Configuring Fabric Edge Node

A LISP VXLAN fabric edge node is the access layer where the traffic enters or exits the network towards the users, devices or endpoints. You can configure the following platforms as a fabric edge node:

- Cisco Catalyst 9300 Series Switches
- Cisco Catalyst 9400 Series Switches
- Cisco Catalyst 9500 Series Switches

Functions of Fabric Edge Node

A fabric edge node performs the following functions in the fabric:

- **Endpoint Registration**: Identifies and authenticates a wired endpoint before registering the endpoint ID information with the control plane node.
- **AAA Authenticator**: An integral part of the IEEE 802.1X port-based authentication process, the edge node collects authentication credentials from the connected devices, relays it to the Authentication Server, and enforces the authorization result.
- **Anycast Layer 3 Gateway**: An edge node acts as Layer 3 anycast gateway, providing optimal forwarding and mobility for the endpoints within the fabric. On edge nodes, the anycast Layer 3 gateway is instantiated as a Switched Virtual Interface (SVI) with a hard-coded anycast MAC address that is uniform across all edge nodes within the fabric site.
- **VXLAN encapsulation/decapsulation**: Packets received from the end points are encapsulated by the fabric edge node. Depending on the destination, the encapsulated packets are forwarded to another edge node or the border node. When fabric encapsulated traffic is received for an endpoint, the fabric edge node decapsulates the traffic and sends it to that endpoint.

How to Configure a Fabric Edge Node

Note Before you begin, ensure that the underlay network links are configured for routed access connectivity.

Step	Task	Purpose
Step 1	Configure VRF	Configure a VRF to support IPv4 and IPv6 routing tables. VRF maintains the routing and forwarding information for devices within a virtual network. A VRF instance has its own IP routing table, a forwarding table, and one or more interfaces assigned to it. The VRF tables help the routing device reach the locator address space.
Step 2	Configure DHCP Options and Snooping	Configure a fabric edge node as a DHCP relay agent to relay the DHCP traffic between fabric endpoints and DHCP server. DHCP Snooping on a VLAN enables DT-PROGRAMMATIC policy that supports onboarding of DHCPv4 hosts.
Step 3	Configure Device Tracking	Configure Switch Integrated Security Features based (SISF-based) device tracking to track the presence, location, and movement of endpoints in the fabric. SISF snoops traffic received by the device, extracts device identity (MAC and IP address), and stores them in a binding table.
Step 4	Configure VLANs	Configure VLANs to segment your network and achieve traffic isolation between the segments.
Step 5	Configure an SVI Interface	Configure an SVI interface for each VRF and for the Default Instance. An SVI interface is a VLAN interface that allows traffic to be routed between the VRFs.

Step	Task	Purpose
Step 6	Configure LISP	• Set up the Ingress Tunnel Router (ITR) functionality for both IPv4 and IPv6 address families. An ITR encapsulates and forwards the incoming packets across the overlay either to another fabric edge node or to the border node, depending on the destination. • Set up the Egress Tunnel Router (ETR) functionality for both IPv4 and IPv6 address families. An ETR decapsulates the received VXLAN-encapsulated packets and sends the packets to the endpoint.
Step 7	Configure Layer 3 VNI and Segment for Default Instance Configure Layer 3 VNI and Segment for User-Defined VRF	In a LISP VXLAN fabric, the VXLAN-GPO header has a VXLAN Network Identifier (VNI) field that servers as an identifier of a specific virtual network. VXLAN VNI helps carry the macro segmentation information within the fabric site. A Layer 3 VNI identifies a Layer 3 overlay. • Configure Layer 3 VNI for the Default Instance. The default instance is used to connect the network infrastructure elements like Access Points and Layer 2 switches to the fabric access layer. • Configure Layer 3 VNI for VLANs in User-Defined VRF.
Step 8	Configure Layer 2 VNI and Segment for Default Instance Configure Layer 2 VNI for VLANs in User-Defined VRF	A Layer 2 VNI identifies a Layer 2 overlay. • Configure Layer 2 VNI for the Default Instance. • Configure Layer 2 VNI for the User-Defined VRF. Configuring Layer 2 VNI programmatically enables these first-hop-security policies on the VLANs: LISP-DT-GUARD-VLAN and LISP-AR-RELAY-VLAN. LISP-DT-GUARD-VLAN policy mitigates IP theft, MAC theft and DOS attacks. LISP-AR-RELAY policy helps in converting ARP broadcast and Neighbor Solicitation (NS) multicast packets to unicast.

Step	Task	Purpose
Step 9	Verify the configurations on the fabric edge node using these show commands: For sample outputs of the **show** commands, refer Verify the Configuration of Fabric Edge Node, on page 28.	
	show lisp session	Displays a summary of the LISP sessions that the fabric edge node has established with the control plane node.
	show lisp service ipv4 statistics **show lisp service ipv6 statistics**	Displays the LISP packet statistics for all EID prefixes. Use this command to check the total number of packet encapsulations, decapsulations, map requests, map replies, map registers, and other LISP-related packet information, for the IPv4 or IPv6 service.
	show lisp service ipv4 summary **show lisp service ipv6 summary**	Displays a summary of the LISP service instances that are created on the device.
	show ip interface brief	Displays a summary of the LISP interfaces that are created dynamically. Filter the output to view the dynamically created LISP interfaces, using the **show ip interface brief | i LISP** command.
	show lisp locator-set	Displays information about the Locator Set configured on the fabric edge node.
	show ip route vrf	Displays the routing table that is configured on the fabric edge node, for a specified VRF.
	show lisp platform	Displays the limits of the given platform or the device. This command shows the LISP instance limits, Layer 3 limits, Layer 2 limits, and the supported configuration style on the device. Use this command to understand the limits of the device before planning its usage and role in the fabric.

Configure VRF

To configure a VRF on a fabric edge node, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**vrf definition** *vrf-name* **Example:** `Device(config)# vrf definition campus`	Configures a VRF table, and enters VRF configuration mode.
Step 4	**address-family** {**ipv4** | **ipv6**} **Example:** `Device(config-vrf)# address-family ipv4`	Specifies the address family as IPv4, and enters address family configuration mode.
Step 5	**exit-address-family** **Example:** `Device(config-vrf-af)# exit-address-family`	Exits address family configuration mode, and enters VRF configuration mode.
Step 6	**end** **Example:** `Device(config-vrf)# end`	Returns to privileged EXEC mode.

Configure Device Tracking

To configure device tracking on a fabric edge node, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**device-tracking policy** *policy-name* **Example:** `Device(config)# device-tracking policy IPDT_POLICY`	Creates a device-tracking policy with the specified name, and enters the device-tracking configuration mode.
Step 4	**tracking enable** **Example:** `Device(config-device-tracking)# tracking enable`	Enables polling for the specified policy.
Step 5	**exit** **Example:** `Device(config-device-tracking)# exit`	Exits device-tracking configuration mode, and enters global configuration mode.
Step 6	**interface** *interface-id* **Example:** `Device(config)# interface GigabitEthernet1/0/3`	Specifies an interface and enters interface configuration mode.
Step 7	**device-tracking attach-policy** *policy-name* **Example:** `Device(config-if)# device-tracking attach-policy IPDT_POLICY`	Attaches the device tracking policy to the interface.
Step 8	**end** **Example:** `Device(config-device-tracking)# end`	Returns to privileged EXEC mode.

Configure VLANs

To configure VLAN on a fabric edge node, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**vlan configuration** *vlan-id* **Example:** `Device(config)# vlan configuration 50`	Allows you to configure VLANs without actually creating them.
Step 4	**ipv6 nd raguard** **Example:** `Device(config)# ipv6 nd raguard`	Configures the default Router Advertisement (RA) Guard policy on the VLAN. The RA Guard feature analyzes the RAs and filters out bogus RAs sent by unauthorized devices. In host mode, all router advertisement and router redirect messages are disallowed on the port.
Step 5	**ipv6 dhcp guard** **Example:** `Device(config)# ipv6 dhcp guard`	Configures the default DHCP Guard policy on the VLAN. The IPv6 DHCP Guard feature blocks reply and advertisement messages that come from unauthorized DHCPv6 servers and relay agents.
Step 6	**vlan** *vlan-id* **Example:** `Device(config)# vlan 50`	Specifies a VLAN ID, and enters VLAN configuration mode.
Step 7	**name** *vlan-name* **Example:** `Device(config-vlan)# name AVlan50`	Specifies a name for the VLAN.
Step 8	**exit** **Example:** `Device(config-vlan)# exit`	Exits VLAN configuration mode, and enters global configuration mode.
Step 9	**vlan** *vlan-id* **Example:** `Device(config)# vlan 91`	Specifies a VLAN ID, and enters VLAN configuration mode.
Step 10	**name** *vlan-name* **Example:** `Device(config-vlan)# name AVlan91`	Specifies a name for the VLAN.
Step 11	**exit** **Example:** `Device(config-vlan)# exit`	Exits VLAN configuration mode, and enters global configuration mode.
Step 12	**end** **Example:**	Returns to privileged EXEC mode.

	Command or Action	Purpose
	`Device(config)# end`	

Configure an SVI Interface

To configure an SVI interface for a VLAN on a fabric edge node, perform this task.

Repeat these steps to configure an SVI interface for each VLAN.

To configure an SVI interface for a Default Instance, execute only those steps that are applicable to the IPv4 address family. Do not execute the commands for IPv6 address family because a default instance does not support IPv6.

Note IPv6 client address assignment through Stateless Address Auto-Configuration (SLAAC) depends on Router Solicitation (RS), Router Advertisement (RA), Neighbor Solicitation (NS), and Neighbor Discovery (ND) message sequences. A default RA interval of 200 seconds results in a longer duration for IP address resolution. To enable faster address convergence using SLAAC, we recommend that you configure a lower RA interval, such as 1000 milliseconds.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

Step 3	**interface** *vlan-id*
	Example:
	For a user-defined VRF:
	`Device(config)# interface Vlan50`
	For a Default Instance:
	`Device(config)# interface Vlan91`
		Specifies the interface for which you are adding a description, and enters interface configuration mode.

Step 4	**description** *string* **Example:** `Device(config-if)# description server1`	Adds a description for an interface.
Step 5	**mac-address** *address* **Example:**	Specifies the MAC address for the VLAN interface (SVI).

	Command or Action	Purpose

	For a user-defined VRF:
	`Device(config-if)# mac-address 0000.0c9f.f18e`
	For a Default Instance:
	`Device(config-if)# mac-address 0000.0c9f.f984`
		We recommend that you use a MAC address starting from the base range value of 0000.0C9F.F05F.
		Note Configure the same MAC address for a given SVI on all the fabric edge nodes.

Step 6	**vrf forwarding** *name* **Example:** `Device(config-if)# vrf forwarding VN3`	Associates the VRF instance with the interface. **Note** This step is not applicable for an SVI of the default instance.

Step 7	**ip address** *ip_address subnet_mask*
	Example:
	For a user-defined VRF:
	`Device(config-if)# ip address 10.50.1.1 255.255.255.0`
	For a Default Instance:
	`Device(config-if)# ip address 10.91.1.1 255.255.255.0`
		Configures the IP address and IP subnet.
		This is the a common EID subnet that is shared across all the fabric edge nodes and the SVI is the Anycast Layer 3 Gateway.

Step 8	**ip helper-address** *ip_address* **Example:** `Device(config-if)# ip helper-address 172.16.2.2`	Configures the IP helper address. DHCP broadcasts will be forwarded as a unicast to this specific helper address rather than be dropped by the router.
Step 9	**no ip redirects** **Example:** `Device(config-if)# no ip redirects`	Disables sending of Internet Control Message Protocol (ICMP) redirect messages.
Step 10	**ipv6 address** *address* **Example:** `Device(config-if)# ipv6 address 2001:DB8:2050::1/64`	Configures an IPv6 address on the interface.
Step 11	**ipv6 enable** **Example:** `Device(config-if)# ipv6 enable`	Enables IPv6 on the interface.

Step 12	**ipv6 nd** {**dad attempts** | **prefix** | **managed-config-flag** | **other-config-flag** | **router-preference** | }
	Example:
	`Device(config-if)# ipv6 nd dad attempts 0`
	`Device(config-if)# ipv6 nd prefix`
		Configures IPv6 neighbor discovery on the interface.
		• **dad attempts**: Specifies the number of consecutive neighbor solicitation messages that are sent on an interface while duplicate address detection is

	Command or Action	Purpose

	`2001:DB8:2050::/64 2592000 604800 no-autoconfig`
	`Device(config-if)# ipv6 nd managed-config-flag`
	`Device(config-if)# ipv6 nd other-config-flag`
	`Device(config-if)# ipv6 nd router-preference High`
		performed on the unicast IPv6 addresses of the interface.
		• **prefix**: Specifies IPv6 prefixes that are included in IPv6 neighbor discovery router advertisements.
		• **managed-config-flag**: Specifies IPv6 interfaces neighbor discovery to allow the hosts to uses DHCP for address configuration.
		• **other-config-flag**: Specifies IPv6 interfaces neighbor discovery to allow the hosts to uses DHCP for non-address configuration.
		• **router-preference**: Specifies a default router preference (DRP) for the router on a specific interface.

Step 13	**ipv6 dhcp relay** {**destination** | **source-interface** | **trust**}
	Example:
	`Device(config-if)# ipv6 dhcp relay destination 2001:DB8:2::2`
	`Device(config-if)# ipv6 dhcp relay source-interface Vlan50`
	`Device(config-if)# ipv6 dhcp relay trust`
		Configures Dynamic Host Configuration Protocol (DHCP) for IPv6 relay service on the interface.
		• **destination**: Specifies a destination address to which client messages are forwarded.
		• **source-interface**: Specifies an interface to use as the source when relaying messages received on this interface.
		• **trust**: Specifies the interface to be trusted to process relay-replies.

Step 14	**no lisp mobility liveness test** **Example:** `Device(config-if)# no lisp mobility liveness test`	Removes mobility liveness settings discovered on this interface.

Step 15	**lisp mobility** *dynamic-eid-name*
	Example:
	For a user-defined VRF:
	`Device(config-if)# lisp mobility AVlan50-IPV4`
	`Device(config-if)# lisp mobility AVlan50-IPV6`
	For a Default Instance:
		Specifies the name of the LISP dynamic-EID policy to apply to this interface.

	Command or Action	Purpose
	`Device(config-if)# lisp mobility AVlan91-IPV4`	
Step 16	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Configure DHCP Options and Snooping

To configure DHCP options and snooping on a fabric edge node, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip dhcp relay information option** **Example:** `Device(config)# ip dhcp relay information option`	Enables the system to insert the DHCP relay agent information option (option-82 field) in forwarded BOOTREQUEST messages to a DHCP server.
Step 4	**ip dhcp snooping vlan** {*vlan id* | *vlan range*} **Example:** `Device(config)# ip dhcp snooping vlan 50,91`	Enables DHCP snooping on a VLAN or VLAN range. It also enables the DT-PROGRAMMATIC policy that supports onboarding of DHCPv4 hosts. DT-PROGRMMATIC policy enables device-tracking for the IEEE 802.1X, web authentication, Cisco TrustSec, and IPSG features.
Step 5	**ip dhcp snooping** **Example:** `Device(config)# ip dhcp snooping`	Enables DHCP snooping globally.
Step 6	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Configure LISP

To configure LISP on a fabric edge node, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router lisp** **Example:** `Device(config)# router lisp`	Enters LISP configuration mode.
Step 4	**locator-table default** **Example:** `Device(config-router-lisp)# locator-table default`	Selects the default (global) routing table for association with the routing locator address space.
Step 5	**locator-set** *loc-set-name* **Example:** `Device(config-router-lisp)# locator-set rloc_set2`	Specifies a locator-set and enters the locator-set configuration mode.
Step 6	**ipv4-interface Loopback** *loopback-interface-id* **priority** *locator-priority* **weight** *locator-weight* **Example:** `Device(config-router-lisp-locator-set)# IPv4-interface Loopback0 priority 10 weight 10`	Configures the loopback IP address to ensure the device is reachable.
Step 7	**exit-locator-set** **Example:** `Device(config-router-lisp-locator-set)# exit-locator-set`	Exits locator-set configuration mode, and enters LISP configuration mode.
Step 8	**locator default-set** *rloc-set-name* **Example:** `Device(config-router-lisp)# locator default-set rloc_set2`	Marks a locator-set as default.

	Command or Action	Purpose

Step 9	**service** { **ipv4** | **ipv6** }
	Example:
	`Device(config-router-lisp)# service ipv4`
	`Device(config-router-lisp)# service ipv6`
		Enables network services on the default instance.
		service ipv4: Enables Layer 3 network services for the IPv4 address family.
		service ipv6: Enables Layer 3 network services for the IPv6 address family.

Step 10	**encapsulation vxlan**
	Example:
	`Device(config-router-lisp-serv-ipv4)# encapsulation vxlan`
	`Device(config-router-lisp-serv-ipv6)# encapsulation vxlan`
		Specifies VXLAN-based encapsulation.

Step 11	**itr map-resolver** *map-address*
	Example:
	`Device(config-router-lisp-serv-ipv4)# itr map-resolver 172.16.1.66`
	`Device(config-router-lisp-serv-ipv4)# itr map-resolver 172.16.1.67`
	`Device(config-router-lisp-serv-ipv6)# itr map-resolver 172.16.1.66`
	`Device(config-router-lisp-serv-ipv6)# itr map-resolver 172.16.1.67`
		Configures map-resolver address for sending map requests, on the Ingress Tunnel Router (ITR).
		A control plane node is the LISP map resolver. Specify the IP address of the Loopback 0 interface on control plane node as the *map-address*. If your fabric site has more than one control plane nodes, execute this command for each of the *map-address* (control plane nodes).

Step 12	**etr map-server** *map-server-address* **key** *authentication-key*
	Example:
	`Device(config-router-lisp-serv-ipv4)# etr map-server 172.16.1.66 key some-key`
	`Device(config-router-lisp-serv-ipv4)# etr map-server 172.16.1.67 key auth-key`
	`Device(config-router-lisp-serv-ipv6)# etr map-server 172.16.1.66 key some-key`
	`Device(config-router-lisp-serv-ipv6)# etr map-server 172.16.1.67 key auth-key`
		Configures a map server to be used by the Egress Tunnel Router (ETR), and specifies the authentication key to be used with this map server.
		Note Ensure that you use the same *authentication-key* that was configured on the control plane node.
		A control plane node is the LISP map server. Specify the IP address of the Loopback 0 interface on control plane node as the *map-server-address*. If your fabric site has more than one control plane node, execute this command for each of the *map-server-address* (control plane nodes).

Step 13	**etr map-server** *map-server-address* **proxy-reply** **Example:** `Device(config-router-lisp-serv-ipv4)# etr map-server 172.16.1.66 proxy-reply`	Configures a map server to be used by the Egress Tunnel Router (ETR), and specifies that the map server answers the map-requests on behalf the ETR.

	Command or Action	Purpose

	`Device(config-router-lisp-serv-ipv4)# etr map-server 172.16.1.67 proxy-reply`
	`Device(config-router-lisp-serv-ipv6)# etr map-server 172.16.1.66 proxy-reply`
	`Device(config-router-lisp-serv-ipv6)# etr map-server 172.16.1.67 proxy-reply`
		A control plane node is the LISP map server. Specify the IP address of the Loopback 0 interface on control plane node as the *map-server-address*. If your fabric site has more than one control plane node, execute this command for each of the *map-server-address* (control plane nodes).

Step 14	**etr**
	Example:
	Example:
	`Device(config-router-lisp-serv-ipv4)# etr`
	`Device(config-router-lisp-serv-ipv6)# etr`
		Configures the device as an Egress Tunnel Router (ETR).

Step 15	**sgt**
	Example:
	`Device(config-router-lisp-serv-ipv4)# sgt`
	`Device(config-router-lisp-serv-ipv6)# sgt`
		Enables the Security Group Tag (SGT) function for SGT tag propagation.

Step 16	**proxy-itr** *address*
	Example:
	`Device(config-router-lisp-serv-ipv4)# proxy-itr 172.16.1.68`
	`Device(config-router-lisp-serv-ipv6)# proxy-itr 172.16.1.68`
		Configures the device to act as a Locator/ID Separation Protocol (LISP) Proxy Ingress Tunnel Router (PITR).
		For *address*, specify the Loopback 0 IP address of this device.

Step 17	Do one of the following:
	• **exit-service-ipv4**
	• **exit-service-ipv6**
	Example:
	`Device(config-router-lisp-serv-ipv4)# exit-service-ipv4`
	`Device(config-router-lisp-serv-ipv6)# exit-service-ipv6`
		Exits service configuration mode, and enters LISP configuration mode.
		Use the appropriate command, depending on which service mode you are exiting from (IPv4 or IPv6 service mode).

Step 18	**service ethernet** **Example:** `Device(config-router-lisp)# service ethernet`	Enables Layer 2 network services.

	Command or Action	Purpose

Step 19	**itr map-resolver** *map-address*
	Example:
	`Device(config-router-lisp-serv-eth)# itr map-resolver 172.16.1.66`
	`Device(config-router-lisp-serv-eth)# itr map-resolver 172.16.1.67`
		Configures map-resolver address for sending map requests, on the Ingress Tunnel Router (ITR).

Step 20	**itr** **Example:** `Device(config-router-lisp-serv-eth)# itr`	Configures the device as an Ingress Tunnel Router (ITR).

Step 21	**etr map-server** *map-server-address* **key** [**0**|**6** | **7** } *authentication-key*
	Example:
	`Device(config-router-lisp-serv-eth)# etr map-server 172.16.1.66 key some-key`
	`Device(config-router-lisp-serv-eth)# etr map-server 172.16.1.67 key auth-key`
		Configures a map server to be used by the Egress Tunnel Router (ETR), and specifies the key type.
		Key type 0 indicates that password is entered as clear text.
		Key type 6 indicates that password is in the AES encrypted form.
		Key type 7 indicates that password is a weak encrypted one.
		The map server and ETR must be configured with matching passwords for the map-registration process to successfully complete. The map server must be preconfigured with the EID prefixes that match the 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.
		Note Ensure that you use the same *authentication-key* that was configured on the control plane node.
		Specify the IP address of the Loopback 0 interface on control plane node as the *map-server-address*. If your fabric site has more than one control plane node, execute this command for each of the *map-server-address* (control plane nodes).

Step 22	**etr map-server** *map-server-address* **proxy-reply**	Configures a map server to be used by the Egress Tunnel Router (ETR), and specifies

	Command or Action	Purpose

	Example:
	`Device(config-router-lisp-serv-eth)# etr map-server 172.16.1.66 proxy-reply`
	`Device(config-router-lisp-serv-eth)# etr map-server 172.16.1.67 proxy-reply`
		that the map server answers the map-requests on behalf the ETR.
		Specify the IP address of the Loopback 0 interface on control plane node as the *map-server-address*. If your fabric site has more than one control plane node, execute this command for each of the *map-server-address* (control plane nodes).

Step 23	**etr** **Example:** `Device(config-router-lisp-serv-eth)# etr`	Configures the device as an Egress Tunnel Router (ETR).
Step 24	**exit-service-ethernet** **Example:** `Device(config-router-lisp-serv-eth)# exit-service-ethernet`	Exits service configuration mode, and enters LISP configuration mode.
Step 25	**ipv4 locator reachability minimum-mask-length** *length* **Example:** `Device(config-router-lisp)# ipv4 locator reachability minimum-mask-length 32`	Specifies the shortest mask prefix to accept when looking up a remote RLOC in the RIB. LISP checks the host reachability from the routing locator.
Step 26	**ipv4 source-locator** *interface-number* **Example:** `Device(config-router-lisp)# ipv4 source-locator loopback0`	Configures the source locator for the outbound LISP packets. Set the loopback interface as the source locator.
Step 27	**exit-router-lisp** **Example:** `Device(config-router-lisp)# exit-router-lisp`	Exits LISP configuration mode, and enters global configuration mode.
Step 28	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Step 29	**show lisp locator-set**
	Example:
	`Device# show lisp locator-set`
	`LISP Locator-set information:`
	
	`172.16.1.68, local, reachable, loopback`
		Displays information about the Locator Set that is configured on the device.

Configure Layer 3 VNI and Segment for Default Instance

A default instance connects network infrastructure elements like Access Points and Layer 2 switches to the fabric access layer. To configure Layer 3 VNI for the default instance, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router lisp** **Example:** `Device(config)# router lisp`	Enters LISP configuration mode.
Step 4	**instance-id** *id* **Example:** `Device(config-router-lisp)# instance-id 4097`	Specifies the instance ID.
Step 5	**remote-rloc-probe on-route-change** **Example:** `Device(config-router-lisp-inst)# remote-rloc-probe on-route-change`	Configures parameters for probing of remote local routing locators (RLOCs).
Step 6	**dynamic-eid** *eid-name* **Example:** `Device(config-router-lisp-inst)# dynamic-eid AVlan91-IPV4`	Creates a dynamic Endpoint Identifier (EID) policy and enters the dynamic-eid configuration mode on the fabric edge node. To configure LISP host mobility, you must create a dynamic-eid policy that can be referenced by the **lisp mobility** *dynamic-eid-name* interface command. Hence the *eid-name* that is associated with **dynamic-eid** command should be the same as *dynamic-eid-name* that is used to configure LISP mobility. For the *dynamic-eid-name*, refer to the lisp mobility configuration step of the Configure an SVI Interface procedure.
Step 7	**database-mapping** *eid-prefix/prefix-length* **locator-set** *RLOC_name* **Example:**	Configures an IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship and an associated traffic policy for LISP.

	Command or Action	Purpose
	`Device(config-router-lisp-inst-dynamic-eid)# database-mapping 10.91.1.0/24 locator-set rloc_set2`	
Step 8	**exit-dynamic-eid** **Example:** `Device(config-router-lisp-inst-dynamic-eid)# exit-dynamic-eid`	Exits dynamic-eid configuration mode, and enters LISP instance configuration mode.
Step 9	**service ipv4** **Example:** `Device(config-router-lisp-inst)# service ipv4`	Enables Layer 3 network services for the IPv4 address family.
Step 10	**eid-table default** **Example:** `Device(config-router-lisp-inst-serv-ipv4)# eid-table default`	Configures the default (global) routing table for association with the configured instance-service.
Step 11	**exit-service-ipv4** **Example:** `Device(config-router-lisp-inst-serv-ipv4)# exit-service-ipv4`	Exits IP service configuration mode, and enters LISP instance configuration mode.
Step 12	**exit-instance-id** **Example:** `Device(config-router-lisp-inst)# exit-instance-id`	Exits instance configuration mode, and enters LISP configuration mode.
Step 13	**end** **Example:** `Device(config-router-lisp)# end`	Returns to privileged EXEC mode.

Step 14	**show lisp session**
	Example:
	`Device# show lisp session`
	`Sessions for VRF default, total: 2, established: 1`
	`Peer State Up/Down In/Out Users`
	`172.16.1.66:4342 Up 02:21:53 20/9 14`
	`Device#`
		Displays a summary of the LISP sessions that this fabric edge node has set up with the control plane node.

Configure Layer 2 VNI and Segment for Default Instance

A Default Instance connects network infrastructure elements like Access Points and Layer-2 switches to the fabric access layer. To configure Layer 2 VNI for the Default Instance, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router lisp** **Example:** `Device(config)# router lisp`	Enters LISP configuration mode.
Step 4	**instance-id** *id* **Example:** `Device(config-router-lisp)# instance-id 8194`	Specifies the instance ID. Ensure that the Layer 2 VNI ID is different from the Layer 3 VNI ID that you have configured in the earlier task.
Step 5	**remote-rloc-probe on-route-change** **Example:** `Device(config-router-lisp-inst)# remote-rloc-probe on-route-change`	Configures parameters for probing of remote local routing locators (RLOCs).
Step 6	**service ethernet** **Example:** `Device(config-router-lisp-inst)# service ethernet`	Enables Layer 2 network services.
Step 7	**eid-table vlan** *vlan-id* **Example:** `Device(config-router-lisp-inst-serv-ethernet)# eid-table vlan 91`	Configures the specified VLAN table for association with the configured instance.
Step 8	**database-mapping** *eid-prefix/prefix-length* **locator-set** *RLOC_name* **Example:** `Device(config-router-lisp-inst-serv-ethernet-eid-table)# database-mapping mac locator-set rloc_set2`	Configures an IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship and an associated traffic policy for LISP.
Step 9	**exit-service-ethernet** **Example:** `Device(config-router-lisp-inst-serv-ethernet)# exit-service-ethernet`	Exits service Ethernet configuration mode, and enters LISP instance configuration mode.

	Command or Action	Purpose
Step 10	**exit-instance-id** **Example:** `Device(config-router-lisp-inst)# exit-instance-id`	Exits instance configuration mode, and enters LISP configuration mode.
Step 11	**end** **Example:** `Device(config-router-lisp)# end`	Returns to privileged EXEC mode.

Configure Layer 3 VNI and Segment for User-Defined VRF

To configure a Layer 3 VNI for user-defined VRF, perform this task:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router lisp** **Example:** `Device(config)# router lisp`	Enters LISP configuration mode.
Step 4	**instance-id** *id* **Example:** `Device(config-router-lisp)# instance-id 4099`	Specifies the instance ID.
Step 5	**remote-rloc-probe on-route-change** **Example:** `Device(config-router-lisp-inst)# remote-rloc-probe on-route-change`	Configures parameters for probing of remote local routing locators (RLOCs).
Step 6	**dynamic-eid** *eid-name* **Example:** `Device(config-router-lisp-inst)# dynamic-eid AVlan50-IPV4`	Creates a dynamic End Point Identifier (EID) policy, and enters the dynamic-eid configuration mode on an xTR.

	Command or Action	Purpose
Step 7	**database-mapping** *eid-prefix/prefix-length* **locator-set** *RLOC_name* **Example:** `Device(config-router-lisp-inst-dynamic-eid)# database-mapping 10.50.1.0/24 locator-set rloc_set2`	Configures an IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship.
Step 8	**exit-dynamic-eid** **Example:** `Device(config-router-lisp-inst-dynamic-eid)# exit-dynamic-eid`	Exits dynamic-eid configuration mode, and enters LISP instance configuration mode.
Step 9	**dynamic-eid** *eid-name* **Example:** `Device(config-router-lisp-inst)# dynamic-eid AVlan50-IPV6`	Creates a dynamic Endpoint Identifier (EID) policy and enters the dynamic-eid configuration mode on a fabric edge node. To configure LISP host mobility, you must create a dynamic-eid policy that can be referenced by the **lisp mobility** *dynamic-eid-name* interface command. Hence the *eid-name* that is associated with **dynamic-eid** command should be the same as *dynamic-eid-name* that is used to configure LISP mobility. For the *dynamic-eid-name*, refer to the lisp mobility configuration step of the Configure an SVI Interface procedure.
Step 10	**database-mapping** *eid-prefix/prefix-length* **locator-set** *RLOC_name* **Example:** `Device(config-router-lisp-inst-dynamic-eid)# database-mapping 2001:DB8:2050::/64 locator-set rloc_set2`	Configures an IPv6 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship.
Step 11	**exit-dynamic-eid** **Example:** `Device(config-router-lisp-inst-dynamic-eid)# exit-dynamic-eid`	Exits dynamic-eid configuration mode, and enters LISP instance configuration mode.
Step 12	**service ipv4** **Example:** `Device(config-router-lisp-inst)# service ipv4`	Enables Layer 3 network services for the IPv4 address family.
Step 13	**eid-table vrf** *vrf-name* **Example:** `Device(config-router-lisp-inst-serv-ipv4)# eid-table vrf VN3`	Configures the VRF table for association with the configured instance-service.

	Command or Action	Purpose
Step 14	**map-cache** *address* **map-request** **Example:** `Device(config-router-lisp-inst-serv-ipv4)# map-cache 0.0.0.0/0 map-request`	Sends map-request for LISP destination IPv4 EID.
Step 15	**exit-service-ipv4** **Example:** `Device(config-router-lisp-inst-serv-ipv4)# exit-service-ipv4`	Exits service IPv4 configuration mode, and enters LISP instance configuration mode.
Step 16	**service ipv6** **Example:** `Device(config-router-lisp-inst)# service ipv6`	Enables Layer 3 network services for the IPv6 address family.
Step 17	**eid-table vrf** *vrf-name* **Example:** `Device(config-router-lisp-inst-serv-ipv6)# eid-table vrf VN3`	Configures the VRF table for association with the configured instance-service.
Step 18	**map-cache** *address* **map-request** **Example:** `Device(config-router-lisp-inst-serv-ipv6)# map-cache ::/0 map-request`	Sends map-request for LISP destination IPv6 EID.
Step 19	**exit-service-ipv6** **Example:** `Device(config-router-lisp-inst-serv-ipv6)# exit-service-ipv6`	Exits service IPv6 configuration mode, and enters LISP instance configuration mode.
Step 20	**exit-instance-id** **Example:** `Device(config-router-lisp-inst)# exit-instance-id`	Exits instance configuration mode, and enters LISP configuration mode.
Step 21	**end** **Example:** `Device(config-router-lisp)# end`	Returns to privileged EXEC mode.

Step 22	**show ip route vrf** *vrf-name*
	Example:
	`Device# show ip route vrf VN3`
	
	`Routing Table: VN3`
	`Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP`
	`D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area`
		Displays the routing table on the device, for a specified VRF.

	Command or Action	Purpose
	N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route H - NHRP, G - NHRP registered, g - NHRP registration summary o - ODR, P - periodic downloaded static route, l - LISP a - application route + - replicated route, % - next hop override, p - overrides from PfR & - replicated local route overrides by connected Gateway of last resort is not set 10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks C 10.50.1.0/24 is directly connected, Vlan50 L 10.50.1.1/32 is directly connected, Vlan50 Device#	

Configure Layer 2 VNI for VLANs in User-Defined VRF

To configure Layer 2 VNI for VLANs in user-defined virtual routing and forwarding instance on a fabric edge node, perform this task:

Procedure

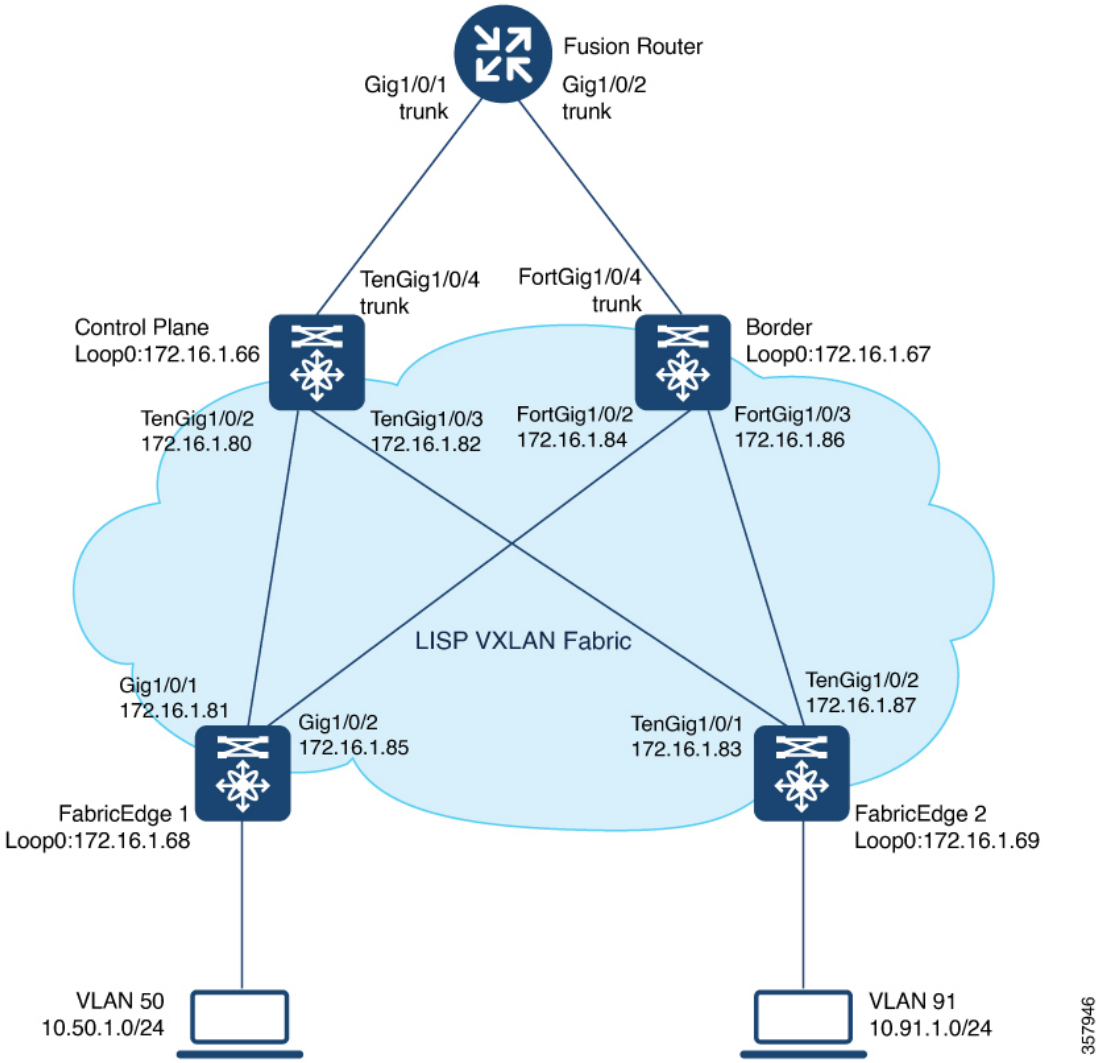
	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router lisp** **Example:** `Device(config)# router lisp`	Enters LISP configuration mode.
Step 4	**instance-id** *id*	Specifies the instance ID.

	Command or Action	Purpose
	Example: `Device(config-router-lisp)# instance-id 8197`	Ensure that each Layer 2 VNI ID is unique and is different from the Layer 3 VNI IDs that you have configured in the earlier task.
Step 5	**remote-rloc-probe on-route-change** **Example:** `Device(config-router-lisp-inst)# remote-rloc-probe on-route-change`	Configures parameters for probing of remote local routing locators (RLOCs).
Step 6	**service ethernet** **Example:** `Device(config-router-lisp-inst)# service ethernet`	Enables Layer 2 network services.
Step 7	**eid-table vlan** *vlan-id* **Example:** `Device(config-router-lisp-inst-serv-ethernet)# eid-table vlan 50`	Configures the specified VLAN table for association with the configured instance.
Step 8	**database-mapping** *eid-prefix/prefix-length* **locator-set** *RLOC_name* **Example:** `Device(config-router-lisp-inst-serv-ethernet-eid-table)# database-mapping mac locator-set rloc_set2`	Configures an IPv4 endpoint identifier-to-routing locator (EID-to-RLOC) mapping relationship and an associated traffic policy for LISP.
Step 9	**exit** **Example:** `Device(config-router-lisp-inst-serv-ethernet-eid-table)# exit`	Exits EID table configuration mode.
Step 10	**exit-service-ethernet** **Example:** `Device(config-router-lisp-inst-serv-ethernet)# exit-service-ethernet`	Exits service Ethernet configuration mode, and enters LISP configuration mode.
Step 11	**exit-instance-id** **Example:** `Device(config-router-lisp-inst)# exit-instance-id`	Exits instance configuration mode, and enters LISP configuration mode.
Step 12	**end** **Example:** `Device(config-router-lisp)# end`	Returns to privileged EXEC mode.

Configuration Example for LISP VXLAN Fabric Edge Node

This example shows a sample configuration for a fabric edge node in the Figure 1: LISP VXLAN Fabric Topology below.

Figure 1: LISP VXLAN Fabric Topology



EN

```
vrf definition VN3
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
```

```
ip dhcp relay information option
ip dhcp snooping vlan 50,91
ip dhcp snooping
!
device-tracking policy IPDT_POLICY
 tracking enable
!
interface GigabitEthernet1/0/3
 device-tracking attach-policy IPDT_POLICY
!
vlan configuration 50
 ipv6 nd raguard
 ipv6 dhcp guard
!
vlan 50
 name AVlan50
!
vlan 91
 name AVlan91
!
interface Vlan50
 description server1
 mac-address 0000.0c9f.f18e
 vrf forwarding VN3
 ip address 10.50.1.1 255.255.255.0
 ip helper-address 172.16.2.2
 no ip redirects
 ipv6 address 2001:DB8:2050::1/64
 ipv6 enable
 ipv6 nd dad attempts 0
 ipv6 nd prefix 2001:DB8:2050::/64 2592000 604800 no-autoconfig
 ipv6 nd managed-config-flag
 ipv6 nd other-config-flag
 ipv6 nd router-preference High
 ipv6 dhcp relay destination 2001:DB8:2::2
 ipv6 dhcp relay source-interface Vlan50
 ipv6 dhcp relay trust
 no lisp mobility liveness test
 lisp mobility AVlan50-IPV4
 lisp mobility AVlan50-IPV6
!

interface Vlan91
 description server2
 mac-address 0000.0c9f.f984
 ip address 10.91.1.1 255.255.255.0
 ip helper-address 172.16.2.2
 no ip redirects
 no lisp mobility liveness test
 lisp mobility AVlan91-IPV4
!


router lisp
 locator-table default
 locator-set rloc_set2
  IPv4-interface Loopback0 priority 10 weight 10
  exit-locator-set
 !
 locator default-set rloc_set2
 service ipv4
  encapsulation vxlan
  itr map-resolver 172.16.1.66
  itr map-resolver 172.16.1.67
  etr map-server 172.16.1.66 key some-key
```

```
 etr map-server 172.16.1.66 proxy-reply
 etr map-server 172.16.1.67 key auth-key
 etr map-server 172.16.1.67 proxy-reply
 etr
 sgt
 proxy-itr 172.16.1.68
 exit-service-ipv4
!
service ipv6
 encapsulation vxlan
 itr map-resolver 172.16.1.66
 itr map-resolver 172.16.1.67
 etr map-server 172.16.1.66 key some-key
 etr map-server 172.16.1.66 proxy-reply
 etr map-server 172.16.1.67 key auth-key
 etr map-server 172.16.1.67 proxy-reply
 etr
 sgt
 proxy-itr 172.16.1.68
 exit-service-ipv6
!
service ethernet
 itr map-resolver 172.16.1.66
 itr map-resolver 172.16.1.67
 itr
 etr map-server 172.16.1.66 key some-key
 etr map-server 172.16.1.66 proxy-reply
 etr map-server 172.16.1.67 key auth-key
 etr map-server 172.16.1.67 proxy-reply
 etr
 exit-service-ethernet
!

instance-id 4097
 remote-rloc-probe on-route-change
 dynamic-eid AVlan91-IPV4
  database-mapping 10.91.1.0/24 locator-set rloc_set2
  exit-dynamic-eid
 !
 service ipv4
  eid-table default
  exit-service-ipv4
 !
 service ipv6
  eid-table default
  exit-service-ipv6
 !
 exit-instance-id
!
instance-id 4099
 remote-rloc-probe on-route-change
 dynamic-eid AVlan50-IPV4
  database-mapping 10.50.1.0/24 locator-set rloc_set2
  exit-dynamic-eid
 !
 dynamic-eid AVlan50-IPV6
  database-mapping 2001:DB8:2050::/64 locator-set rloc_set2
  exit-dynamic-eid
 !
 service ipv4
  eid-table vrf VN3
  map-cache 0.0.0.0/0 map-request
  exit-service-ipv4
 !
```

```
 service ipv6
  eid-table vrf VN3
  map-cache ::/0 map-request
  exit-service-ipv6
 !
 exit-instance-id
!
!

instance-id 8194
 remote-rloc-probe on-route-change
 service ethernet
  eid-table vlan 91
  database-mapping mac locator-set rloc_set2
  exit-service-ethernet
 !
 exit-instance-id
!
!

instance-id 8197
 remote-rloc-probe on-route-change
 service ethernet
  eid-table vlan 50
  database-mapping mac locator-set rloc_set2
  exit-service-ethernet
 !
 exit-instance-id
!
!
ipv4 locator reachability minimum-mask-length 32
ipv4 source-locator Loopback0
exit-router-lisp
!
```

Verify the Configuration of Fabric Edge Node

This section provides sample outputs for the **show** commands on the fabric edge nodes in the topology shown Figure 1: LISP VXLAN Fabric Topology.

View a summary of the LISP sessions that are created on the edge node:

```
FabricEdge# show lisp session

Sessions for VRF default, total: 2, established: 2
Peer                            State      Up/Down        In/Out    Users
172.16.1.66:4342                  Up         1d04h          27/9      14
172.16.1.67:4342                  Up         1d03h          19/9      14
FabricEdge#
```

View the LISP session with the Control Plane Node (172.16.1.66) :

```
FabricEdge# show lisp session 172.16.1.66 port 4342
Peer address:     172.16.1.66:4342
Local address:    172.16.1.69:27785
Session Type:     Active
Session State:    Up (1d04h)
Messages in/out:  27/9
Bytes in/out:     1666/276
Fatal errors:     0
Rcvd unsupported: 0
```

```
Rcvd invalid VRF: 0
Rcvd override:    0
Rcvd malformed:   0
Sent deferred:    0
SSO redundancy:   N/A
Auth Type:        None

Accepting Users:  0
Users:            14
  Type                     ID                                      In/Out    State
  Pubsub subscriber        lisp 0 IID 4097 AFI IPv4                 1/0      Idle
  Pubsub subscriber        lisp 0 IID 4097 AFI IPv6                 1/0      Idle
  Pubsub subscriber        lisp 0 IID 4099 AFI IPv4                 1/0      Idle
  Pubsub subscriber        lisp 0 IID 4099 AFI IPv6                 1/0      Idle
  Pubsub subscriber        lisp 0 IID 8194 AFI MAC                  2/0      Idle
  Pubsub subscriber        lisp 0 IID 8197 AFI MAC                  2/0      Idle
  Capability Exchange      N/A                                      1/1      waiting
  ETR Reliable Registration lisp 0 IID 4097 AFI IPv4                0/1      TCP
  ETR Reliable Registration lisp 0 IID 4097 AFI IPv6                0/1      TCP
  ETR Reliable Registration lisp 0 IID 4099 AFI IPv4                0/1      TCP
  ETR Reliable Registration lisp 0 IID 4099 AFI IPv6                0/1      TCP
  ETR Reliable Registration lisp 0 IID 8194 AFI MAC                 0/1      TCP
  ETR Reliable Registration lisp 0 IID 8197 AFI MAC                 0/1      TCP
  ETR Reliable Registration lisp 0 IID 16777214 AFI IPv4           13/2      TCP
FabricEdge#
```

View the Locator set information:

```
FabricEdge# show lisp locator-set
LISP Locator-set information:

172.16.1.68, local, reachable, loopback
```

View the dynamic interfaces that are created after configuring LISP instances:

```
FabricEdge# show ip interface brief | i LISP
L2LISP0                172.16.1.68       YES unset  up                    up
L2LISP0.8194           172.16.1.68       YES unset  up                    up
L2LISP0.8197           172.16.1.68       YES unset  up                    up
LISP0                  unassigned        YES unset  up                    up
LISP0.4097             172.16.1.68       YES unset  up                    up
LISP0.4099             10.50.1.1         YES unset  up                    up
FabricEdge#
```

View the IPv4 map-cache entries:

```
FabricEdge# show lisp instance-id 4099 ipv4 map-cache
LISP IPv4 Mapping Cache for LISP 0 EID-table vrf VN3 (IID 4099), 2 entries

0.0.0.0/0, uptime: 18:03:23, expires: 00:12:10, via map-reply, unknown-eid-forward
action: send-map-request + Encapsulating to proxy ETR
  PETR       Uptime    State      Pri/Wgt     Encap-IID  Metric
  172.16.1.67  18:03:23  up          10/10        -         0
10.50.1.0/24, uptime: 19:59:51, expires: never, via dynamic-EID, send-map-request
  Negative cache entry, action: send-map-request
```

View the LISP EID statistics related to packet encapsulations, decapsulations, map requests, map replies, map registers, and other LISP-related packets:

```
FabricEdge# show lisp service ipv4 statistics
LISP EID Statistics for all EID instances - last cleared: never
Control Packets:
```

```
  Map-Requests in/out:                              2/2465
    Map-Requests in (5 sec/1 min/5 min):            0/0/0
    Encapsulated Map-Requests in/out:               0/2465
    RLOC-probe Map-Requests in/out:                 2/0
    SMR-based Map-Requests in/out:                  2/0
    Extranet SMR cross-IID Map-Requests in:         0
    Map-Requests expired on-queue/no-reply          0/493
    Map-Resolver Map-Requests forwarded:            0
    Map-Server Map-Requests forwarded:              0
  Map-Reply records in/out:                         0/0
    Authoritative records in/out:                   0/0
    Non-authoritative records in/out:               0/0
    Negative records in/out:                        0/0
    RLOC-probe records in/out:                      0/0
    Map-Server Proxy-Reply records out:             0
  WLC Map-Subscribe records in/out:                 0/11
    Map-Subscribe failures in/out:                  0/0
  WLC Map-Unsubscribe records in/out:               0/0
    Map-Unsubscribe failures in/out:                0/0
  Map-Register records in/out:                      0/150
    Map-Registers in (5 sec/1 min/5 min):           0/0/0
    Map-Server AF disabled:                         0
    Not valid site eid prefix:                      0
    Authentication failures:                        0
    Disallowed locators:                            0
    Miscellaneous:                                  0
  WLC Map-Register records in/out:                  0/0
    WLC AP Map-Register in/out:                     0/0
    WLC Client Map-Register in/out:                 0/0
    WLC Map-Register failures in/out:               0/0
  Map-Notify records in/out:                        24/0
    Authentication failures:                        0
  WLC Map-Notify records in/out:                    0/0
    WLC AP Map-Notify in/out:                       0/0
    WLC Client Map-Notify in/out:                   0/0
    WLC Map-Notify failures in/out:                 0/0
  Publish-Subscribe in/out:
    Subscription Request records in/out:            0/0
      IID subscription requests in/out:             0/0
      Pub-refresh subscription requests in/out:     0/0
      Policy subscription requests in/out:          0/0
    Subscription Request failures in/out:           0/0
    Subscription Status records in/out:             0/0
      End of Publication records in/out:            0/0
      Subscription rejected records in/out:         0/0
      Subscription removed records in/out:          0/0
    Subscription Status failures in/out:            0/0
    Solicit Subscription records in/out:            21/0
    Solicit Subscription failures in/out:           0/0
    Publication records in/out:                     0/0
    Publication failures in/out:                    0/0
Errors:
  Mapping record TTL alerts:                        0
  Map-Request invalid source rloc drops:            0
  Map-Register invalid source rloc drops:           0
  DDT Requests failed:                              0
  DDT ITR Map-Requests dropped:                     0 (nonce-collision: 0, bad-xTR-nonce:
0)
Cache Related:
  Cache entries created/deleted:                    7/4
  NSF CEF replay entry count                        0
  Number of rejected EID-prefixes due to limit:     0
Forwarding:
  Number of data signals processed:                 0 (+ dropped 0)
```

```
  Number of reachability reports:                  0 (+ dropped 0)
  Number of SMR signals dropped:                   0
LISP RLOC Statistics - last cleared: never
Control Packets:
  RTR Map-Requests forwarded:                      0
  RTR Map-Notifies forwarded:                      0
  DDT-Map-Requests in/out:                         0/0
  DDT-Map-Referrals in/out:                        0/0
Errors:
  Map-Request format errors:                       0
  Map-Reply format errors:                         0
  Map-Referral format errors:                      0
LISP Miscellaneous Statistics - last cleared: never
Errors:
  Invalid IP version drops:                        0
  Invalid IP header drops:                         0
  Invalid IP proto field drops:                    0
  Invalid packet size drops:                       0
  Invalid LISP control port drops:                 0
  Invalid LISP checksum drops:                     0
  Unsupported LISP packet type drops:              0
  Unknown packet drops:                            0
FabricEdge#
```

View a summary of the IPv4 service instances on the fabric edge node:

```
FabricEdge# show lisp service ipv4 summary
Router-lisp ID:   0
Instance count:   5
Key: DB - Local EID Database entry count (@ - RLOC check pending
                                          * - RLOC consistency problem),
     DB no route - Local EID DB entries with no matching RIB route,
     Cache - Remote EID mapping cache size, IID - Instance ID,
     Role - Configured Role

                      Interface    DB  DB no  Cache Incom Cache
EID VRF name             (.IID)  size  route   size plete  Idle Role
default               LISP0.4097     1      0      1  0.0%  0.0% ETR-PITR
VN3                   LISP0.4099     1      0      2  0.0%  0.0% ETR-PITR

Number of eid-tables:                               2
Total number of database entries:                   2 (inactive 0)
Maximum database entries:                      214528
EID-tables with inconsistent locators:              0
Total number of map-cache entries:                  3
Maximum map-cache entries:                     214528
EID-tables with incomplete map-cache entries:       0
EID-tables pending map-cache update to FIB:         0
FabricEdge#
```

View the details of the routing table that is created when a Layer 3 VRF is configured:

```
FabricEdge# show ip route vrf VN3

Routing Table: VN3
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
```

```
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        10.50.1.0/24 is directly connected, Vlan50
L        10.50.1.1/32 is directly connected, Vlan50
FabricEdge#
```