LISP Generalized SMR

The LISP Generalized SMR feature enables LISP xTR (ITR and ETR) to update map cache when there is a change in database mapping.

Note There is no configuration commands for this feature. This feature is turned on automatically.

Information About LISP Generalized SMR

Solicit-Map-Request (SMR)

Soliciting a Map-Request enables ETRs to control requests for Map-Reply messages when there is change in database mapping. SMRs enable remote ITRs to update the database mappings that are cached. An SMR message is simply a bit set in a Map-Request message. An ITR or PITR will send a Map-Request when they receive an SMR message.

Note There is no configuration commands for this feature. This feature is turned on automatically.

Generalized SMR (GSMR)

SMR was mainly used to support LISP mobility. This mechanism has been generalized (Generalized Solicit Map Request - GSMR) to support the following use cases:

- De-configured local EID
- Local EID no-route (when an ETR decapsulates a data packet and finds no route for a configured local EID)

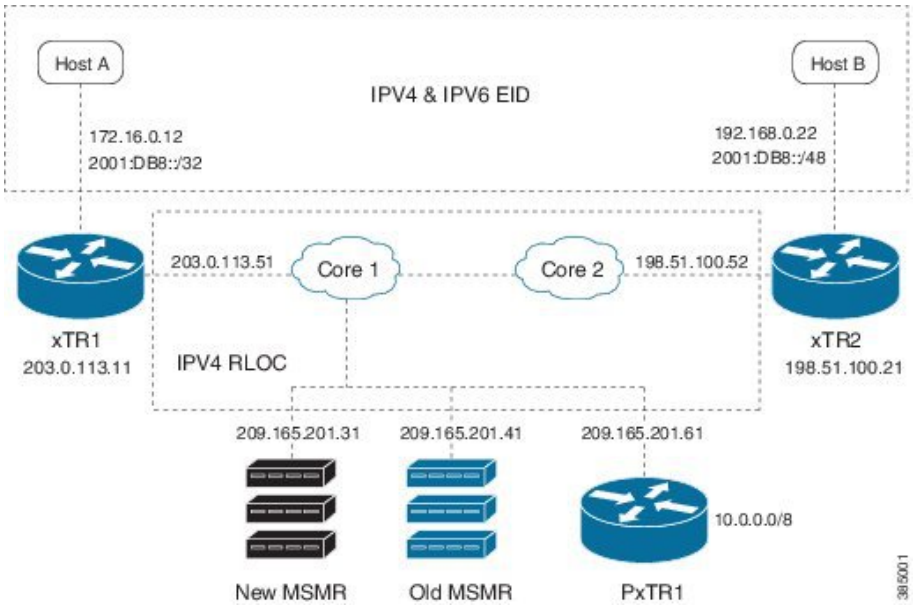
- Mobility host move out and detection
- Overlapping prefix

Note There are no configuration commands for this feature. This feature is turned on automatically.

Verifying LISP Generalized SMR

Perform this task to verify the LISP Generalized SMR feature which is enabled automatically in the LISP network. In this example, a LISP site uses a single edge router that functions as both ITR and ETR (known as an xTR). Routing Locators (RLOCs) are in IPv4. EID prefixes are in both IPv4 and IPv6. The LISP site registers to two map server/map resolver (MSMR) devices in the network core. The topology used in verifying LISP Generalized SMR is as shown in the figure below.

Figure 1: LISP Generalized SMR Topology



The components as shown in the topology are described below:

- xTR1 and xTR2 are xTRs for 2 LISP sites.
- Core1 and Core 2 are routing locators (RLOCs) core routers with no LISP configuration.
- New MSMR is a map-server and map-resolver with reliable map-registration support, whereas Old MSMR does not support reliable map-registration.
- PxTR1 works as a Proxy Ingress Tunnel Router (PITR) and Proxy Egress Tunnel Router (PETR) between the network with 10.0.0.0/8 prefix and the LISP sites.
- Only static routing protocols are used in this setup to reduce control traffic.

Verifying 172.16.0.0/24 is in map cache on xTR2:

```
Device# show ip lisp map-cache
LISP IPv4 Mapping Cache for EID-table default (IID 0), 3 entries
```

```
0.0.0.0/0, uptime: 03:32:45, expires: never, via static send map-request
Negative cache entry, action: send-map-request
10.20.20.0/24, uptime: 00:00:05, expires: 23:59:54, via map-reply, complete
Locator       Uptime    State     Pri/Wgt
203.0.113.11   00:00:05 up           1/100
172.16.0.0/24, uptime: 00:35:49, expires: 23:24:10, via map-reply, complete
Locator       Uptime   State     Pri/Wgt
203.0.113.11   00:35:49 up           1/100
```

Shutting down interface Ethernet1/0 on xTR1:

```
Device(config)# interface ethernet 1/0
Device(config-if)# shutdown
```

Verifying 172.16.0.0/24 is in map cache on xTR1:

```
Device# show ip lisp data
LISP ETR IPv4 Mapping Database for EID-table default (IID 0), LSBs: 0x1
Entries total 3, no-route 1, inactive 0
10.10.10.0/24, locator-set set1
Locator       Pri/Wgt Source     State
203.0.113.11   1/100   cfg-addr   site-self, reachable
10.20.20.0/24, locator-set set1
Locator       Pri/Wgt Source     State
203.0.113.11   1/100   cfg-addr   site-self, reachable
172.16.0.0/24, locator-set set1 *** NO ROUTE TO EID PREFIX ***
Locator       Pri/Wgt Source     State
203.0.113.11   1/100   cfg-addr   site-self, reachable
```

Pinging Host A from Host B:

```
Device# ping 172.16.0.12
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.12, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

xTR1 decapsulates the data packets, finds out the no-route situation, and sends an SMR to xTR2:

```
Device#
*Feb 19 22:08:15.160: LISP: Send map request type dyn-EID SMR
*Feb 19 22:08:15.160: LISP: Send map request for EID prefix IID 0 192.168.0.22/32
*Feb 19 22:08:15.160: LISP-0: AF IID 0 IPv4, Send SMR map-request for 172.16.0.12 to
198.51.100.21.
*Feb 19 22:08:15.160: LISP-0: EID-AF IPv4, Sending probe map-request from 203.0.113.11 to
198.51.100.21
for EID 21.21.21.22/32, ITR-RLOCs 1, nonce 0x68E45971-0xE3DF4931, SMR 172.16.0.12, DoNotReply.
```

xTR2 processes the SMR and sends out a map-request to the map server:

```
Device#
*Feb 19 22:08:15.161: LISP: Processing received Map-Request(1) message on Ethernet0/0 from
 203.0.113.11:4342 to 198.51.100.21:4342
*Feb 19 22:08:15.161: LISP: Received map request for IID 0 192.168.0.22/32, source_eid IID
 0 172.16.0.12, ITR-RLOCs: 203.0.113.11,
records 1, nonce 0x68E45971-0xE3DF4931, probe, SMR, DoNotReply
*Feb 19 22:08:15.161: LISP-0: AF IID 0 IPv4, Scheduling SMR trigger Map-Request for
172.16.0.12/32 from 192.168.0.22.
*Feb 19 22:08:15.161: LISP-0: IID 0 SMR & D bit set, not replying to map-request.
*Feb 19 22:08:15.290: LISP: Send map request type SMR
*Feb 19 22:08:15.290: LISP: Send map request for EID prefix IID 0 172.16.0.12/32
Device#
*Feb 19 22:08:15.290: LISP-0: AF IID 0 IPv4, Send SMR triggered map request for 172.16.0.12/32
 (1) from 192.168.0.22.
*Feb 19 22:08:15.290: LISP-0: EID-AF IPv4, Sending map-request from 172.16.0.12 to 172.16.0.12
 for EID 172.16.0.12/32, ITR-RLOCs 1,
nonce 0x4D04AB2F-0x99FF6FF5 (encap src 198.51.100.21, dst 209.165.201.41).
```

```
Device#
*Feb 19 22:08:16.333: LISP: Send map request type SMR
*Feb 19 22:08:16.333: LISP: Send map request for EID prefix IID 0 172.16.0.12/32
*Feb 19 22:08:16.333: LISP-0: AF IID 0 IPv4, Send SMR triggered map request for 172.16.0.12/32
 (2) from 192.168.0.22.
*Feb 19 22:08:16.333: LISP-0: EID-AF IPv4, Sending map-request from 172.16.0.12 to 172.16.0.12
 for EID 172.16.0.12/32, ITR-RLOCs 1,
nonce 0x4D04AB2F-0x99FF6FF5 (encap src 198.51.100.21, dst 209.165.201.41).
Device#
*Feb 19 22:08:18.423: LISP-0: Map Request IID 0 prefix 172.16.0.12/32 SMR[LL], Switching
Map-Resolver 209.165.201.41 to 209.165.201.31.
*Feb 19 22:08:18.423: LISP: Send map request type SMR
*Feb 19 22:08:18.423: LISP: Send map request for EID prefix IID 0 172.16.0.12/32
*Feb 19 22:08:18.423: LISP-0: AF IID 0 IPv4, Send SMR triggered map request for 172.16.0.12/32
 (3) from 192.168.0.22.
*Feb 19 22:08:18.423: LISP-0: EID-AF IPv4, Sending map-request from 172.16.0.12 to 172.16.0.12
 for EID 172.16.0.12/32, ITR-RLOCs 1,
nonce 0x5A4AC708-0x59A42AB6 (encap src 198.51.100.21, dst 209.165.201.31).
*Feb 19 22:08:18.424: LISP: Processing received Map-Reply(2) message on Ethernet0/0 from
209.165.201.31:4342 to 198.51.100.21:4342
*Feb 19 22:08:18.424: LISP: Received map reply nonce 0x5A4AC708-0x59A42AB6, records 1
```

xTR2's map-cache is updated upon map-reply from the map server:

```
Device# show ip lisp map-cache
LISP IPv4 Mapping Cache for EID-table default (IID 0), 3 entries

0.0.0.0/0, uptime: 03:56:43, expires: never, via static send map-request
Negative cache entry, action: send-map-request
10.20.20.0/24, uptime: 00:24:04, expires: 23:35:56, via map-reply, complete
Locator       Uptime   State     Pri/Wgt
203.0.113.11   00:24:04 up          1/100
172.16.0.10/24, uptime: 00:59:48, expires: 00:00:51, via map-reply, forward-native
Negative cache entry, action: forward-native
```

xTR1 will put the 172.16.0.10/24 prefix in its away table:

```
Device# show ip lisp away
LISP Away Table for router lisp 0 (default) IID 0
Entries: 1
Prefix                                    Producer
172.16.0.10/24                            local EID
```

Additional References for LISP Reliable Registration

Related Documents

Document Title	Location
Cisco IOS commands	Cisco IOS Master Command List, All Releases
LISP commands	Cisco IOS IP Routing: LISP Command Reference

Standards and RFCs

Standard/RFC	Title
RFC 6830	*The Locator/ID Separation Protocol (LISP)*

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for LISP Generalized SMR

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for LISP Generalized SMR

Feature Name	Releases	Feature Information
LISP Generalized SMR		The LISP Generalize SMR feature supports LISP mobility, de-configured local Endpoint Identifier (EID), local EID no-route, overlapping prefix support, and mobility host move out and detection. The following commands were modified: **show ip lisp away**, **show ip lisp data**, **show ip lisp map-cache**.