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LISP MIB
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Abstract

This document defines managed objects for the Locator/ID Separation Protocol (LISP). These objects provide information useful for monitoring LISP devices, including determining basic LISP configuration information, LISP functional status, and operational counters and other statistics.

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1. Requirements Notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [\[RFC2119\]](#).

2. Introduction

This draft describes the Management Information Base (MIB) module for use with network management protocols in the Internet community. Specifically, the MIB for managing Locator/ID Separation Protocol (LISP) devices is described.

LISP [\[RFC6830\]](#) specifies a network-based architecture and mechanisms that implement a new semantic for IP addressing using two separate name spaces: Endpoint Identifiers (EIDs), used within sites, and Routing Locators (RLOCs), used on the transit networks that make up the Internet infrastructure. To achieve this separation, LISP defines protocol mechanisms for mapping from EIDs to RLOCs.

From a data plane perspective, LISP traffic is handled exclusively at the network layer by devices performing Ingress Tunnel Router (ITR) and Egress Tunnel Router (ETR) LISP functions. Data plane operations performed by these devices are described in [\[RFC6830\]](#). Additionally, data plane interworking between legacy (Internet) and LISP sites is implemented by devices performing Proxy ITR (PITR) and Proxy ETR (PETR) functions. The data plane operations of these devices is described in [\[RFC6832\]](#).

From a control plane perspective, LISP employs mechanisms related to creating, maintaining, and resolving mappings from EIDs to RLOCs. LISP ITRs, ETRs, PITRs, and PETRs perform specific control plane functions, and these control plane operations are described in [\[RFC6830\]](#). Additionally, LISP infrastructure devices supporting LISP control plane functionality include Map-Servers and Map-Resolvers, and the control plane operations of these devices are described in [\[RFC6833\]](#).

3. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of RFC 3410](#) [\[RFC3410\]](#).

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP).

Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

4. Definition of Terms

This document does not define any new terms. All terms used in this document are listed here for completeness; the authoritative definition of each term can be found in the definition section of the respective, specified reference.

Endpoint ID (EID): [[RFC6830](#)]

Routing Locator (RLOC): [[RFC6830](#)]

EID-to-RLOC Cache: [[RFC6830](#)]

EID-to-RLOC Database: [[RFC6830](#)]

Ingress Tunnel Router (ITR): [[RFC6830](#)]

Egress Tunnel Router (ETR): [[RFC6830](#)]

xTR: [[RFC6830](#)]

Proxy ITR (PITR): [[RFC6832](#)]

Proxy ETR (PETR): [[RFC6832](#)]

LISP Site: [[RFC6830](#)]

Map-Server: [[RFC6833](#)]

Map-Resolver: [[RFC6833](#)]

Map-Request: [[RFC6833](#)]

Map-Reply: [[RFC6833](#)]

Negative Map-Reply: [[RFC6833](#)]

5. LISP MIB Objectives

The objectives for this LISP MIB module are to provide a read-only mechanisms to support the following functions:

- o Provide a means for obtaining an ON/OFF list of LISP features configured on a device, and the current status of configuration attributes related to those features. As an example, LISP features that could be enabled might include ITR, ETR, PITR, PETR, MS or MR support for IPv4 or IPv6 address families. Other examples could include indicating whether rloc-probing is enabled, or whether the use of a PETR is enabled. Configuration attributes related to these features could include the setting of a configured map-cache limit value, or the setting of a mapping time-to-live value.
- o Provide a means for obtaining the current attributes of various LISP tables, such as the EID-to-RLLOC policy data contained in the Map-Cache, or the local EID-to-RLLOC policy data contained in the Mapping-Database.
- o Provide a means for obtaining the current operational statistics of various LISP functions, such as the number of packets encapsulated and decapsulated by the device. Other counters of operational interest, depending on LISP function, include things like the current number of map-cache entries, and the total number and rate of map-requests received and sent by the device.

6. Structure of LISP MIB Module

6.1. Overview of Defined Notifications

No LISP MIB notifications are defined.

6.2. Overview of Defined Tables

The LISP MIB module is composed of the following tables of objects:

`lispFeatures` - This table provides information representing the various lisp features that can be enabled on LISP devices.

`lispIidToVrf` - This table provides information representing the mapping of a LISP instance ID to a VRF (Virtual Routing/Forwarding).

`lispGlobalStats` - This table provides global statistics for a given Instance ID per address-family on a LISP device.

`lispMappingDatabase` - This table represents the EID-to-RLLOC database that contains the EID-prefix to RLLOC mappings configured on an ETR. In general, this table would be representative of all such mappings for a given site that this device belongs to.

`lispMappingDatabaseLocator` - This table represents the set of routing locators contained in the EID-to-RLOC database configured on an ETR.

`lispMapCache` - This table represents the short-lived, on-demand table maintained on an ITR that stores, tracks, and times-out EID-to-RLOC mappings.

`lispMapCacheLocator` - This table represents the set of locators per EID prefix contained in the map-cache table of an ITR.

`lispConfiguredLocator` - This table represents the set of routing locators configured on a LISP device.

`lispEidRegistration` - This table provides the properties of each EID prefix that is registered with this device when configured to be a Map-Server.

`lispEidRegistrationEtr` - This table provides the properties of the different ETRs that send registers, for a given EID prefix, to this device when configured to be a Map-Server.

`lispEidRegistrationLocator` - This table provides the properties of the different locators per EID prefix that is registered with this device when configured to be a Map-Server.

`lispUseMapServer` - This table provides the properties of all Map-Servers that this device is configured to use.

`lispUseMapResolver` - This table provides the properties of all Map-Resolvers that this device is configured to use.

`lispUseProxyEtr` - This table provides the properties of all Proxy ETRs that this device is configured to use.

7. LISP MIB Definitions

```
LISP-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE,
    mib-2, Unsigned32, Counter64,
    Integer32, TimeTicks          FROM SNMPv2-SMI          -- [RFC2578]
    TruthValue, TEXTUAL-CONVENTION,
    TimeStamp                    FROM SNMPv2-TC            -- [RFC2579]
    MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF      -- [RFC2580]
    MplsL3VpnName
```



```
FROM MPLS-L3VPN-STD-MIB -- [RFC4382]
AddressFamilyNumbers
FROM IANA-ADDRESS-FAMILY-NUMBERS-MIB; -- [IANA]
```

lispMIB MODULE-IDENTITY

LAST-UPDATED "201305240000Z" -- 22 May 2013

ORGANIZATION

"IETF Locator/ID Separation Protocol (LISP) Working Group"

CONTACT-INFO

"Email: lisp@ietf.org

WG charter:

<http://www.ietf.org/html.charters/lisp-charter.html>"

DESCRIPTION

"Locator/ID Separation Protocol (LISP) MIB Managed Object module. The LISP MIB is intended for management of LISP devices.

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REVISION "201305240000Z" -- 22 May 2013

DESCRIPTION "Initial version of the IETF LISP-MIB module. Published as RFC xxxx."

-- RFC Ed.: RFC-editor pls fill in xxxx

::= { mib-2 XXX }

-- RFC Ed.: assigned by IANA, see [section 10](#) for details

--

-- Textual Conventions

--

LispAddressType ::= TEXTUAL-CONVENTION

DISPLAY-HINT "39a"

STATUS current

DESCRIPTION

"LISP architecture can be applied to a wide variety of address-families. This textual-convention is a generalization for representing addresses that belong to those address-families. For convenience, this document refers to any such address as a LISP address.

LispAddressType textual-convention consists of the following four-tuple:

1. IANA Address Family Number: A field of length 2-octets, whose value is of the form following the assigned AddressFamilyNumbers textual-convention described in [[IANA](#)]. The enumerations are listed in [[IANA](#)]. Note that this list of address family numbers is maintained by IANA.
2. Length of LISP address: A field of length 1-octet, whose value indicates the octet-length of the next (third)

field of this `LispAddressType` four-tuple.

3. LISP address: A field of variable length as indicated in the previous (second) field, whose value is an address of the IANA Address Family indicated in the first field of this `LispAddressType` four-tuple. Note that any of the IANA Address Families can be represented. Particularly when the address family is LISP Canonical Address Format (LCAF) [[LCAF](#)] with IANA assigned Address Family Number 16387, then the first octet of this field indicates the LCAF type, and the rest of this field is same as the encoding format of the LISP Canonical Address after the length field, as defined in [[LCAF](#)].
4. Mask-length of address: A field of length 1-octet, whose value is the mask-length to be applied to the LISP address specified in the previous (third) field.

To illustrate the use of this object, consider the LISP MIB Object below entitled `lispMapCacheEntry`. This object begins with the following entities:

```
lispMapCacheEntry ::= SEQUENCE {  
    lispMapCacheEidLength      INTEGER,  
    lispMapCacheEid            LispAddressType,  
    ... [skip] ...
```

Example 1: Suppose that the IPv4 EID prefix stored is 192.0.2.0/24. In this case, the values within `lispMapCacheEntry` would be:

```
lispMapCacheEidLength = 8  
lispMapCacheEid = 1, 4, 192.0.2.0, 24  
... [skip] ...
```

where 8 is the total length in octets of the next object (`lispMapCacheEid` of type `LispAddressType`). Then, the value 1 indicates the IPv4 AF (per [[IANA](#)]), the value 4 indicates that the AF is 4-octets in length, 192.0.2.0 is the IPv4 address, and the value 24 is the mask-length in bits. Note that the `lispMapCacheEidLength` value of 8 is used to compute the length of the fourth (last) field in `lispMapCacheEid` to be 1 octet - as computed by $8 - (2 + 1 + 4) = 1$.

Example 2: Suppose that the IPv6 EID prefix stored is 2001:db8:a::/48. In this case, the values within `lispMapCacheEntry` would be:

```
lispMapCacheEidLength = 20
```



```
lispMapCacheEid = 2, 16, 2001:db8:a::, 48
... [skip] ...
```

where 20 is the total length in octets of the next object (lispMapCacheEID of type LispAddressType). Then, the value 2 indicates the IPv4 AF (per [IANA]), the value 16 indicates that the AF is 16-octets in length, 2001:db8:a:: is the IPv6 address, and the value 48 is the mask-length in bits. Note that the lispMapCacheEidLength value of 20 is used to compute the length of the fourth (last) field in lispMapCacheEid to be 1 octet - as computed by $20 - (2 + 1 + 16) = 1$.

Example 3: As an example where LCAF is used, suppose that the IPv4 EID prefix stored is 192.0.2.0/24 and it is part of LISP Instance ID 101. In this case, the values within lispMapCacheEntry would be:

```
lispMapCacheEidLength = 11
lispMapCacheEid = 16387, 7, 2, 101, 1, 192.0.2.0, 24
... [skip] ...
```

where 11 is the total length in octets of the next object (lispMapCacheEID of type LispAddressType). Then, the value 16387 indicates the LCAF AF (see [IANA]), the value 7 indicates that the LCAF AF is 7-octets in length in this case, 2 indicates that LCAF Type 2 encoding is used (see [LCAF]), 101 gives the Instance ID, 1 gives the AFI (per [IANA]) for an IPv4 address, 192.0.2.0 is the IPv4 address, and 24 is the mask-length in bits. Note that the lispMapCacheEidLength value of 11 octets is used to compute the length of the last field in lispMapCacheEid to be 1 octet, as computed by $11 - (2 + 1 + 1 + 1 + 1 + 1 + 4) = 1$.

REFERENCE

"[RFC6830, Section 14.2](#), [draft-ietf-lisp-lcaf-02.txt](#)."

SYNTAX OCTET STRING (SIZE (5..39))

--

-- Top level components of this MIB.

--

lispObjects OBJECT IDENTIFIER ::= { lispMIB 1 }

lispConformance OBJECT IDENTIFIER ::= { lispMIB 2 }

lispFeaturesTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispFeaturesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This table represents the ON/OFF status of the
 various LISP features that can be enabled on LISP devices."
REFERENCE
 "[RFC6830, Section 4.0.](#), [Section 5.5.](#), [Section 6.3.](#)"
 ::= { lispObjects 1 }

lispFeaturesEntry OBJECT-TYPE
SYNTAX LispFeaturesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "An entry (conceptual row) in the lispFeaturesTable."
INDEX { lispFeaturesInstanceID,
 lispFeaturesAddressFamily }
 ::= { lispFeaturesTable 1 }

LispFeaturesEntry ::= SEQUENCE {
 lispFeaturesInstanceID Unsigned32,
 lispFeaturesAddressFamily AddressFamilyNumbers,
 lispFeaturesItrEnabled TruthValue,
 lispFeaturesEtrEnabled TruthValue,
 lispFeaturesProxyItrEnabled TruthValue,
 lispFeaturesProxyEtrEnabled TruthValue,
 lispFeaturesMapServerEnabled TruthValue,
 lispFeaturesMapResolverEnabled TruthValue,
 lispFeaturesMapCacheSize Unsigned32,
 lispFeaturesMapCacheLimit Unsigned32,
 lispFeaturesEtrMapCacheTtl Unsigned32,
 lispFeaturesRlocProbeEnabled TruthValue,
 lispFeaturesEtrAcceptMapDataEnabled TruthValue,
 lispFeaturesEtrAcceptMapDataVerifyEnabled TruthValue,
 lispFeaturesRouterTimeStamp TimeStamp
}

lispFeaturesInstanceID OBJECT-TYPE
SYNTAX Unsigned32 (0..16777215)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This represents the Instance ID of the LISP header.
 An Instance ID in the LISP address encoding helps
 uniquely identify the AFI-based address space to which
 a given EID belongs. It's default value is 0."
DEFVAL { 0 }


```
::= { lispFeaturesEntry 1 }
```

lispFeaturesAddressFamily OBJECT-TYPE

SYNTAX AddressFamilyNumbers

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IANA address family number of destination address
of packets that this LISP device is enabled to process."

```
::= { lispFeaturesEntry 2 }
```

lispFeaturesItrEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of ITR role on this device. If
this object is TRUE, then ITR feature is enabled."

```
::= { lispFeaturesEntry 3 }
```

lispFeaturesEtrEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of ETR role on this device. If
this object is TRUE, then ETR feature is enabled."

```
::= { lispFeaturesEntry 4 }
```

lispFeaturesProxyItrEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of Proxy-ITR role on this device.
If this object is TRUE, then Proxy-ITR feature is enabled."

```
::= { lispFeaturesEntry 5 }
```

lispFeaturesProxyEtrEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of Proxy-ETR role on this device.
If this object is TRUE, then Proxy-ETR feature is enabled."

```
::= { lispFeaturesEntry 6 }
```

lispFeaturesMapServerEnabled OBJECT-TYPE


```
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates the status of Map Server role on this device.
    If this object is TRUE, then Map Server feature is
    enabled."
::= { lispFeaturesEntry 7 }
```

lispFeaturesMapResolverEnabled OBJECT-TYPE

```
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates the status of Map Resolver role on this device.
    If this object is TRUE, then Map Resolver feature is
    enabled."
::= { lispFeaturesEntry 8 }
```

lispFeaturesMapCacheSize OBJECT-TYPE

```
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Size of EID-to-RLOC map cache on this device."
::= { lispFeaturesEntry 9 }
```

lispFeaturesMapCacheLimit OBJECT-TYPE

```
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Maximum permissible entries in EID-to-RLOC map cache on
    this device."
::= { lispFeaturesEntry 10 }
```

lispFeaturesEtrMapCacheTtl OBJECT-TYPE

```
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The stored Record TTL of the EID-to-RLOC map record in
    the map cache."
::= { lispFeaturesEntry 11 }
```

lispFeaturesRlocProbeEnabled OBJECT-TYPE

```
SYNTAX      TruthValue
MAX-ACCESS  read-only
```


STATUS current

DESCRIPTION

"Indicates the status of rloc-probing feature on this device. If this object is TRUE, then this feature is enabled."

::= { lispFeaturesEntry 12 }

lispFeaturesEtrAcceptMapDataEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of accepting piggybacked mapping data received in a map-request on this device. If this object is TRUE, then this device accepts piggybacked mapping data."

::= { lispFeaturesEntry 13 }

lispFeaturesEtrAcceptMapDataVerifyEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of verifying accepted piggybacked mapping data received in a map-request on this device. If this object is TRUE, then this device verifies accepted piggybacked mapping data."

::= { lispFeaturesEntry 14 }

lispFeaturesRouterTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which LISP feature was enabled on this device."

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispFeaturesEntry 15 }

lispIidToVrfTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispIidToVrfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table represents the mapping of LISP Instance ID to a VRF."

REFERENCE

"[RFC6830, Section 5.5](#). and [RFC4382, Section 7](#)."

::= { lispObjects 2 }

lispIidToVrfEntry OBJECT-TYPE

SYNTAX LispIidToVrfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the lispIidToVrfTable."

INDEX { lispFeaturesInstanceID }

::= { lispIidToVrfTable 1 }

LispIidToVrfEntry ::= SEQUENCE {

lispIidToVrfName

MplsL3VpnName

}

lispIidToVrfName OBJECT-TYPE

SYNTAX MplsL3VpnName

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The identifier for each VPN that is mapped to the given LISP Instance ID."

::= { lispIidToVrfEntry 1 }

lispGlobalStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispGlobalStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides global statistics for a given Instance ID per address-family on a LISP device."

REFERENCE

"[RFC6830, Section 6.1](#)."

::= { lispObjects 3 }

lispGlobalStatsEntry OBJECT-TYPE

SYNTAX LispGlobalStatsEntry

MAX-ACCESS not-accessible


```
STATUS      current
DESCRIPTION
    "An entry (conceptual row) in the
    lispGlobalStatsTable."
INDEX       { lispFeaturesInstanceID,
              lispFeaturesAddressFamily }
 ::= { lispGlobalStatsTable 1 }

LispGlobalStatsEntry ::= SEQUENCE {
    lispGlobalStatsMapRequestsIn      Counter64,
    lispGlobalStatsMapRequestsOut     Counter64,
    lispGlobalStatsMapRepliesIn       Counter64,
    lispGlobalStatsMapRepliesOut      Counter64,
    lispGlobalStatsMapRegistersIn     Counter64,
    lispGlobalStatsMapRegistersOut    Counter64
}

lispGlobalStatsMapRequestsIn OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of map requests received by this device for
        any EID prefix of the given address family and Instance ID.

        Discontinuities in this monotonically increasing value occur
        at re-initialization of the management system.
        Discontinuities can also occur as a result of LISP features
        being removed, which can be detected by observing the value
        of lispFeaturesRouterTimeStamp."
    ::= { lispGlobalStatsEntry 1 }

lispGlobalStatsMapRequestsOut OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of map requests sent by this device for any
        EID prefix of the given address family and Instance ID.

        Discontinuities in this monotonically increasing value occur
        at re-initialization of the management system.
        Discontinuities can also occur as a result of LISP features
        being removed, which can be detected by observing the value
        of lispFeaturesRouterTimeStamp."
    ::= { lispGlobalStatsEntry 2 }

lispGlobalStatsMapRepliesIn OBJECT-TYPE
```


SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of map replies received by this device for any
EID prefix of the given address family and Instance ID.

Discontinuities in this monotonically increasing value occur
at re-initialization of the management system.
Discontinuities can also occur as a result of LISP features
being removed, which can be detected by observing the value
of lispFeaturesRouterTimeStamp."
::= { lispGlobalStatsEntry 3 }

lispGlobalStatsMapRepliesOut OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of map replies sent by this device for any EID
prefix of the given address family and Instance ID.

Discontinuities in this monotonically increasing value occur
at re-initialization of the management system.
Discontinuities can also occur as a result of LISP features
being removed, which can be detected by observing the value
of lispFeaturesRouterTimeStamp."
::= { lispGlobalStatsEntry 4 }

lispGlobalStatsMapRegistersIn OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of map registers received by this device for
any EID prefix of the given address family and Instance ID.

Discontinuities in this monotonically increasing value occur
at re-initialization of the management system.
Discontinuities can also occur as a result of LISP features
being removed, which can be detected by observing the value
of lispFeaturesRouterTimeStamp."
::= { lispGlobalStatsEntry 5 }

lispGlobalStatsMapRegistersOut OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"Total number of map registers sent by this device for any EID prefix of the given address family and Instance ID.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of LISP features being removed, which can be detected by observing the value of `lispFeaturesRouterTimeStamp`."

::= { `lispGlobalStatsEntry` 6 }

`lispMappingDatabaseTable` OBJECT-TYPE

SYNTAX SEQUENCE OF `LispMappingDatabaseEntry`

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table represents the EID-to-RLOC mapping database that contains the EID-prefix to RLOC mappings configured on an ETR.

In general, this table would be representative of all such mappings for the given LISP site to which this device belongs."

REFERENCE

"[RFC6830, Section 6.0](#)."

::= { `lispObjects` 4 }

`lispMappingDatabaseEntry` OBJECT-TYPE

SYNTAX `LispMappingDatabaseEntry`

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in `lispMappingDatabaseTable`."

INDEX { `lispMappingDatabaseEidLength`,
 `lispMappingDatabaseEid` }

::= { `lispMappingDatabaseTable` 1 }

`LispMappingDatabaseEntry` ::= SEQUENCE {

<code>lispMappingDatabaseEidLength</code>	Integer32,
<code>lispMappingDatabaseEid</code>	LispAddressType,
<code>lispMappingDatabaseLsb</code>	Unsigned32,
<code>lispMappingDatabaseEidPartitioned</code>	TruthValue,
<code>lispMappingDatabaseTimeStamp</code>	TimeStamp,
<code>lispMappingDatabaseDecapOctets</code>	Counter64,
<code>lispMappingDatabaseDecapPackets</code>	Counter64,
<code>lispMappingDatabaseEncapOctets</code>	Counter64,


```
    lispMappingDatabaseEncapPackets      Counter64
}
```

lispMappingDatabaseEidLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object gives the octet-length of
lispMappingDatabaseEid."

::= { lispMappingDatabaseEntry 1 }

lispMappingDatabaseEid OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The EID prefix of the mapping database."

::= { lispMappingDatabaseEntry 2 }

lispMappingDatabaseLsb OBJECT-TYPE

SYNTAX Unsigned32 (0..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The locator status bits for this EID prefix."

::= { lispMappingDatabaseEntry 3 }

lispMappingDatabaseEidPartitioned OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates if this device is partitioned from the site that
contains this EID prefix. If this object is TRUE, then it
means this device is partitioned from the site."

::= { lispMappingDatabaseEntry 4 }

lispMappingDatabaseTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the EID Prefix information
represented by this mapping database entry was configured
on this device."

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispMappingDatabaseEntry 5 }

lispMappingDatabaseDecapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were decapsulated by this device addressed to a host within this EID-prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of LISP features being removed, which can be detected by observing the value of lispMappingDatabaseTimeStamp."

::= { lispMappingDatabaseEntry 6 }

lispMappingDatabaseDecapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were decapsulated by this device addressed to a host within this EID-prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of LISP features being removed, which can be detected by observing the value of lispMappingDatabaseTimeStamp."

::= { lispMappingDatabaseEntry 7 }

lispMappingDatabaseEncapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were encapsulated by this device, whose inner header source address matched this EID prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of LISP features

being removed, which can be detected by observing the value of lispMappingDatabaseTimeStamp."
 ::= { lispMappingDatabaseEntry 8 }

lispMappingDatabaseEncapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were encapsulated by this device whose inner header source address matched this EID prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of LISP features being removed, which can be detected by observing the value of lispMappingDatabaseTimeStamp."

::= { lispMappingDatabaseEntry 9 }

lispMappingDatabaseLocatorTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispMappingDatabaseLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table represents the set of routing locators per EID prefix contained in the EID-to-RLOC database configured on this ETR."

REFERENCE

"[RFC6830, Section 6.2.](#)"

::= { lispObjects 5 }

lispMappingDatabaseLocatorEntry OBJECT-TYPE

SYNTAX LispMappingDatabaseLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the lispMappingDatabaseLocatorTable."

INDEX { lispMappingDatabaseEidLength,
 lispMappingDatabaseEid,
 lispMappingDatabaseLocatorRlocLength,
 lispMappingDatabaseLocatorRloc }

::= { lispMappingDatabaseLocatorTable 1 }

LispMappingDatabaseLocatorEntry ::= SEQUENCE {
 lispMappingDatabaseLocatorRlocLength Integer32,


```
lispMappingDatabaseLocatorRloc      LispAddressType,
lispMappingDatabaseLocatorRlocPriority Integer32,
lispMappingDatabaseLocatorRlocWeight Integer32,
lispMappingDatabaseLocatorRlocMPriority Integer32,
lispMappingDatabaseLocatorRlocMWeight Integer32,
lispMappingDatabaseLocatorRlocState  INTEGER,
lispMappingDatabaseLocatorRlocLocal  INTEGER,
lispMappingDatabaseLocatorRlocTimeStamp TimeStamp,
lispMappingDatabaseLocatorRlocDecapOctets Counter64,
lispMappingDatabaseLocatorRlocDecapPackets Counter64,
lispMappingDatabaseLocatorRlocEncapOctets Counter64,
lispMappingDatabaseLocatorRlocEncapPackets Counter64
}
```

lispMappingDatabaseLocatorRlocLength OBJECT-TYPE

```
SYNTAX      Integer32 (5..259)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This object is used to get the octet-length of
    lispMappingDatabaseLocatorRloc."
 ::= { lispMappingDatabaseLocatorEntry 1 }
```

lispMappingDatabaseLocatorRloc OBJECT-TYPE

```
SYNTAX      LispAddressType
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This object is a locator for the given EID prefix in
    the mapping database."
 ::= { lispMappingDatabaseLocatorEntry 2 }
```

lispMappingDatabaseLocatorRlocPriority OBJECT-TYPE

```
SYNTAX      Integer32 (0..255)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The unicast priority of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 3 }
```

lispMappingDatabaseLocatorRlocWeight OBJECT-TYPE

```
SYNTAX      Integer32 (0..100)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The unicast weight of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 4 }
```


lispMappingDatabaseLocatorRlocMPriority OBJECT-TYPE

SYNTAX Integer32 (0..255)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The multicast priority of the RLOC."
::= { lispMappingDatabaseLocatorEntry 5 }

lispMappingDatabaseLocatorRlocMWeight OBJECT-TYPE

SYNTAX Integer32 (0..100)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The multicast weight of the RLOC."
::= { lispMappingDatabaseLocatorEntry 6 }

lispMappingDatabaseLocatorRlocState OBJECT-TYPE

SYNTAX INTEGER {
up (1),
down (2),
unreachable (3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The state of this RLOC as per this device.
(1 = RLOC is up; 2 = RLOC is down; 3 = RLOC is unreachable)."
::= { lispMappingDatabaseLocatorEntry 7 }

lispMappingDatabaseLocatorRlocLocal OBJECT-TYPE

SYNTAX INTEGER {
siteself (1),
sitelocal (2)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Indicates whether the RLOC is local to this device
(or remote, meaning local to another device in the same LISP
site). (1 = RLOC is an address on this device; 2 = RLOC is
an address on another device)."
::= { lispMappingDatabaseLocatorEntry 8 }

lispMappingDatabaseLocatorRlocTimeStamp OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The value of sysUpTime at which the RLOC of the EID Prefix represented by this mapping database entry was configured on this device.

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispMappingDatabaseLocatorEntry 9 }

lispMappingDatabaseLocatorRlocDecapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were addressed to this RLOC of the EID-prefix and were decapsulated.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of database mappings getting re-configured or RLOC status changes, which can be detected by observing the value of lispMappingDatabaseLocatorRlocTimeStamp."

::= { lispMappingDatabaseLocatorEntry 10 }

lispMappingDatabaseLocatorRlocDecapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were addressed to this RLOC of the EID-prefix and were decapsulated.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of database mappings getting re-configured or RLOC status changes, which can be detected by observing the value of lispMappingDatabaseLocatorRlocTimeStamp."

::= { lispMappingDatabaseLocatorEntry 11 }

lispMappingDatabaseLocatorRlocEncapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were encapsulated by this device using this RLOC address as the source, and that were sourced by an address of this EID-prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of database mappings getting re-configured or RLOC status changes, which can be detected by observing the value of `lispMappingDatabaseLocatorRlocTimeStamp`."

::= { lispMappingDatabaseLocatorEntry 12 }

`lispMappingDatabaseLocatorRlocEncapPackets` OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were encapsulated by this device using this RLOC address as the source, and that were sourced by an address of this EID-prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of database mappings getting re-configured or RLOC status changes, which can be detected by observing the value of `lispMappingDatabaseLocatorRlocTimeStamp`."

::= { lispMappingDatabaseLocatorEntry 13 }

`lispMapCacheTable` OBJECT-TYPE

SYNTAX SEQUENCE OF `LispMapCacheEntry`

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table represents the short-lived, on-demand table on an ITR that stores, tracks, and is responsible for timing-out and otherwise validating EID-to-RLOC mappings."

REFERENCE

["RFC6830, Section 6.0., Section 12.0."](#)

::= { lispObjects 6 }

`lispMapCacheEntry` OBJECT-TYPE

SYNTAX `LispMapCacheEntry`

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the


```
    lispMapCacheTable."
INDEX      { lispMapCacheEidLength,
              lispMapCacheEid }
 ::= { lispMapCacheTable 1 }

LispMapCacheEntry ::= SEQUENCE {
    lispMapCacheEidLength      Integer32,
    lispMapCacheEid            LispAddressType,
    lispMapCacheEidTimeStamp   TimeStamp,
    lispMapCacheEidExpiryTime  TimeTicks,
    lispMapCacheEidState       TruthValue,
    lispMapCacheEidAuthoritative TruthValue,
    lispMapCacheEidDecapOctets Counter64,
    lispMapCacheEidDecapPackets Counter64,
    lispMapCacheEidEncapOctets Counter64,
    lispMapCacheEidEncapPackets Counter64
}

lispMapCacheEidLength OBJECT-TYPE
    SYNTAX      Integer32 (5..259)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is used to get the octet-length of
        lispMapCacheEid."
    ::= { lispMapCacheEntry 1 }

lispMapCacheEid OBJECT-TYPE
    SYNTAX      LispAddressType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The EID prefix in the mapping cache."
    ::= { lispMapCacheEntry 2 }

lispMapCacheEidTimeStamp OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime at which the EID Prefix information
        represented by this entry was learned by this device.

        If this information was present at the most recent
        re-initialization of the local management subsystem, then
        this object contains a zero value."
    DEFVAL { 0 }
    ::= { lispMapCacheEntry 3 }
```


lispMapCacheEidExpiryTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time remaining before the ITR times-out this EID prefix."

::= { lispMapCacheEntry 4 }

lispMapCacheEidState OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is used to indicate the activity of this EID prefix. If this object is TRUE, then it means this EID prefix is seeing activity."

::= { lispMapCacheEntry 5 }

lispMapCacheEidAuthoritative OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is used to indicate whether the EID prefix was installed by an authoritative map-reply. If this object is TRUE, then it means this EID prefix was installed by an authoritative map-reply."

::= { lispMapCacheEntry 6 }

lispMapCacheEidDecapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were decapsulated by this device and were sourced from a remote host within this EID-prefix."

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of cache being removed and replaced, which can be detected by observing the value of lispMapCacheEidTimeStamp."

::= { lispMapCacheEntry 7 }

lispMapCacheEidDecapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were decapsulated by this device and were sourced from a remote host within this EID-prefix.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of cache being removed and replaced, which can be detected by observing the value of lispMapCacheEidTimeStamp."

::= { lispMapCacheEntry 8 }

lispMapCacheEidEncapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were encapsulated by this device using the given EID-prefix in the map cache.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of cache being removed and replaced, which can be detected by observing the value of lispMapCacheEidTimeStamp."

::= { lispMapCacheEntry 9 }

lispMapCacheEidEncapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were encapsulated by this device using the given EID-prefix in the map cache.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of cache being removed and replaced, which can be detected by observing the value of lispMapCacheEidTimeStamp."

::= { lispMapCacheEntry 10 }

lispMapCacheLocatorTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispMapCacheLocatorEntry

MAX-ACCESS not-accessible

STATUS current
 DESCRIPTION
 "This table represents the set of locators per EID prefix
 contained in the map-cache table of an ITR."
 REFERENCE
["RFC6830, Section 6.3."](#)
 ::= { lispObjects 7 }

lispMapCacheLocatorEntry OBJECT-TYPE
 SYNTAX LispMapCacheLocatorEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "An entry (conceptual row) in the
 lispMapCacheLocatorTable."
 INDEX { lispMapCacheEidLength,
 lispMapCacheEid,
 lispMapCacheLocatorRlocLength,
 lispMapCacheLocatorRloc }
 ::= { lispMapCacheLocatorTable 1 }

LispMapCacheLocatorEntry ::= SEQUENCE {
 lispMapCacheLocatorRlocLength Integer32,
 lispMapCacheLocatorRloc LispAddressType,
 lispMapCacheLocatorRlocPriority Integer32,
 lispMapCacheLocatorRlocWeight Integer32,
 lispMapCacheLocatorRlocMPriority Integer32,
 lispMapCacheLocatorRlocMWeight Integer32,
 lispMapCacheLocatorRlocState INTEGER,
 lispMapCacheLocatorRlocTimeStamp TimeStamp,
 lispMapCacheLocatorRlocLastPriorityChange TimeTicks,
 lispMapCacheLocatorRlocLastWeightChange TimeTicks,
 lispMapCacheLocatorRlocLastMPriorityChange TimeTicks,
 lispMapCacheLocatorRlocLastMWeightChange TimeTicks,
 lispMapCacheLocatorRlocLastStateChange TimeTicks,
 lispMapCacheLocatorRlocRtt TimeTicks,
 lispMapCacheLocatorRlocDecapOctets Counter64,
 lispMapCacheLocatorRlocDecapPackets Counter64,
 lispMapCacheLocatorRlocEncapOctets Counter64,
 lispMapCacheLocatorRlocEncapPackets Counter64
 }

lispMapCacheLocatorRlocLength OBJECT-TYPE
 SYNTAX Integer32 (5..259)
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "This object is used to get the octet-length of


```
    lispMapCacheLocatorRloc."  
    ::= { lispMapCacheLocatorEntry 1 }
```

lispMapCacheLocatorRloc OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The locator for the EID prefix in the mapping cache."

```
    ::= { lispMapCacheLocatorEntry 2 }
```

lispMapCacheLocatorRlocPriority OBJECT-TYPE

SYNTAX Integer32 (0..255)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The unicast priority of the RLOC for this EID prefix
(0-255); lower more preferred. "

```
    ::= { lispMapCacheLocatorEntry 3 }
```

lispMapCacheLocatorRlocWeight OBJECT-TYPE

SYNTAX Integer32 (0..100)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The unicast weight of the RLOC for this EID prefix
(0 - 100) percentage. "

```
    ::= { lispMapCacheLocatorEntry 4 }
```

lispMapCacheLocatorRlocMPriority OBJECT-TYPE

SYNTAX Integer32 (0..255)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The multicast priority of the RLOC for this EID prefix
(0-255); lower more preferred."

```
    ::= { lispMapCacheLocatorEntry 5 }
```

lispMapCacheLocatorRlocMWeight OBJECT-TYPE

SYNTAX Integer32 (0..100)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The multicast weight of the RLOC for this EID prefix
(0 - 100) percentage."

```
    ::= { lispMapCacheLocatorEntry 6 }
```

lispMapCacheLocatorRlocState OBJECT-TYPE


```
SYNTAX      INTEGER {
                up (1),
                down (2),
                unreachable (3)
            }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The state of this RLOC as per this device
    (1 = RLOC is up; 2 = RLOC is down; 3 = RLOC is unreachable)."
```

::= { lispMapCacheLocatorEntry 7 }

lispMapCacheLocatorRlocTimeStamp OBJECT-TYPE

```
SYNTAX      TimeStamp
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The value of sysUpTime at which the RLOC of EID prefix
    information represented by this entry was learned by
    this device.

    If this information was present at the most recent
    re-initialization of the local management subsystem,
    then this object contains a zero value."
```

DEFVAL { 0 }

::= { lispMapCacheLocatorEntry 8 }

lispMapCacheLocatorRlocLastPriorityChange OBJECT-TYPE

```
SYNTAX      TimeTicks
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Time elapsed since the last change of the unicast priority
    of the RLOC for this EID prefix. Note that this is
    independent of lispMapCacheLocatorRlocTimeStamp."
```

::= { lispMapCacheLocatorEntry 9 }

lispMapCacheLocatorRlocLastWeightChange OBJECT-TYPE

```
SYNTAX      TimeTicks
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Time elapsed since the last change of the unicast weight
    of the RLOC for this EID prefix. Note that this is
    independent of lispMapCacheLocatorRlocTimeStamp."
```

::= { lispMapCacheLocatorEntry 10 }

lispMapCacheLocatorRlocLastMPriorityChange OBJECT-TYPE

SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Time since the last change of the multicast priority of the
 RLOC for this EID prefix."
::= { lispMapCacheLocatorEntry 11 }

lispMapCacheLocatorRlocLastMWeightChange OBJECT-TYPE

SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Time since the last change of the multicast weight of the
 RLOC for this EID prefix."
::= { lispMapCacheLocatorEntry 12 }

lispMapCacheLocatorRlocLastStateChange OBJECT-TYPE

SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Time since the last change of the up/down state of the
 RLOC for this EID prefix."
::= { lispMapCacheLocatorEntry 13 }

lispMapCacheLocatorRlocRtt OBJECT-TYPE

SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Round trip time of RLOC probe and map-reply for this RLOC
 address for this prefix."
::= { lispMapCacheLocatorEntry 14 }

lispMapCacheLocatorRlocDecapOctets OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of octets of LISP packets that were decapsulated
 by this device and were sourced from a remote host within
 this EID-prefix and were encapsulated for this RLOC.

 Discontinuities in this monotonically increasing value occur
 at re-initialization of the management system.
 Discontinuities can also occur as a result of RLOC of cache
 being removed and replaced, which can be detected by

observing the value of lispMapCacheLocatorRlocTimeStamp."
::= { lispMapCacheLocatorEntry 15 }

lispMapCacheLocatorRlocDecapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were decapsulated by this device and were sourced from a remote host within this EID-prefix and were encapsulated for this RLOC.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of RLOC of cache being removed and replaced, which can be detected by observing the value of lispMapCacheLocatorRlocTimeStamp."

::= { lispMapCacheLocatorEntry 16 }

lispMapCacheLocatorRlocEncapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that matched this EID prefix and were encapsulated using this RLOC address.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of RLOC of cache being removed and replaced, which can be detected by observing the value of lispMapCacheLocatorRlocTimeStamp."

::= { lispMapCacheLocatorEntry 17 }

lispMapCacheLocatorRlocEncapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that matched this EID prefix and were encapsulated using this RLOC address.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of RLOC of cache being removed and replaced, which can be detected by observing the value of lispMapCacheLocatorRlocTimeStamp."

::= { lispMapCacheLocatorEntry 18 }

lispConfiguredLocatorTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispConfiguredLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table represents the set of routing locators configured on this device. Note that the Proxy-ITR configured addresses are treated as routing locators and therefore can be part of this table."

REFERENCE

["RFC6830, Section 6.3."](#)

::= { lispObjects 8 }

lispConfiguredLocatorEntry OBJECT-TYPE

SYNTAX LispConfiguredLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the lispConfiguredLocatorTable."

INDEX { lispConfiguredLocatorRlocLength,
lispConfiguredLocatorRloc }

::= { lispConfiguredLocatorTable 1 }

LispConfiguredLocatorEntry ::= SEQUENCE {

lispConfiguredLocatorRlocLength	Integer32,
lispConfiguredLocatorRloc	LispAddressType,
lispConfiguredLocatorRlocState	INTEGER,
lispConfiguredLocatorRlocLocal	INTEGER,
lispConfiguredLocatorRlocTimeStamp	TimeStamp,
lispConfiguredLocatorRlocDecapOctets	Counter64,
lispConfiguredLocatorRlocDecapPackets	Counter64,
lispConfiguredLocatorRlocEncapOctets	Counter64,
lispConfiguredLocatorRlocEncapPackets	Counter64

}**lispConfiguredLocatorRlocLength OBJECT-TYPE**

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is used to get the octet-length of lispConfiguredLocatorRloc."

::= { lispConfiguredLocatorEntry 1 }

lispConfiguredLocatorRloc OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible


```
STATUS      current
DESCRIPTION
    "This object is a RLOC address configured on this device.
    It can be an RLOC that is local to this device or can be an
    RLOC which belongs to another ETR within the same site.
    Proxy-ITR address is treated as an RLOC."
 ::= { lispConfiguredLocatorEntry 2 }

lispConfiguredLocatorRlocState OBJECT-TYPE
    SYNTAX      INTEGER {
                    up (1),
                    down (2),
                    unreachable (3)
                }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The state of this RLOC as per this device. (1 = RLOC is up;
        2 = RLOC is down; 3 = RLOC is unreachable)."
```

```
 ::= { lispConfiguredLocatorEntry 3 }

lispConfiguredLocatorRlocLocal OBJECT-TYPE
    SYNTAX      INTEGER {
                    siteself (1),
                    sitelocal (2)
                }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates whether the RLOC is local to this device (or
        remote, meaning local to another device in the same LISP
        site). (1 = RLOC is an address on this device; 2 = RLOC is
        an address on another device)."
```

```
 ::= { lispConfiguredLocatorEntry 4 }

lispConfiguredLocatorRlocTimeStamp OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime at which the RLOC was configured on
        this device.

        If this information was present at the most recent
        re-initialization of the local management subsystem, then
        this object contains a zero value."
```

```
 DEFVAL { 0 }
 ::= { lispConfiguredLocatorEntry 5 }
```


lispConfiguredLocatorRlocDecapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were addressed to this RLOC and were decapsulated.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of configured RLOC being removed and replaced, which can be detected by observing the value of lispConfiguredLocatorRlocTimeStamp."

::= { lispConfiguredLocatorEntry 6 }

lispConfiguredLocatorRlocDecapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were addressed to this RLOC and were decapsulated.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of configured RLOC being removed and replaced, which can be detected by observing the value of lispConfiguredLocatorRlocTimeStamp."

::= { lispConfiguredLocatorEntry 7 }

lispConfiguredLocatorRlocEncapOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of LISP packets that were encapsulated by this device using this RLOC address as the source.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of configured RLOC being removed and replaced, which can be detected by observing the value of lispConfiguredLocatorRlocTimeStamp."

::= { lispConfiguredLocatorEntry 8 }

lispConfiguredLocatorRlocEncapPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of LISP packets that were encapsulated by this device using this RLOC address as the source.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of configured RLOC being removed and replaced, which can be detected by observing the value of lispConfiguredLocatorRlocTimeStamp."

::= { lispConfiguredLocatorEntry 9 }

lispEidRegistrationTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispEidRegistrationEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides the properties of each LISP EID prefix that is registered with this device when configured to be a Map-Server."

REFERENCE

"[RFC6833, Section 4.0.](#)"

::= { lispObjects 9 }

lispEidRegistrationEntry OBJECT-TYPE

SYNTAX LispEidRegistrationEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the lispEidRegistrationTable."

INDEX { lispEidRegistrationEidLength,
lispEidRegistrationEid }

::= { lispEidRegistrationTable 1 }

LispEidRegistrationEntry ::= SEQUENCE {

lispEidRegistrationEidLength	Integer32,
lispEidRegistrationEid	LispAddressType,
lispEidRegistrationSiteName	OCTET STRING,
lispEidRegistrationSiteDescription	OCTET STRING,
lispEidRegistrationIsRegistered	TruthValue,
lispEidRegistrationFirstTimeStamp	TimeStamp,
lispEidRegistrationLastTimeStamp	TimeStamp,
lispEidRegistrationLastRegisterSenderLength	Integer32,
lispEidRegistrationLastRegisterSender	LispAddressType,
lispEidRegistrationAuthenticationErrors	Counter64,
lispEidRegistrationRlocsMismatch	Counter64


```
}
```

```
lispEidRegistrationEidLength OBJECT-TYPE
```

```
    SYNTAX      Integer32 (5..259)
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "This object is used to get the octet-length of  
        lispEidRegistrationEid."
```

```
    ::= { lispEidRegistrationEntry 1 }
```

```
lispEidRegistrationEid OBJECT-TYPE
```

```
    SYNTAX      LispAddressType
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The EID prefix that is being registered."
```

```
    ::= { lispEidRegistrationEntry 2 }
```

```
lispEidRegistrationSiteName OBJECT-TYPE
```

```
    SYNTAX      OCTET STRING (SIZE(0..63))
```

```
    MAX-ACCESS  read-only
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "Site name used by a Map-Server to distinguish different  
        LISP sites that are registering with it."
```

```
    ::= { lispEidRegistrationEntry 3 }
```

```
lispEidRegistrationSiteDescription OBJECT-TYPE
```

```
    SYNTAX      OCTET STRING (SIZE(0..255))
```

```
    MAX-ACCESS  read-only
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "Description for a site name used by a Map-Server. The EID  
        prefix that is being registered belongs to this site."
```

```
    ::= { lispEidRegistrationEntry 4 }
```

```
lispEidRegistrationIsRegistered OBJECT-TYPE
```

```
    SYNTAX      TruthValue
```

```
    MAX-ACCESS  read-only
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "Indicates the registration status of the given EID prefix.  
        If this object is TRUE, then it means the EID prefix is  
        registered.
```

```
        The value FALSE implies the EID prefix is not registered  
        with the Map Server. There are multiple scenarios when this
```


could happen like authentication failures, routing problems, misconfigs to name a few."
 ::= { lispEidRegistrationEntry 5 }

lispEidRegistrationFirstTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the first valid register message for the EID Prefix information represented by this entry was received by this device.

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispEidRegistrationEntry 6 }

lispEidRegistrationLastTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the last valid register message for the EID Prefix information represented by this entry was received by this device.

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispEidRegistrationEntry 7 }

lispEidRegistrationLastRegisterSenderLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is used to get the octet-length of lispEidRegistrationLastRegisterSender, the next object."

::= { lispEidRegistrationEntry 8 }

lispEidRegistrationLastRegisterSender OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Source address of the last valid register message for the given EID prefix that was received by this device."

::= { lispEidRegistrationEntry 9 }

lispEidRegistrationAuthenticationErrors OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of total authentication errors of map-registers received for the given EID prefix."

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of site config changes, which can be detected by observing the value of lispEidRegistrationFirstTimeStamp."

::= { lispEidRegistrationEntry 10 }

lispEidRegistrationRlocsMismatch OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of total map-registers received that had at least one RLOC that was not in the allowed list of RLOCs for the given EID prefix."

Discontinuities in this monotonically increasing value occur at re-initialization of the management system.

Discontinuities can also occur as a result of site config changes, which can be detected by observing the value of lispEidRegistrationFirstTimeStamp."

::= { lispEidRegistrationEntry 11 }

lispEidRegistrationEtrTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispEidRegistrationEtrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides the properties of ETRs that register the given EID prefix with this device when configured to be a Map-Server."

REFERENCE

["RFC6830, Section 6.1."](#)

::= { lispObjects 10 }

lispEidRegistrationEtrEntry OBJECT-TYPE

SYNTAX LispEidRegistrationEtrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the
lispEidRegistrationEtrTable."

INDEX { lispEidRegistrationEidLength,
lispEidRegistrationEid,
lispEidRegistrationEtrSenderLength,
lispEidRegistrationEtrSender }

::= { lispEidRegistrationEtrTable 1 }

LispEidRegistrationEtrEntry ::= SEQUENCE {

lispEidRegistrationEtrSenderLength	Integer32,
lispEidRegistrationEtrSender	LispAddressType,
lispEidRegistrationEtrLastTimeStamp	TimeStamp,
lispEidRegistrationEtrTtl	Unsigned32,
lispEidRegistrationEtrProxyReply	TruthValue,
lispEidRegistrationEtrWantsMapNotify	TruthValue

}

lispEidRegistrationEtrSenderLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is used to get the octet-length of
lispEidRegistrationEtrSender."

::= { lispEidRegistrationEtrEntry 1 }

lispEidRegistrationEtrSender OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Source address of the ETR that is sending valid register
messages for this EID prefix to this device."

::= { lispEidRegistrationEtrEntry 2 }

lispEidRegistrationEtrLastTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the last valid register
message from this ETR for the EID Prefix information
represented by this entry was received by this device."

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

DEFVAL { 0 }

::= { lispEidRegistrationEtrEntry 3 }

lispEidRegistrationEtrTtl OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Record TTL of the registering ETR device for this EID prefix."

::= { lispEidRegistrationEtrEntry 4 }

lispEidRegistrationEtrProxyReply OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates proxy-replying status of the registering ETR for this EID prefix. If this object is TRUE, then it means the Map-Server can proxy-reply."

::= { lispEidRegistrationEtrEntry 5 }

lispEidRegistrationEtrWantsMapNotify OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates whether the EID prefix wants Map-Notifications. If this object is TRUE, then it means the EID prefix wants Map-Notifications."

::= { lispEidRegistrationEtrEntry 6 }

lispEidRegistrationLocatorTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispEidRegistrationLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides the properties of all locators per LISP site that are served by this device when configured to be a Map-Server."

REFERENCE

["RFC6830, Section 6.1."](#)

::= { lispObjects 11 }

lispEidRegistrationLocatorEntry OBJECT-TYPE

SYNTAX LispEidRegistrationLocatorEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the
lispEidRegistrationLocatorTable."

INDEX { lispEidRegistrationEidLength,
lispEidRegistrationEid,
lispEidRegistrationEtrSenderLength,
lispEidRegistrationEtrSender,
lispEidRegistrationLocatorRlocLength,
lispEidRegistrationLocatorRloc }

::= { lispEidRegistrationLocatorTable 1 }

LispEidRegistrationLocatorEntry ::= SEQUENCE {

lispEidRegistrationLocatorRlocLength	Integer32,
lispEidRegistrationLocatorRloc	LispAddressType,
lispEidRegistrationLocatorRlocState	INTEGER,
lispEidRegistrationLocatorIsLocal	TruthValue,
lispEidRegistrationLocatorPriority	Integer32,
lispEidRegistrationLocatorWeight	Integer32,
lispEidRegistrationLocatorMPriority	Integer32,
lispEidRegistrationLocatorMWeight	Integer32

}

lispEidRegistrationLocatorRlocLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is used to get the octet-length of
lispEidRegistrationLocatorRloc."

::= { lispEidRegistrationLocatorEntry 1 }

lispEidRegistrationLocatorRloc OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The locator of the given EID prefix being registered by the
given ETR with this device."

::= { lispEidRegistrationLocatorEntry 2 }

lispEidRegistrationLocatorRlocState OBJECT-TYPE

SYNTAX INTEGER {
up (1),
down (2)}


```
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The cached state of this RLOC received in map-register from
        the ETR by the device, in the capacity of a Map-Server.
        Value 1 refers to up, value 2 refers to down."
    ::= { lispEidRegistrationLocatorEntry 3 }

lispEidRegistrationLocatorIsLocal OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Indicates if the given locator is local to the registering
        ETR. If this object is TRUE, it means the locator is local."
    ::= { lispEidRegistrationLocatorEntry 4 }

lispEidRegistrationLocatorPriority OBJECT-TYPE
    SYNTAX Integer32 (0..255)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The unicast priority of the RLOC for this EID prefix in the
        register message sent by the given ETR."
    ::= { lispEidRegistrationLocatorEntry 5 }

lispEidRegistrationLocatorWeight OBJECT-TYPE
    SYNTAX Integer32 (0..100)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The unicast weight of the RLOC for this EID prefix in the
        register message sent by the given ETR."
    ::= { lispEidRegistrationLocatorEntry 6 }

lispEidRegistrationLocatorMPriority OBJECT-TYPE
    SYNTAX Integer32 (0..255)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The multicast priority of the RLOC for this EID prefix in
        the register message sent by the given ETR."
    ::= { lispEidRegistrationLocatorEntry 7 }

lispEidRegistrationLocatorMWeight OBJECT-TYPE
    SYNTAX Integer32 (0..100)
    MAX-ACCESS read-only
```


STATUS current

DESCRIPTION

"The multicast weight of the RLOC for this EID prefix in the register message sent by the given ETR."

::= { lispEidRegistrationLocatorEntry 8 }

lispUseMapServerTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispUseMapServerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides the properties of the map-server(s) with which this device is configured to register."

REFERENCE

["RFC6833, Section 4.3."](#)

::= { lispObjects 12 }

lispUseMapServerEntry OBJECT-TYPE

SYNTAX LispUseMapServerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the lispUseMapServerTable."

INDEX { lispUseMapServerAddressLength,
lispUseMapServerAddress }

::= { lispUseMapServerTable 1 }

LispUseMapServerEntry ::= SEQUENCE {

lispUseMapServerAddressLength Integer32,

lispUseMapServerAddress LispAddressType,

lispUseMapServerState INTEGER

}

lispUseMapServerAddressLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is used to get the octet-length of lispUseMapServerAddress."

::= { lispUseMapServerEntry 1 }

lispUseMapServerAddress OBJECT-TYPE

SYNTAX LispAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Address of Map-Server configured on this device."
 ::= { lispUseMapServerEntry 2 }

lispUseMapServerState OBJECT-TYPE

SYNTAX INTEGER {
 up (1),
 down (2),
 unreachable (3)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"State of this Map-Server configured on this device
 (1 = Map-Server is up; 2 = Map-Server is down)."

::= { lispUseMapServerEntry 3 }

lispUseMapResolverTable OBJECT-TYPE

SYNTAX SEQUENCE OF LispUseMapResolverEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides the properties of the map-resolver(s)
 this device is configured to use."

REFERENCE

["RFC6833, Section 4.4."](#)

::= { lispObjects 13 }

lispUseMapResolverEntry OBJECT-TYPE

SYNTAX LispUseMapResolverEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the
 lispUseMapResolverTable."

INDEX { lispUseMapResolverAddressLength,
 lispUseMapResolverAddress }

::= { lispUseMapResolverTable 1 }

LispUseMapResolverEntry ::= SEQUENCE {

lispUseMapResolverAddressLength Integer32,

lispUseMapResolverAddress LispAddressType,

lispUseMapResolverState INTEGER

}

lispUseMapResolverAddressLength OBJECT-TYPE

SYNTAX Integer32 (5..259)

MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This object is used to get the octet-length of
 lispUseMapResolverAddress."
::= { lispUseMapResolverEntry 1 }

lispUseMapResolverAddress OBJECT-TYPE
SYNTAX LispAddressType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "Address of map-resolver configured on this device."
::= { lispUseMapResolverEntry 2 }

lispUseMapResolverState OBJECT-TYPE
SYNTAX INTEGER {
 up (1),
 down (2)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "State of this Map-Resolver configured on this device
 (1 = Map-Resolver is up; 2 = Map-Resolver is down)."
::= { lispUseMapResolverEntry 3 }

lispUseProxyEtrTable OBJECT-TYPE
SYNTAX SEQUENCE OF LispUseProxyEtrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This table provides the properties of all Proxy ETRs that
 this device is configured to use."
REFERENCE
 ["RFC6830, Section 6.0."](#)
::= { lispObjects 14 }

lispUseProxyEtrEntry OBJECT-TYPE
SYNTAX LispUseProxyEtrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "An entry (conceptual row) in the
 lispUseProxyEtrTable."
INDEX { lispUseProxyEtrAddressLength,


```
        lispUseProxyEtrAddress }
 ::= { lispUseProxyEtrTable 1 }

LispUseProxyEtrEntry ::= SEQUENCE {
    lispUseProxyEtrAddressLength      Integer32,
    lispUseProxyEtrAddress            LispAddressType,
    lispUseProxyEtrPriority            Integer32,
    lispUseProxyEtrWeight             Integer32,
    lispUseProxyEtrMPPriority         Integer32,
    lispUseProxyEtrMWeight            Integer32,
    lispUseProxyEtrState              INTEGER
}

lispUseProxyEtrAddressLength OBJECT-TYPE
    SYNTAX      Integer32 (5..259)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is used to get the octet-length of
        lispUseProxyEtrAddress."
    ::= { lispUseProxyEtrEntry 1 }

lispUseProxyEtrAddress OBJECT-TYPE
    SYNTAX      LispAddressType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Address of Proxy ETR configured on this device."
    ::= { lispUseProxyEtrEntry 2 }

lispUseProxyEtrPriority OBJECT-TYPE
    SYNTAX      Integer32 (0..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The unicast priority of the PETR locator."
    ::= { lispUseProxyEtrEntry 3 }

lispUseProxyEtrWeight OBJECT-TYPE
    SYNTAX      Integer32 (0..100)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The unicast weight of the PETR locator."
    ::= { lispUseProxyEtrEntry 4 }

lispUseProxyEtrMPPriority OBJECT-TYPE
    SYNTAX      Integer32 (0..255)
```



```
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "The multicast priority of the PETR locator."
    ::= { lispUseProxyEtrEntry 5 }

lispUseProxyEtrMWeight OBJECT-TYPE
    SYNTAX      Integer32 (0..100)
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "The multicast weight of the PETR locator."
    ::= { lispUseProxyEtrEntry 6 }

lispUseProxyEtrState OBJECT-TYPE
    SYNTAX      INTEGER {
                    down (0),
                    up (1)
                }
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "State of this Proxy ETR configured on this device
        (0 = Proxy ETR is down; 1 = Proxy ETR is up)."
    ::= { lispUseProxyEtrEntry 7 }

--
-- Conformance Information
--

lispCompliances OBJECT IDENTIFIER ::= { lispConformance 1 }
lispGroups      OBJECT IDENTIFIER ::= { lispConformance 2 }

--
-- Compliance Statements
--

lispMIBComplianceEtr MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for LISP ETRs. It conveys
        information if device supports ETR feature, and relevant
        state associated with that feature."
    MODULE      -- this module
    MANDATORY-GROUPS { lispMIBEtrGroup }
```



```
GROUP    lispMIBItrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPetrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPitrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapResolverGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEtrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBItrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBTuningParametersGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEncapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDecapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDiagnosticsGroup
DESCRIPTION
    "This group is optional."
```



```
GROUP    lispMIBVrfGroup
DESCRIPTION
    "This group is optional."

 ::= { lispCompliances 1 }

lispMIBComplianceItr MODULE-COMPLIANCE
STATUS    current
DESCRIPTION
    "The compliance statement for LISP ITRs. It conveys
    information if device supports ITR feature, and any
    state associated with that feature."
MODULE -- this module
MANDATORY-GROUPS { lispMIBItrGroup }

GROUP    lispMIBEtrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPetrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPitrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapResolverGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEtrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBItrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBTuningParametersGroup
```



```
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEncapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDecapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDiagnosticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBVrfGroup
DESCRIPTION
    "This group is optional."

:= { lispCompliances 2 }

lispMIBCompliancePetr MODULE-COMPLIANCE
STATUS    current
DESCRIPTION
    "The compliance statement for LISP Proxy-ETRs. It conveys
    information if given device supports Proxy-ETR feature,
    and relevant state associated with that feature."
MODULE    -- this module
MANDATORY-GROUPS { lispMIBPetrGroup }

GROUP    lispMIBEtrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBItrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPitrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapResolverGroup
DESCRIPTION
```


"This group is optional."

GROUP lispMIBetrExtendedGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBitrExtendedGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBMapServerExtendedGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBTuningParametersGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBEncapStatisticsGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBDecapStatisticsGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBDiagnosticsGroup

DESCRIPTION

"This group is optional."

GROUP lispMIBVrfGroup

DESCRIPTION

"This group is optional."

::= { lispCompliances 3 }

lispMIBCompliancePitr MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for LISP Proxy-ITRs. It conveys information if device supports Proxy-ITR feature, and relevant state associated with that feature."

MODULE -- this module

MANDATORY-GROUPS { lispMIBPitrGroup }

GROUP lispMIBetrGroup

DESCRIPTION

"This group is optional."


```
GROUP    lispMIBItrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPetrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapResolverGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEtrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBItrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBTuningParametersGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEncapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDecapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDiagnosticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBVrfGroup
DESCRIPTION
    "This group is optional."
```



```
::= { lispCompliances 4 }
```

```
lispMIBComplianceMapServer MODULE-COMPLIANCE
```

```
STATUS current
```

```
DESCRIPTION
```

```
"The compliance statement for LISP Map Servers. It  
conveys information if device supports Map Server  
feature, and relevant state associated with that  
feature."
```

```
MODULE -- this module
```

```
MANDATORY-GROUPS { lispMIBMapServerGroup }
```

```
GROUP lispMIBEtrGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBItrGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBPetrGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBPitrGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBMapResolverGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBEtrExtendedGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBItrExtendedGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBMapServerExtendedGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```

```
GROUP lispMIBTuningParametersGroup
```

```
DESCRIPTION
```

```
"This group is optional."
```



```
GROUP    lispMIBEncapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDecapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDiagnosticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBVrfGroup
DESCRIPTION
    "This group is optional."

::= { lispCompliances 5 }

lispMIBComplianceMapResolver MODULE-COMPLIANCE
STATUS    current
DESCRIPTION
    "The compliance statement for LISP Map Resolvers. It
    conveys information if device supports Map Server
    feature, and relevant state associated with that
    feature."
MODULE    -- this module
MANDATORY-GROUPS { lispMIBMapResolverGroup }

GROUP    lispMIBEtrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBItrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPetrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBPitrGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerGroup
DESCRIPTION
    "This group is optional."
```



```
GROUP    lispMIBetrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBitrExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBMapServerExtendedGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBTuningParametersGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBEncapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDecapStatisticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBDiagnosticsGroup
DESCRIPTION
    "This group is optional."

GROUP    lispMIBVrfGroup
DESCRIPTION
    "This group is optional."

::= { lispCompliances 6 }

--
-- Units of Conformance
--

lispMIBetrGroup OBJECT-GROUP
    OBJECTS { lispFeaturesEtrEnabled,
               lispMappingDatabaseLsb,
               lispMappingDatabaseLocatorRlocPriority,
               lispMappingDatabaseLocatorRlocWeight,
               lispMappingDatabaseLocatorRlocMPriority,
               lispMappingDatabaseLocatorRlocMWeight,
               lispMappingDatabaseLocatorRlocState,
               lispMappingDatabaseLocatorRlocLocal,
```



```
        lispConfiguredLocatorRlocState,
        lispConfiguredLocatorRlocLocal,
        lispUseMapServerState
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support basic
        management of LISP ETRs."
    ::= { lispGroups 1 }

lispMIBItrGroup OBJECT-GROUP
    OBJECTS { lispFeaturesItrEnabled,
              lispFeaturesMapCacheSize,
              lispMappingDatabaseLsb,
              lispMapCacheLocatorRlocPriority,
              lispMapCacheLocatorRlocWeight,
              lispMapCacheLocatorRlocMPriority,
              lispMapCacheLocatorRlocMWeight,
              lispMapCacheLocatorRlocState,
              lispMapCacheEidTimeStamp,
              lispMapCacheEidExpiryTime,
              lispUseMapResolverState,
              lispUseProxyEtrPriority,
              lispUseProxyEtrWeight,
              lispUseProxyEtrMPriority,
              lispUseProxyEtrMWeight,
              lispUseProxyEtrState
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support basic
        management of LISP ITRs."
    ::= { lispGroups 2 }

lispMIBPetrGroup OBJECT-GROUP
    OBJECTS { lispFeaturesProxyEtrEnabled
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support basic
        management of LISP Proxy-ETRs."
    ::= { lispGroups 3 }

lispMIBPitrGroup OBJECT-GROUP
    OBJECTS { lispFeaturesProxyItrEnabled,
              lispConfiguredLocatorRlocState,
              lispConfiguredLocatorRlocLocal
    }
```



```
STATUS current
DESCRIPTION
    "A collection of objects to support basic
    management of LISP Proxy-ITRs."
 ::= { lispGroups 4 }

lispMIBMapServerGroup OBJECT-GROUP
OBJECTS { lispFeaturesMapServerEnabled,
          lispEidRegistrationIsRegistered,
          lispEidRegistrationLocatorRlocState
        }
STATUS current
DESCRIPTION
    "A collection of objects to support basic
    management of LISP Map Servers."
 ::= { lispGroups 5 }

lispMIBMapResolverGroup OBJECT-GROUP
OBJECTS { lispFeaturesMapResolverEnabled
        }
STATUS current
DESCRIPTION
    "A collection of objects to support basic
    management of LISP Map Resolvers."
 ::= { lispGroups 6 }

lispMIBetrExtendedGroup OBJECT-GROUP
OBJECTS { lispFeaturesRlocProbeEnabled,
          lispFeaturesEtrAcceptMapDataEnabled,
          lispFeaturesEtrAcceptMapDataVerifyEnabled,
          lispMappingDatabaseEidPartitioned
        }
STATUS current
DESCRIPTION
    "A collection of objects to support management
    of LISP features and properties on ETRs."
 ::= { lispGroups 7 }

lispMIBitrExtendedGroup OBJECT-GROUP
OBJECTS { lispFeaturesRlocProbeEnabled,
          lispMapCacheEidState,
          lispMapCacheEidAuthoritative,
          lispMapCacheLocatorRlocTimeStamp,
          lispMapCacheLocatorRlocLastPriorityChange,
          lispMapCacheLocatorRlocLastWeightChange,
          lispMapCacheLocatorRlocLastMPriorityChange,
          lispMapCacheLocatorRlocLastMWeightChange,
          lispMapCacheLocatorRlocLastStateChange,
```



```
        lispMapCacheLocatorRlocRtt
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support management
        of LISP features and properties on ITRs."
    ::= { lispGroups 8 }

lispMIBMapServerExtendedGroup OBJECT-GROUP
    OBJECTS { lispEidRegistrationSiteName,
        lispEidRegistrationSiteDescription,
        lispEidRegistrationIsRegistered,
        lispEidRegistrationFirstTimeStamp,
        lispEidRegistrationLastTimeStamp,
        lispEidRegistrationLastRegisterSenderLength,
        lispEidRegistrationLastRegisterSender,
        lispEidRegistrationEtrLastTimeStamp,
        lispEidRegistrationEtrTtl,
        lispEidRegistrationEtrProxyReply,
        lispEidRegistrationEtrWantsMapNotify,
        lispEidRegistrationLocatorIsLocal,
        lispEidRegistrationLocatorPriority,
        lispEidRegistrationLocatorWeight,
        lispEidRegistrationLocatorMPriority,
        lispEidRegistrationLocatorMWeight
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support management
        of LISP features and properties on Map Servers
        related to EID registrations."
    ::= { lispGroups 9 }

lispMIBTuningParametersGroup OBJECT-GROUP
    OBJECTS { lispFeaturesMapCacheLimit,
        lispFeaturesEtrMapCacheTtl
    }
    STATUS current
    DESCRIPTION
        "A collection of writeable objects used to
        configure LISP behavior and to tune performance."
    ::= { lispGroups 10 }

lispMIBEncapStatisticsGroup OBJECT-GROUP
    OBJECTS { lispMappingDatabaseTimeStamp,
        lispMappingDatabaseEncapOctets,
        lispMappingDatabaseEncapPackets,
        lispMappingDatabaseLocatorRlocTimeStamp,
```



```
        lispMappingDatabaseLocatorRlocEncapOctets,
        lispMappingDatabaseLocatorRlocEncapPackets,
        lispMapCacheEidTimeStamp,
        lispMapCacheEidEncapOctets,
        lispMapCacheEidEncapPackets,
        lispMapCacheLocatorRlocTimeStamp,
        lispMapCacheLocatorRlocEncapOctets,
        lispMapCacheLocatorRlocEncapPackets,
        lispConfiguredLocatorRlocTimeStamp,
        lispConfiguredLocatorRlocEncapOctets,
        lispConfiguredLocatorRlocEncapPackets
    }
    STATUS current
    DESCRIPTION
        "A collection of LISP encapsulation statistics
        by the device."
    ::= { lispGroups 11 }

lispMIBDecapStatisticsGroup OBJECT-GROUP
    OBJECTS { lispMappingDatabaseTimeStamp,
        lispMappingDatabaseDecapOctets,
        lispMappingDatabaseDecapPackets,
        lispMappingDatabaseLocatorRlocTimeStamp,
        lispMappingDatabaseLocatorRlocDecapOctets,
        lispMappingDatabaseLocatorRlocDecapPackets,
        lispMapCacheEidTimeStamp,
        lispMapCacheEidDecapOctets,
        lispMapCacheEidDecapPackets,
        lispMapCacheLocatorRlocTimeStamp,
        lispMapCacheLocatorRlocDecapOctets,
        lispMapCacheLocatorRlocDecapPackets,
        lispConfiguredLocatorRlocTimeStamp,
        lispConfiguredLocatorRlocDecapOctets,
        lispConfiguredLocatorRlocDecapPackets
    }
    STATUS current
    DESCRIPTION
        "A collection of LISP decapsulation statistics
        by the device."
    ::= { lispGroups 12 }

lispMIBDiagnosticsGroup OBJECT-GROUP
    OBJECTS { lispFeaturesRouterTimeStamp,
        lispGlobalStatsMapRequestsIn,
        lispGlobalStatsMapRequestsOut,
        lispGlobalStatsMapRepliesIn,
        lispGlobalStatsMapRepliesOut,
        lispGlobalStatsMapRegistersIn,
```



```
        lispGlobalStatsMapRegistersOut,
        lispEidRegistrationAuthenticationErrors,
        lispEidRegistrationRlocsMismatch
    }
    STATUS current
    DESCRIPTION
        "Objects providing additional diagnostics
        related to a LISP router. These are related
        to LISP control plane state."
    ::= { lispGroups 13 }

lispMIBVrfGroup OBJECT-GROUP
    OBJECTS { lispIdToVrfName
    }
    STATUS current
    DESCRIPTION
        "Objects providing information related to VRF
        configurations on a LISP router."
    ::= { lispGroups 14 }
```

END

8. Relationship to Other MIB Modules

8.1. MIB modules required for IMPORTS

The LISP MIB imports the TEXTUAL-CONVENTION AddressFamilyNumbers from the IANA-ADDRESS-FAMILY-NUMBERS-MIB [[IANA](#)].

The LISP MIB imports mib-2, Unsigned32, Counter64, Integer32, and TimeTicks from SNMPv2-SMI -- [[RFC2578](#)].

The LISP MIB imports TruthValue, TEXTUAL-CONVENTION, TimeStamp, and TimeTicks from SNMPv2-TC -- [[RFC2579](#)].

The LISP MIB imports MODULE-COMPLIANCE from SNMPv2-TC -- [[RFC2580](#)].

The LISP MIB imports MplsL3VpnName from MPLS-L3VPN-STD-MIB -- [[RFC4382](#)].

9. Security Considerations

There are no management objects defined in this MIB module that have a MAX-ACCESS clause of read-write and/or read-create. As long as these MIB modules are implemented correctly, there are no risks that any management objects of this MIB module can modify device settings via direct SNMP SET operations.

There are no readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) that are considered sensitive.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\]](#), [section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of these MIB modules is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

[10.](#) IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor -----	OBJECT IDENTIFIER value -----
lispMib	{ mib-2 XXX }

This document instructs IANA to allocate a new value in the "SMI Network Management MGMT Codes Internet-standard MIB" subregistry of the "Network Management Parameters" registry, according to the following registration data: Decimal: [TBD by IANA] Name: lispMIB Description: Locator/ID Separation Protocol (LISP) References: [RFC XXXX (this RFC)]

[11.](#) References

[11.1.](#) Normative References

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- [RFC4382] Nadeau, T. and H. van der Linde, "MPLS/BGP Layer 3 Virtual Private Network (VPN) Management Information Base", [RFC 4382](#), February 2006.
- [RFC6830] Farinacci, D., Fuller, V., Meyer, D., and D. Lewis, "The Locator/ID Separation Protocol (LISP)", [RFC 6830](#), January 2013.
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11.2. Informative References

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[Appendix A](#). Acknowledgments

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