Abstract

This document defines managed objects for the Locator/ID Separation Protocol (LISP). These objects provide information useful for monitoring LISP devices, including basic configuration information, LISP status, and operational 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]. Finally, while not specifically required, this document assumes the existence of a database to store and propagate those mappings globally.

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

Endpoint ID (EID): a 32-bit (for IPv4) or 128-bit (for IPv6) value used in the source and destination address fields of the first (inner-most) IP header of a LISP packet. A source EID is allocated to a host from an EID-prefix block associated with the site where the host is located. A host determines a destination address in the same way that it determines a destination address today, for example through a DNS lookup or SIP exchange.

Routing Locator (RLOC): a 32-bit (for IPv4) or 128-bit (for IPv6) value used in the source and destination address fields of the second (outer-most) IP header of a LISP packet. RLOC addresses are allocated to an egress tunnel router (ETR) and numbered from topologically-aggregatable blocks assigned to a site at each point to which it attaches to the global Internet.

EID-to-RLOC Map-Cache: a short-lived, on-demand table maintained locally in an ITR or PITR that stores, tracks, and is responsible for timing-out and otherwise validating EID-to-RLOC mappings. This table is distinct from the full "database" of EID-to-RLOC mappings in that it is dynamic and relatively small. At a given moment in time, it consists only of entries for those sites to which the ITR or PITR is currently communicating or has communicated with within the configured TTL period.

EID-to-RLOC Mapping-Database: a global distributed database that contains all known EID-to-RLOC mappings. Each potential ETR typically contains a small piece of the database consisting of only the EID-to-RLOC mappings for the EID prefix(es) for which the ETR is "authoritative" and the RLOC(s) by which those EID prefix(es) are reachable from the global Internet.

Ingress Tunnel Router (ITR): a router that accepts an IP packet with a single IP header (more precisely, an IP packet that does not contain a LISP header), treats this "inner" IP destination address as an EID and performs an EID-to-RLOC mapping lookup, and then prepends an "outer" IP header with one of its own globally-routable RLOCs in the source address field and the RLOC resulting from the mapping lookup in the destination address field. That
is, in general an ITR receives an IP packet from site end-systems on one side and sends a LISP-encapsulated IP packet toward the Internet on the other side.

Egress Tunnel Router (ETR): a router that accepts an IP packet where the destination address in the "outer" IP header is one of its own RLOCs, strips the "outer" header, and forwards the packet based on the next IP header found. That is, in general an ETR receives LISP-encapsulated IP packets from the Internet on one side and sends decapsulated IP packets toward site end-systems on the other side.

xTR: a term of general reference to an ITR or ETR when direction of data flow is not part of the context description. xTR refers to the router that is the tunnel endpoint and performs both ITR and ETR functionality. For example, "An xTR can be located at the Customer Edge (CE) router," meaning both ITR and ETR functionality is activated at the CE router.

Proxy ITR (PITR): a router that acts like an ITR but does so on behalf of non-LISP sites which send packets to destinations at LISP sites. The PITR, also known as a PTR, is defined and described in [RFC6832].

Proxy ETR (PETR): a router that acts like an ETR but does so on behalf of LISP sites which send packets to destinations at non-LISP sites. The PETR is defined and described in [RFC6832].

LISP Site: a set of routers in an edge network that are under a single technical administration. LISP routers which reside in the edge network are the demarcation points to separate the edge network from the core network.

Map-Server: a LISP network infrastructure component which learns EID-to-RLOC mapping entries from an authoritative source such as an ETR through static configuration, or another out-of-band mechanism. A Map-Server advertises these mappings into the distributed mapping database.

Map-Resolver: a LISP network infrastructure component which accepts LISP Encapsulated Map-Requests, typically from an ITR, and quickly determines whether or not the destination IP address is part of the EID namespace. If it is, the Map-Resolver finds the appropriate EID-to-RLOC mapping by consulting the distributed mapping database. If it is not, a Negative Map-Reply is immediately returned.
Map-Request: a LISP Map-Request message type sent by an ITR or PITR to a Map-Resolver when it needs a mapping for an EID, wants to test an RLOC for reachability, or wants to refresh a mapping before TTL expiration.

Map-Reply: a LISP Map-Reply message type returned in response to a Map-Request for a destination EID that exists in the mapping database and contains the locator-set and associated policy for the queried EID. Information returned in a Map-Reply is stored in the EID-to-RLOC Map-Cache.

Negative Map-Reply: a LISP Map-Reply message type that contains an empty locator-set. Returned in response to a Map-Request if the destination EID does not exist in the mapping database. Typically, this means that the "EID" being requested is an IP address connected to a non-LISP site. Information returned in a Negative Map-Reply is stored in the EID-to-RLOC Map-Cache.

5. LISP MIB Objectives

The objectives for defining this LISP MIB module are as follows:

- Provide a means for obtaining a list of enabled LISP features and the current status of configuration attributes related to those features. As an example, LISP capabilities which could be enabled include ITR, ETR, PITR, PETR, MS or MR support for IPv4 or IPv6 address families. Other examples include, indicating whether rloc-probing is enabled, and indicating the configured map-cache limit value.

- Provide a means for obtaining the current attributes of various LISP tables, such as the EID-to-RLOC policy data contained in the Map-Cache, or the local EID-to-RLOC policy data contained in the Mapping-Database.

- 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.

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-RLOC 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 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 on an ITR that stores, tracks, and is responsible for timing-out and otherwise validating 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 "201302040000Z" -- 04 February 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 Textual Conventions module. The LISP MIB is intended for management of LISP routers."
    Copyright (C) The IETF Trust (2013)."
    REVISION     "201302040000Z" -- 04 February 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-00.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 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."
::= { 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
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
"Maximum permissible entries in EID-to-RLOC map cache on
this device."
::= { lispFeaturesEntry 10 }
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."
::= { 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."
::= { 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 2 }
REFERENCE
"RFC 4382, Section 7."

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
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 }

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 }

An entry (conceptual row) in the lispMappingDatabaseTable.

INDEX  { lispMappingDatabaseEidLength, lispMappingDatabaseEid }

::= { lispMappingDatabaseTable 1 }

lispMappingDatabaseEntry ::= SEQUENCE { lispMappingDatabaseEidLength Integer32, lispMappingDatabaseEid LispAddressType, lispMappingDatabaseLabel Unsigned32, lispMappingDatabaseEidPartitioned TruthValue, lispMappingDatabaseTimeStamp TimeStamp, lispMappingDatabaseDecapOctets Counter64, lispMappingDatabaseDecapPackets Counter64, lispMappingDatabaseEncapOctets 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.

::= { 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 8 }

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 }
lispMappingDatabaseLocatorRlocWeight OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast weight of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 4 }

lispMappingDatabaseLocatorRlocMPriority OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast priority of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 5 }

lispMappingDatabaseLocatorRlocTimeStamn OBJECT-TYPE
SYNTAX       LispAddressTime
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This object is used to get the time stamp of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 6 }

lispMappingDatabaseLocatorRlocDecapOctets OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast number of decaps of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 7 }

lispMappingDatabaseLocatorRlocEncapOctets OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast number of encapsulations of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 8 }

lispMappingDatabaseLocatorRlocDecapPackets OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast number of decaps of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 9 }

lispMappingDatabaseLocatorRlocEncapPackets OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast number of encapsulations of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 10 }

lispMappingDatabaseLocatorRlocLength OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This object is used to get the octet-length of the RLOC.
 ::= { lispMappingDatabaseLocatorEntry 11 }

lispMappingDatabaseLocatorRlocOBJECT-TYPE
SYNTAX       LispAddress
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This object is used to get the locator for the given EID prefix in the
mapping database."
 ::= { lispMappingDatabaseLocatorEntry 2 }

lispMappingDatabaseLocatorRlocPriority OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast priority of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 3 }

lispMappingDatabaseLocatorRlocWeight OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast weight of the RLOC."
 ::= { lispMappingDatabaseLocatorEntry 4 }

lispMappingDatabaseLocatorRlocMPriority OBJECT-TYPE
SYNTAX       Integer32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "The unicast 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.

 ::= { 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."
 ::= { 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)
}
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."
::= { 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."
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 11 }

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 12 }

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 13 }

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 14 }

lispMapCacheLocatorRlocDecapPackets OBJECT-TYPE
SYNTAX     Counter64
MAX-ACCESS read-only
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."
::= { 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 8 }
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
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."
::= { 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."
::= { 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
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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,
    lispUseProxyEtrMPriority            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 }

lispUseProxyEtrMPriority 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
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 }
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,
lispMapCacheEidTimeSamp,
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,
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 { lispIidToVrfName }
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].

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:

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>OBJECT IDENTIFIER value</th>
</tr>
</thead>
<tbody>
<tr>
<td>lispMib</td>
<td>{ mib-2 XXX }</td>
</tr>
</tbody>
</table>

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


11.2. Informative References


Appendix A. Open Issues

Open issues for the LISP MIB include the following:

1. This LISP MIB draft does not include LISP Multicast [LISP-MCAST] considerations. Multicast considerations will be added in a separate LISP Multicast MIB draft.

Appendix B. Acknowledgments

A thank you is owed to Dino Farinacci for his inputs and review comments on the initial versions of this draft. In addition, the authors would like to gratefully acknowledge several others who have reviewed and commented on this draft. They include: Darrel Lewis, Isidor Kouvelas, Jesper Skriver, Selina Heimlich, Parna Agrawal, Dan Romascanu, and Luigi Iannone. A special thanks to Brian Haberman, the Internet Area AD, for his very detailed review. Also to Miguel Garcia for reviewing this document as part of the General Area Review Team.
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