



LISP

Network Deployment and Troubleshooting

The Complete Guide to LISP Implementation
on IOS-XE, IOS-XR, and NX-OS

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Cisco Press

```

Map-Requests expired on-queue/no-reply 0/0
Map-Resolver Map-Requests forwarded: 0
Map-Server Map-Requests forwarded: 0
Map-Reply records in/out: 0/2
  Authoritative records in/out: 0/2
  Non-authoritative records in/out: 0/0
  Negative records in/out: 0/2
  RLOC-probe records in/out: 0/0
  Map-Server Proxy-Reply records out: 0
Map-Register records in/out: 254/0
  Map-Server AF disabled: 0
  Authentication failures: 0
Map-Notify records in/out: 0/168
  Authentication failures: 0
Deferred packet transmission: 0/0
  DDT referral deferred/dropped: 0/0
  DDT request deferred/dropped: 0/0
  Map-Reply deferred/dropped: 0/0
  MR negative Map-Reply deferred/dropped: 0/0
  MR Map-Request fwd deferred/dropped: 0/0
  MS Map-Request fwd deferred/dropped: 0/0
  MS proxy Map-Reply deferred/dropped: 0/0
  xTR mcast Map-Notify deferred/dropped: 0/0
  MS Info-Reply deferred/dropped: 0/0
  RTR Map-Register fwd deferred/dropped: 0/0
  RTR Map-Notify fwd deferred/dropped: 0/0
  ETR Info-Request deferred/dropped: 0/0
Errors:
Map-Request invalid source rloc drops: 0
Map-Register invalid source rloc drops: 0
DDT ITR Map-Requests dropped: 0 (nonce-collision: 0, bad-xTR-nonce: 0)
Cache Related:
  Cache entries created/deleted: 0/0
  NSF CEF replay entry count 0
  Number of EID-prefixes in map-cache: 0
  Number of negative entries in map-cache: 0
  Total number of RLOCs in map-cache: 0
  Average RLOCs per EID-prefix: 0
Forwarding:
  Number of data signals processed: 0 (+ dropped 0)
  Number of reachability reports: 0 (+ 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
    Mapping record TTL alerts:           0
    DDT Requests failed:                 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 dropss:          0
    Invalid LISP control port drops:      0
    Invalid LISP checksum drops:          0
    Unsupported LISP packet type drops:   0
    Unknown packet drops:                0

```

A similar set of commands can be applied both to the xTR and PxTR nodes to confirm the LISP control plane operation. For example, Example 4-12 shows XTR3 and PxTR3 output to give you an idea of what types of information can be extracted. For brevity, this example does not show output from every xTR and PxTR; however, the commands across the platforms are similar, and Chapter 3 shows examples across all platforms for similar verification steps.

Example 4-12 XTR3 LISP Control Plane Verification

```

!XTR3 NX-OS LISP control plane verification.

XTR3# show ipv6 lisp
LISP IPv6 Configuration Information for VRF "default" (iid 0)
    Ingress Tunnel Router (ITR):  enabled
    Egress Tunnel Router (ETR):   enabled
    Proxy-ITR Router (PTR):      disabled
    Proxy-ETR Router (PETR):     disabled
    Map Resolver (MR):           disabled
    Map Server (MS):             disabled
    LISP Multicast:              disabled
    GLT interface:               glt1

```

```

LISP control-plane security:    disabled
Locator VRF:                   default
Encap-Map-Request source:      2001:192:168:3::3
LISP-NAT Interworking:         disabled
Use locators from BGP RIB:     disabled
ITR send Map-Request:          enabled
ITR send Data-Probe:           disabled
LISP ALT-VRF:                  not configured
LISP-DDT:                      disabled
ITR Map-Resolver:              2001:192:168:100::100, last used: 00:13:59
ITR Map-Resolver:              2001:192:168:200::200, last used: 00:13:59
ETR Map-Server(s):             2001:192:168:100::100, 2001:192:168:200::200
Last Map-Register sent to MS:  00:00:41
ETR merge-registrations:       disabled
ETR glean mapping:             disabled, verify disabled
ETR accept mapping data:       disabled, verify disabled
ETR map-cache TTL:             24 hours
ETR map-register TTL:          3 minutes
Shortest EID-prefix allowed:   /48
Use Proxy-ETRs:
    2001:192:168:13::13, priority: 50, weight: 50
    2001:192:168:12::12, priority: 50, weight: 50
    2001:192:168:11::11, priority: 50, weight: 50
Locator Reachability Algorithms:
    Echo-nonce algorithm:      disabled
    TCP-counts algorithm:      disabled
    RLOC-probe algorithm:      disabled
Static mappings configured:    0
Map-cache limit:               18000
Reserve-list:                  not configured
Map-cache size:                6
ETR Database, global LSBs: 0x00000001:
    EID-prefix: 2001:172:16::3/128, instance-id: 0, LSBs: 0x00000001
    Locator: 2001:192:168:3::3, priority: 1, weight: 100
    Uptime: 6d17h, state: up, local
    EID-prefix: 2001:172:16:3::/64, instance-id: 0, LSBs: 0x00000001
    Locator: 2001:192:168:3::3, priority: 1, weight: 100
    Uptime: 6d19h, state: up, local

```

XTR3# show lisp proxy-itr

Discovered Proxy-ITRs (PITRs) in VRF "default"

```

2001:192:168:12::12 2001:192:168:13::13 2001:192:168:11::11 2001:10:4:10::4

```

XTR3# show ipv6 lisp statistics

LISP Statistics for VRF "default" - last cleared: never

Data Forwarding:

```

IPv6-in-IPv4 encap/decap packets:      0/0
IPv6-in-IPv6 encap/decap packets:    57/0
Translated packets in/out:             0/0
Map-cache lookup succeeded/failed:    57/11
LISP-ALT lookup succeeded/failed:      0/0
Loc-reach-bit changes local/remote:   0/0

```

Control Packets:

```

Data-Probes in/out:                    0/0
Map-Requests in/out:                  9122/1148
  Encapsulated Map-Requests in/out:    9/1148
  RLOC-probe Map-Requests in/out:      9113/0
  SMR-based Map-Requests in/out:       0/0
Map-Replies in/out:                  1131/9122
  Security header included in/out:     0/0
  Authoritative in/out:                1131/9122
  Non-authoritative in/out:            0/0
  Negative Map-Replies in/out:         1127/0
  RLOC-probe Map-Replies in/out:       0/9113
Map-Registers in/out:                0/19148
  Authentication failures:             0
Map-Notifies in/out:                 0/0
  Authentication failures:             0
Map-Notify-Acks in/out:               0/0
Map-Referrals in/out:                 0/0
EID Map-Registers in/out:             0/0
EID Map-Notifies in/out:              0/0
EID Map-Notify-Acks in/out:           0/0

```

Errors:

```

Encapsulations failed:                11
Map-Request format errors:            0
Map-Reply format errors:              0
Map-Reply spoof alerts:               0
Map-Reply signature failed:           0
Map-cache recursive-loop occurrences: 0
Map-Register UDP length too small:    0

```

Cache Related:

```

Cache entries created/timed-out:      976/968
Number of EID-prefixes in map-cache:  3
Number of negative map-cache entries:  0
Number of translation cache entries:    0
Total number of RLOCs in map-cache:    5
Number of best-priority RLOCs:         5
Average RLOCs per EID-prefix:          1

```

Note The command `show ipv6 lisp statistics` is also very useful for viewing counters related to failure in the data plane seen from cache- and forwarding-related counter values.

The output from XTR3 in Example 4-12 shows the following.

- Whether the node was configured as an ITR or ETR
- Which map servers, map resolvers, and PETRs are configured, whether they are reachable, and when the last communication occurred
- The locally attached EID prefix entries for the ETR
- Time-to-live (TTL) values for cached entries and entry limits
- The ETR map register time, which in this case is 3 minutes, which means the ETR will register its EID prefixes every 3 minutes
- The PITRs that the node discovered
- LISP control plane and data plane packet statistics

Example 4-13 shows the PxTR3 control plane verification commands. This example shows information about PxTR3 as a PxTR device.

Example 4-13 PxTR3 Control Plane Verification

```
!PxTR3 NX-OS control plane verification

PxTR3# show ipv6 lisp
LISP IPv6 Configuration Information for VRF "default" (iid 0)
  Ingress Tunnel Router (ITR):      disabled
  Egress Tunnel Router (ETR):      disabled
  Proxy-ITR Router (PTR):          enabled
  PTR local locator:                2001:192:168:13::13
  Proxy-ETR Router (PETR):         enabled
  Map Resolver (MR):               disabled
  Map Server (MS):                 disabled
  LISP Multicast:                  disabled
  GLT interface:                   glt1
  LISP control-plane security:     disabled
  Locator VRF:                     default
  LISP-NAT Interworking:           disabled
  Use locators from BGP RIB:       disabled
  ITR send Map-Request:            enabled
  ITR send Data-Probe:             disabled
  LISP ALT-VRF:                   not configured
  LISP-DDT:                       disabled
  ITR Map-Resolver:                2001:192:168:100::100, last used: 08:21:00
```

```

ITR Map-Resolver:          2001:192:168:200::200, last used: 08:21:18
ETR merge-registrations:    disabled
ETR glean mapping:          disabled, verify disabled
ETR accept mapping data:    disabled, verify disabled
ETR map-cache TTL:          24 hours
ETR map-register TTL:       3 minutes
Shortest EID-prefix allowed: /48
Locator Reachability Algorithms:
  Echo-nonce algorithm:     disabled
  TCP-counts algorithm:     disabled
  RLOC-probe algorithm:     enabled
Static mappings configured: 1
Map-cache limit:            18000
Reserve-list:               not configured
Map-cache size:             4

```

PxTR3# show ipv6 lisp statistics

LISP Statistics for VRF "default" - last cleared: never

Data Forwarding:

```

IPv6-in-IPv4 encap/decap packets: 0/0
IPv6-in-IPv6 encap/decap packets: 18/0
Translated packets in/out:        0/0
Map-cache lookup succeeded/failed: 24/0
LISP-ALT lookup succeeded/failed: 0/0
Loc-reach-bit changes local/remote: 0/0

```

Control Packets:

```

Data-Probes in/out:              0/0
Map-Requests in/out:             0/17
  Encapsulated Map-Requests in/out: 0/6
  RLOC-probe Map-Requests in/out:   0/11
  SMR-based Map-Requests in/out:    0/0
Map-Replies in/out:              17/0
  Security header included in/out:  0/0
  Authoritative in/out:              17/0
  Non-authoritative in/out:          0/0
  Negative Map-Replies in/out:       0/0
  RLOC-probe Map-Replies in/out:     11/0
Map-Registers in/out:            0/0
  Authentication failures:           0
Map-Notifies in/out:             0/0
  Authentication failures:           0
Map-Notify-Acks in/out:          0/0
Map-Referrals in/out:            0/0
EID Map-Registers in/out:        0/0

```