discovered: 1
  Last dynamic EID discovered: 40.40.40.3, 00:00:15 ago
  Roaming dynamic EIDs:
           40.40.40.3, NULL0, uptime: 00:00:15
                       discovered by: ip packet reception
```

Display IPv4 LISP site information on Router B.

```
<RouterB> display lisp site verbose

LISP Site Registration Information for public VRF

Site name:   DC
Description: none configured
Allowed configured locators: any

  Configured EID-prefix: 40.40.40.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.1.1
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.2.3 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
  More-specific EID-prefix: 40.40.40.3/32, instance-id: 0
    Currently registered:      yes
    First registered:          00:02:10
    Last registered:           00:00:25
    Who last registered:       192.168.2.3
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   yes
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.2.3 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0

Site name:   client
Description: none configured
```

```
Allowed configured locators: any

  Configured EID-prefix: 30.30.30.0/24, instance-id: 0
    More-specifics registered: 1
    Currently registered:      yes
    First registered:          00:35:22
    Last registered:           00:00:25
    Who last registered:       192.168.3.4
    Routing table tag:         0
    Proxy Replying:            no
    Wants Map-Notifications:   no
    Registered TTL:            1440 minutes
    Registered locators:
      192.168.3.4 (LR), priority: 1, weight: 1
    Registration errors:
      Authentication failures: 0
      Allowed locators mismatch: 0
```

Ping VM 40.40.40.3 in the LISP site **DC 2** from Site client 30.30.30.4. The VM can be successfully pinged. (Details not shown.)

Display IPv4 LISP mapping cache entries on Router D.

```
[RouterD] display lisp ipv4 map-cache
LISP IP Mapping Cache for Public VRF (iid 0), 1 entries

40.40.40.3/32, uptime: 01:48:31, expires: 22:11:29, via map-reply
  Locator      Uptime    State       Priority/  Data     Control
                                     Weight     in/out   in/out
  192.168.2.3  00:01:31  up          1/1        3/3      1/0
```

Document conventions and icons

Conventions

This section describes the conventions used in the documentation.

Port numbering in examples

The port numbers in this document are for illustration only and might be unavailable on your device.

Command conventions

Convention	Description
Boldface	**Bold** text represents commands and keywords that you enter literally as shown.
Italic	*Italic* text represents arguments that you replace with actual values.
[ ]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x | y | ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x | y | ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x | y | ... } *	Asterisk marked braces enclose a set of required syntax choices separated by vertical bars, from which you select at least one.
[x | y | ...] *	Asterisk marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.

GUI conventions

Convention	Description
Boldface	Window names, button names, field names, and menu items are in Boldface. For example, the **New User** window appears; click **OK**.
>	Multi-level menus are separated by angle brackets. For example, **File** > **Create** > **Folder**.

Symbols

Convention	Description
⚠ **WARNING!**	An alert that calls attention to important information that if not understood or followed can result in personal injury.
△ **CAUTION:**	An alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.
ⓘ **IMPORTANT:**	An alert that calls attention to essential information.
NOTE:	An alert that contains additional or supplementary information.
TIP:	An alert that provides helpful information.

Network topology icons

Convention	Description
	Represents a generic network device, such as a router, switch, or firewall.
	Represents a routing-capable device, such as a router or Layer 3 switch.
	Represents a generic switch, such as a Layer 2 or Layer 3 switch, or a router that supports Layer 2 forwarding and other Layer 2 features.
	Represents an access controller, a unified wired-WLAN module, or the access controller engine on a unified wired-WLAN switch.
	Represents an access point.
	Represents a wireless terminator unit.
	Represents a wireless terminator.
	Represents a mesh access point.
	Represents omnidirectional signals.
	Represents directional signals.
	Represents a security product, such as a firewall, UTM, multiservice security gateway, or load balancing device.
	Represents a security card, such as a firewall, load balancing, NetStream, SSL VPN, IPS, or ACG card.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
  - Hewlett Packard Enterprise Support Center **Get connected with updates** page:

    www.hpe.com/support/e-updates
  - Software Depot website:

    www.hpe.com/support/softwaredepot
- To view and update your entitlements, and to link your contracts, Care Packs, and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  www.hpe.com/support/AccessToSupportMaterials

IMPORTANT:

Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

Website	Link
Networking websites	
Hewlett Packard Enterprise Information Library for Networking	www.hpe.com/networking/resourcefinder
Hewlett Packard Enterprise Networking website	www.hpe.com/info/networking
Hewlett Packard Enterprise My Networking website	www.hpe.com/networking/support
Hewlett Packard Enterprise My Networking Portal	www.hpe.com/networking/mynetworking
Hewlett Packard Enterprise Networking Warranty	www.hpe.com/networking/warranty
General websites	
Hewlett Packard Enterprise Information Library	www.hpe.com/info/enterprise/docs
Hewlett Packard Enterprise Support Center	www.hpe.com/support/hpesc
Hewlett Packard Enterprise Support Services Central	ssc.hpe.com/portal/site/ssc/
Contact Hewlett Packard Enterprise Worldwide	www.hpe.com/assistance
Subscription Service/Support Alerts	www.hpe.com/support/e-updates
Software Depot	www.hpe.com/support/softwaredepot
Customer Self Repair (not applicable to all devices)	www.hpe.com/support/selfrepair
Insight Remote Support (not applicable to all devices)	www.hpe.com/info/insightremotesupport/docs

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty, Care Pack Service, or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (docsfeedback@hpe.com). When submitting your feedback, include the document title,

part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.

Index

V