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LISP YANG Model  
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Abstract

This document describes a YANG data model to use with the Locator/ID Separation Protocol (LISP).

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## 1. Introduction

The Locator/ID Separation Protocol (LISP) defines several network elements subject to be configured. This document presents the YANG data models required for basic configuration of all major LISP [RFC6830] elements. The models also capture some essential operational data elements as well.

## 2. LISP Module

This module is the base LISP module that is augmented in multiple models to represent various LISP device roles.

## 2.1. Module Structure

```
module: ietf-lisp
```

```

  +--rw lisp
    +--rw locator-sets
      +--rw locator-set* [locator-set-name]
        +--rw locator-set-name      string
        +--rw (locator-type)?
          +--:(local-interface)
            +--rw interface* [interface-ref]
              +--rw interface-ref      if:interface-ref
              +--rw priority?          uint8
              +--rw weight?            uint8
              +--rw multicast-priority? uint8
              +--rw multicast-weight?  uint8
          +--:(general-locator)
            +--rw locator* [id]
              +--rw id                  string
              +--rw locator-address
                +--rw address-type      lisp-address-family-ref
                +--rw virtual-network-id? instance-id-type
                +--rw (address)?
                  +--:(no-address)
                    | +--rw no-address?      empty
                  +--:(ipv4)
                    | +--rw ipv4?            inet:ipv4-address
                  +--:(ipv4-prefix)
                    | +--rw ipv4-prefix?    inet:ipv4-prefix
                  +--:(ipv6)
                    | +--rw ipv6?            inet:ipv6-address
                  +--:(ipv6-prefix)
                    | +--rw ipv6-prefix?    inet:ipv6-prefix
                  +--:(mac)
                    | +--rw mac?            yang:mac-address
                  +--:(distinguished-name)
                    | +--rw distinguished-name? distinguished-name
                -type
                  +--:(as-number)
                    | +--rw as-number?      inet:as-number
                  +--:(null-address)
                    | +--rw null-address
                    |   +--rw address?      empty
                  +--:(afi-list)
                    | +--rw afi-list
                    |   +--rw address-list*  simple-address
                  +--:(instance-id)
                    | +--rw instance-id
                    |   +--rw iid?          instance-id-type
                    |   +--rw mask-length?  uint8

```

```

|         +--rw address?          simple-address
+---:(as-number-lcaf)
|         +--rw as-number-lcaf
|         +--rw as?              inet:as-number
|         +--rw address?        simple-address
+---:(application-data)
|         +--rw application-data
|         +--rw address?          simple-address
|         +--rw protocol?         uint8
|         +--rw ip-tos?           int32
|         +--rw local-port-low?   inet:port-number
|         +--rw local-port-high?  inet:port-number
|         +--rw remote-port-low?  inet:port-number
|         +--rw remote-port-high? inet:port-number
+---:(geo-coordinates)
|         +--rw geo-coordinates
|         +--rw latitude?         bits
|         +--rw latitude-degrees? uint8
|         +--rw latitude-minutes? uint8
|         +--rw latitude-seconds? uint8
|         +--rw longitude?        bits
|         +--rw longitude-degrees? uint16
|         +--rw longitude-minutes? uint8
|         +--rw longitude-seconds? uint8
|         +--rw altitude?         int32
|         +--rw address?          simple-address
+---:(nat-traversal)
|         +--rw nat-traversal
|         +--rw ms-udp-port?      uint16
|         +--rw etr-udp-port?     uint16
|         +--rw global-etr-rloc?  simple-address
|         +--rw ms-rloc?          simple-address
|         +--rw private-etr-rloc? simple-address
|         +--rw rtr-rlocs*        simple-address
+---:(explicit-locator-path)
|         +--rw explicit-locator-path
|         +--rw hop* [hop-id]
|         +--rw hop-id           string
|         +--rw address?         simple-address
|         +--rw lrs-bits?        bits
+---:(source-dest-key)
|         +--rw source-dest-key
|         +--rw source?          simple-address
|         +--rw dest?            simple-address
+---:(key-value-address)
|         +--rw key-value-address
|         +--rw key?             simple-address
|         +--rw value?           simple-address

```

```

|                                     +--:(service-path)
|                                     +--rw service-path
|                                     +--rw service-path-id?  service-path-id-type
|                                     +--rw service-index?    uint8
|                                     +--rw priority?         uint8
|                                     +--rw weight?          uint8
|                                     +--rw multicast-priority? uint8
|                                     +--rw multicast-weight?  uint8
+--rw lisp-router-instances
  +--rw lisp-router-instance* [lisp-router-instance-id]
    +--rw lisp-router-instance-id  int32
    +--rw lisp-role* [lisp-role-type]
      | +--rw lisp-role-type    lisp-role-ref
    +--rw lisp-router-id
      +--rw site-id?  uint64
      +--rw xtr-id?   lisp:xtr-id-type

```

## 2.2. Module Definition

```

<CODE BEGINS> file "ietf-lisp@2017-07-01.yang"
module ietf-lisp {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp";
  prefix lisp;
  import ietf-interfaces {
    prefix if;
  }
  import ietf-lisp-address-types {
    prefix lacf;
  }
  import ietf-yang-types {
    prefix yang;
  }
  organization
    "IETF LISP (Locator/ID Separation Protocol) Working Group";
  contact
    "lisp@ietf.org";
  description
    "This YANG module defines the generic parameters for LISP.
    The module can be extended by vendors to define vendor-specific
    LISP parameters and policies."

```

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(<http://trustee.ietf.org/license-info>).

This version of this YANG module is part of RFC 6338; see  
the RFC itself for full legal notices.  
";

```
revision 2017-07-01 {
  description
    "Initial revision.";
  reference
    "https://tools.ietf.org/html/rfc6830";
}
identity lisp-role {
  description
    "LISP router role.";
}
identity itr {
  base lisp-role;
  description
    "LISP ITR.";
}
identity pitr {
  base lisp-role;
  description
    "LISP PITR.";
}
identity etr {
  base lisp-role;
  description
    "LISP ETR.";
}
identity petr {
  base lisp-role;
  description
    "LISP PETR.";
}
identity mapping-system {
  description
    "Mapping System interface";
}
identity single-node-mapping-system {
  base mapping-system;
  description
    "logically singular Map Server";
}
typedef mapping-system-ref {
  type identityref {
```

```
    base mapping-system;
  }
  description
    "Mapping System reference";
}

typedef lisp-role-ref {
  type identityref {
    base lisp-role;
  }
  description
    "LISP role reference";
}

typedef map-reply-action {
  type enumeration {
    enum no-action {
      value 0;
      description
        "Mapping is kept alive and no encapsulation occurs.";
    }
    enum natively-forward {
      value 1;
      description
        "Matching packets are not encapsulated or dropped but
        natively forwarded.";
    }
    enum send-map-request {
      value 2;
      description
        "Matching packets invoke Map-Requests.";
    }
    enum drop {
      value 3;
      description
        "Matching packets are dropped.";
    }
  }
  description
    "Defines the lisp map-cache ACT type";
  reference "https://tools.ietf.org/html/rfc6830#section-6.1.4";
}

typedef eid-id {
  type string;
  description
    "Type encoding of lisp-addresses to be generally used in EID
    keyed lists.";
}

typedef auth-key-type {
```

```
type enumeration {
  enum none {
    value 0;
    description
      "No authentication.";
  }
  enum hmac-sha-1-96 {
    value 1;
    description
      "HMAC-SHA-1-96 (RFC2404) authentication is used.";
  }
  enum hmac-sha-256-128 {
    value 2;
    description
      "HMAC-SHA-256-128 (RFC4868) authentication is used.";
  }
}
description
  "Enumeration of the authentication mechanisms supported by
  LISP.";
reference
  "https://tools.ietf.org/html/rfc6830#section-6.1.6";
}
typedef xtr-id-type {
  type binary {
    length "16";
  }
  description
    "128 bit xTR identifier.";
}

grouping locator-properties {
  description
    "Properties of a RLOC";
  leaf priority {
    type uint8;
    description
      "Locator priority.";
  }
  leaf weight {
    type uint8;
    description
      "Locator weight.";
  }
  leaf multicast-priority {
    type uint8;
    description
      "Locator's multicast priority";
  }
}
```



```
    }
    leaf multicast-weight {
      type uint8;
      description
        "Locator's multicast weight";
    }
  }

  grouping locators-grouping {
    description
      "Group that defines a list of LISP locators.";
    list locator {
      key "id";
      description
        "List of routing locators";
      leaf id {
        type string {
          length "1..64";
        }
        description
          "Locator id";
      }
      container locator-address {
        uses lcaf:lisp-address;
        description
          "The locator address provided in LISP canonincal
            address format.";
      }
      uses locator-properties;
    }
  }

  grouping local-locators-grouping {
    description
      "Group that defines a list of LISP locators.";
    list interface {
      key "interface-ref";
      description
        "The address type of the locator";
      leaf interface-ref {
        type if:interface-ref;
        description
          "The name of the interface supporting the locator.";
      }
      uses locator-properties;
    }
  }
}
```

```
grouping mapping {
  description
    "Group that defines a LISP mapping.";
  container eid {
    uses lcaf:lisp-address;
    description
      "End-host Identifier (EID) to be mapped to a list of
      locators";
  }
  leaf time-to-live {
    type uint32;
    units minutes;
    description
      "Mapping validity period in minutes.";
  }
  leaf creation-time {
    type yang:date-and-time;
    description
      "Time when the mapping was created.";
  }
  leaf authoritative {
    type bits {
      bit A {
        description
          "Authoritative bit.";
      }
    }
    description
      "Bit that indicates if mapping comes from an
      authoritative source.";
  }
  leaf static {
    type boolean;
    default "false";
    description
      "This leaf should be true if the mapping is static.";
  }
  choice locator-list {
    description
      "list of locartors are either negative, or positive.";
    case negative-mapping {
      leaf map-reply-action {
        type map-reply-action;
        description
          "Forwarding action for a negative mapping.";
      }
    }
    case positive-mapping {
```

```
        container rlocs {
            uses locators-grouping;
            description
                "List of locators for a positive mapping.";
        }
    }
}

grouping mappings {
    description
        "Group that defines a list of LISP mappings.";
    list virtual-network {
        key "vni";
        description
            "Virtual network to which the mappings belong.";
        leaf vni {
            type lcaf:instance-id-type;
            description
                "Virtual network identifier.";
        }
        container mappings {
            description
                "Mappings within the virtual network.";
            list mapping {
                key "id";
                description
                    "List of EID to RLOCs mappings.";
                leaf id {
                    type eid-id;
                    description
                        "Id that uniquely identifies a mapping.";
                }
                uses mapping;
            }
        }
    }
}

container lisp {
    description
        "Parameters for the LISP subsystem.";

    container locator-sets {
        description
            "Container that defines a named locator set which can be
            referenced elsewhere.";
        list locator-set {
```

```
    key "locator-set-name";
    description
        "Multiple locator sets can be defined.";
    leaf locator-set-name {
        type string {
            length "1..64";
        }
        description
            "Locator set name";
    }
    choice locator-type {
        description
            "Locator sets can be based on local interfaces, or
            general locators.";
        case local-interface {
            uses local-locators-grouping;
            description
                "List of locators in this set based on local
                interfaces.";
        }
        case general-locator {
            uses locators-grouping;
            description
                "List of locators in this set based on lisp-address.";
        }
    }
}

container lisp-router-instances {
    description
        "Different LISP routers instantiated in the device";
    list lisp-router-instance {
        key "lisp-router-instance-id";
        description
            "Each entry contains parameters for a LISP router.";
        leaf lisp-router-instance-id {
            type int32;
            description
                "Arbitrary lisp-router id.";
        }
        list lisp-role {
            key lisp-role-type;
            description
                "List of lisp device roles such as MS, MR, ITR,
                Pitr, ETR or PETR.";
            leaf lisp-role-type {
                type lisp-role-ref;
            }
        }
    }
}
```

```

        description
            "The type of LISP device - identity derived from the
             'lisp-device' base identity.";
    }
}
container lisp-router-id {
    when "../lisp-role/lisp-role-type = 'itr' or
          ../lisp-role/lisp-role-type = 'pitrr' or
          ../lisp-role/lisp-role-type = 'etr' or
          ../lisp-role/lisp-role-type = 'petr'" {
        description "Only when ITR, PITR, ETR or PETR.";
    }
    description
        "Site-ID and xTR-ID of the device.";
    leaf site-id {
        type uint64;
        description "Site ID";
    }
    leaf xtr-id {
        type lisp:xtr-id-type;
        description "xTR ID";
    }
}
}
}
}
}
<CODE ENDS>
```

### 3. LISP-ITR Module

This module captures the configuration data model of a LISP ITR. The model also captures some operational data elements.

### 3.1. Module Structure

```

module: ietf-lisp-itr
augment /lisp:lisp/lisp:lisp-router-instances/lisp:lisp-router-instance:
  +--rw itr!
    +--rw rloc-probing!
      | +--rw interval?          uint16
      | +--rw retries?          uint8
      | +--rw retries-interval? uint16
    +--rw itr-rlocs?            -> /lisp:lisp/locator-sets/locator-set/locator-set
-name
  +--rw map-resolvers
    | +--rw map-resolver*      inet:ip-address
  +--rw proxy-etr
    | +--rw proxy-etr-address* inet:ip-address

```

```

+--rw map-cache
  +--rw virtual-network* [vni]
    +--rw vni          lcaf:instance-id-type
    +--rw mappings
      +--rw mapping* [id]
        +--rw id          eid-id
        +--rw eid
          +--rw address-type          lisp-address-family-ref
          +--rw virtual-network-id?   instance-id-type
          +--rw (address)?
            +--:(no-address)
              | +--rw no-address?          empty
            +--:(ipv4)
              | +--rw ipv4?                inet:ipv4-address
            +--:(ipv4-prefix)
              | +--rw ipv4-prefix?         inet:ipv4-prefix
            +--:(ipv6)
              | +--rw ipv6?                inet:ipv6-address
            +--:(ipv6-prefix)
              | +--rw ipv6-prefix?         inet:ipv6-prefix
            +--:(mac)
              | +--rw mac?                 yang:mac-address
            +--:(distinguished-name)
              | +--rw distinguished-name?   distinguished-name-ty
          +--:(as-number)
            | +--rw as-number?             inet:as-number
          +--:(null-address)
            | +--rw null-address
            |   +--rw address?             empty
          +--:(afi-list)
            | +--rw afi-list
            |   +--rw address-list*       simple-address
          +--:(instance-id)
            | +--rw instance-id
            |   +--rw iid?                 instance-id-type
            |   +--rw mask-length?        uint8
            |   +--rw address?            simple-address
          +--:(as-number-lcaf)
            | +--rw as-number-lcaf
            |   +--rw as?                  inet:as-number
            |   +--rw address?            simple-address
          +--:(application-data)
            | +--rw application-data
            |   +--rw address?             simple-address
            |   +--rw protocol?           uint8
            |   +--rw ip-tos?             int32
            |   +--rw local-port-low?     inet:port-number
            |   +--rw local-port-high?    inet:port-number

```

```

|         +--rw remote-port-low?      inet:port-number
|         +--rw remote-port-high?    inet:port-number
+---:(geo-coordinates)
|   +--rw geo-coordinates
|     +--rw latitude?                 bits
|     +--rw latitude-degrees?         uint8
|     +--rw latitude-minutes?         uint8
|     +--rw latitude-seconds?         uint8
|     +--rw longitude?                bits
|     +--rw longitude-degrees?        uint16
|     +--rw longitude-minutes?        uint8
|     +--rw longitude-seconds?        uint8
|     +--rw altitude?                 int32
|     +--rw address?                  simple-address
+---:(nat-traversal)
|   +--rw nat-traversal
|     +--rw ms-udp-port?              uint16
|     +--rw etr-udp-port?             uint16
|     +--rw global-etr-rloc?          simple-address
|     +--rw ms-rloc?                  simple-address
|     +--rw private-etr-rloc?         simple-address
|     +--rw rtr-rlocs*                simple-address
+---:(explicit-locator-path)
|   +--rw explicit-locator-path
|     +--rw hop* [hop-id]
|       +--rw hop-id                 string
|       +--rw address?               simple-address
|       +--rw lrs-bits?              bits
+---:(source-dest-key)
|   +--rw source-dest-key
|     +--rw source?                  simple-address
|     +--rw dest?                    simple-address
+---:(key-value-address)
|   +--rw key-value-address
|     +--rw key?                     simple-address
|     +--rw value?                   simple-address
+---:(service-path)
|   +--rw service-path
|     +--rw service-path-id?         service-path-id-type
|     +--rw service-index?           uint8
+--rw time-to-live?                  uint32
+--rw creation-time?                 yang:date-and-time
+--rw authoritative?                 bits
+--rw static?                        boolean
+--rw (locator-list)?
|   +---:(negative-mapping)
|   |   +--rw map-reply-action?      map-reply-action
|   +---:(positive-mapping)

```

```

+--rw rlocs
  +--rw locator* [id]
    +--rw id string
    +--rw locator-address
      | +--rw address-type lisp-address-fa
mily-ref
      | +--rw virtual-network-id? instance-id-type
e
      | +--rw (address)?
      |   +--:(no-address)
      |     | +--rw no-address? empty
      |   +--:(ipv4)
      |     | +--rw ipv4? inet:ipv4
-address
      |   +--:(ipv4-prefix)
      |     | +--rw ipv4-prefix? inet:ipv4
-prefix
      |   +--:(ipv6)
      |     | +--rw ipv6? inet:ipv6
-address
      |   +--:(ipv6-prefix)
      |     | +--rw ipv6-prefix? inet:ipv6
-prefix
      |   +--:(mac)
      |     | +--rw mac? yang:mac-
address
      |   +--:(distinguished-name)
      |     | +--rw distinguished-name? distingui
shed-name-type
      |   +--:(as-number)
      |     | +--rw as-number? inet:as-n
umber
      |   +--:(null-address)
      |     | +--rw null-address
      |     |   +--rw address? empty
      |   +--:(afi-list)
      |     | +--rw afi-list
      |     |   +--rw address-list* simple-address
      |   +--:(instance-id)
      |     | +--rw instance-id
      |     |   +--rw iid? instance-id-type
      |     |   +--rw mask-length? uint8
      |     |   +--rw address? simple-address
      |   +--:(as-number-lcaf)
      |     | +--rw as-number-lcaf
      |     |   +--rw as? inet:as-number
      |     |   +--rw address? simple-address
      |   +--:(application-data)
      |     | +--rw application-data
      |     |   +--rw address? simple-addr
ess
      |   +--rw protocol? uint8
      |   +--rw ip-tos? int32
      |   +--rw local-port-low? inet:port-n
umber
      |   +--rw local-port-high? inet:port-n
umber
      |   +--rw remote-port-low? inet:port-n
umber
      |   +--rw remote-port-high? inet:port-n
umber
      |   +--:(geo-coordinates)

```





```

|         |         | +--rw geo-coordinates
|         |         |   +--rw latitude?          bits
|         |         |   +--rw latitude-degrees?    uint8
|         |         |   +--rw latitude-minutes?    uint8
|         |         |   +--rw latitude-seconds?    uint8
|         |         |   +--rw longitude?          bits
|         |         |   +--rw longitude-degrees?   uint16
|         |         |   +--rw longitude-minutes?   uint8
|         |         |   +--rw longitude-seconds?   uint8
|         |         |   +--rw altitude?          int32
|         |         |   +--rw address?          simple-add
ress
|         |         | +---:(nat-traversal)
|         |         | |   +--rw nat-traversal
|         |         | |   +--rw ms-udp-port?      uint16
|         |         | |   +--rw etr-udp-port?     uint16
|         |         | |   +--rw global-etr-rloc?  simple-addr
ess
|         |         | |   +--rw ms-rloc?          simple-addr
ess
|         |         | |   +--rw private-etr-rloc? simple-addr
ess
|         |         | |   +--rw rtr-rlocs*        simple-addr
ess
|         |         | +---:(explicit-locator-path)
|         |         | |   +--rw explicit-locator-path
|         |         | |   |   +--rw hop* [hop-id]
|         |         | |   |   |   +--rw hop-id      string
|         |         | |   |   |   +--rw address?    simple-address
|         |         | |   |   |   +--rw lrs-bits?   bits
|         |         | |   +---:(source-dest-key)
|         |         | |   |   +--rw source-dest-key
|         |         | |   |   |   +--rw source?     simple-address
|         |         | |   |   |   +--rw dest?      simple-address
|         |         | |   +---:(key-value-address)
|         |         | |   |   +--rw key-value-address
|         |         | |   |   |   +--rw key?       simple-address
|         |         | |   |   |   +--rw value?     simple-address
|         |         | |   +---:(service-path)
|         |         | |   |   +--rw service-path
|         |         | |   |   |   +--rw service-path-id? service-path
-id-type
|         |         | |   |   |   +--rw service-index? uint8
|         |         | |   +--rw priority?          uint8
|         |         | |   +--rw weight?           uint8
|         |         | |   +--rw multicast-priority? uint8
|         |         | |   +--rw multicast-weight?  uint8

```

### 3.2. Module Definition

```

<CODE BEGINS> file "ietf-lisp-itr@2017-07-01.yang"
module ietf-lisp-itr {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp-itr";
  prefix lisp-itr;

```

```
import ietf-lisp {
  prefix lisp;
}
import ietf-inet-types {
  prefix inet;
}
organization
  "IETF LISP (Locator/ID Separation Protocol) Working Group";
contact
  "lisp@ietf.org";
description
  "This YANG module defines the generic parameters for a LISP
  ITR. The module can be extended by vendors to define
  vendor-specific parameters and policies."
```

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This version of this YANG module is part of RFC 6338; see the RFC itself for full legal notices.

```
";
revision 2017-07-01 {
  description
    "Initial revision.";
  reference
    "https://tools.ietf.org/html/rfc6830";
}
augment "/lisp:lisp/lisp:lisp-router-instances/lisp:lisp-router-instance" {
  when "lisp:lisp-role/lisp:lisp-role-type = 'lisp:itr' or
        lisp:lisp-role/lisp:lisp-role-type = 'lisp:pitr'" {
    description
      "Augment is valid when LISP role type is ITR or PITR.";
  }
  description
    "This augments LISP devices list with (P)ITR specific
    parameters.";
  container itr {
    presence "LISP (P)ITR operation enabled";
    description
      "ITR parameters";
    container rloc-probing {
```

```
presence "RLOC probing active";
description
  "RLOC-probing parameters";
leaf interval {
  type uint16;
  units "seconds";
  description
    "Interval in seconds for resending the probes";
}
leaf retries {
  type uint8;
  description
    "Number of retries for sending the probes";
}
leaf retries-interval {
  type uint16;
  units "seconds";
  description
    "Interval in seconds between retries when sending probes.
    The action taken if all retries fail to receive is
    impementation specific.";
}
}
leaf itr-rlocs {
  type leafref {
    path "/lisp:lisp/lisp:locator-sets/lisp:locator-set/"
      + "lisp:locator-set-name";
  }
  description
    "Reference to a locator set that the (P)ITR includes in
    Map-Requests";
}
container map-resolvers {
  description
    "Map-Resolvers that the (P)ITR uses.";
  leaf-list map-resolver {
    type inet:ip-address;
    min-elements 1;
    description
      "Each Map-Resolver within the list of Map-Resolvers.";
  }
}
container proxy-etr {
  when "../lisp:lisp-role/lisp:lisp-role-type = 'lisp:itr'" {
    description
      "Container exists only when LISP role type is ITR";
  }
  description

```

```

        "Proxy ETRs that the ITR uses.";
    leaf-list proxy-etr-address{
        type inet:ip-address;
        description
            "Proxy ETR RLOC address.";
    }
}
container map-cache{
    uses lisp:mappings;
    description
        "EID to RLOCs mappings cache.";
}
}
}
}
<CODE ENDS>

```

#### 4. LISP-ETR Module

This module captures the configuration data model of a LISP ETR. The model also captures some operational data elements.

##### 4.1. Module Structure

```

module: ietf-lisp-etr
augment /lisp:lisp/lisp:lisp-router-instances/lisp:lisp-router-instance:
  +--rw etr!
    +--rw map-servers
      |   +--rw map-server* [ms-address]
      |   |   +--rw ms-address          inet:ip-address
      |   |   +--rw auth-key?           string
      |   |   +--rw auth-key-type?      lisp:auth-key-type
    +--rw local-eids
      +--rw virtual-network* [vni]
      +--rw vni              lcaf:instance-id-type
      +--rw eids
        +--rw local-eid* [id]
          +--rw id                      lisp:eid-id
          +--rw eid-address
            |   +--rw address-type          lisp-address-family-ref
            |   +--rw virtual-network-id?   instance-id-type
            |   +--rw (address)?
            |   |   +--:(no-address)
            |   |   |   +--rw no-address?           empty
            |   |   +--:(ipv4)
            |   |   |   +--rw ipv4?                 inet:ipv4-address
            |   |   +--:(ipv4-prefix)
            |   |   |   +--rw ipv4-prefix?          inet:ipv4-prefix

```

pe

```

+---:(ipv6)
|   +--rw ipv6?                               inet:ipv6-address
+---:(ipv6-prefix)
|   +--rw ipv6-prefix?                         inet:ipv6-prefix
+---:(mac)
|   +--rw mac?                                yang:mac-address
+---:(distinguished-name)
|   +--rw distinguished-name?                  distinguished-name-ty

+---:(as-number)
|   +--rw as-number?                           inet:as-number
+---:(null-address)
|   +--rw null-address
|       +--rw address?    empty
+---:(afi-list)
|   +--rw afi-list
|       +--rw address-list*    simple-address
+---:(instance-id)
|   +--rw instance-id
|       +--rw iid?              instance-id-type
|       +--rw mask-length?      uint8
|       +--rw address?          simple-address
+---:(as-number-lcaf)
|   +--rw as-number-lcaf
|       +--rw as?                inet:as-number
|       +--rw address?          simple-address
+---:(application-data)
|   +--rw application-data
|       +--rw address?            simple-address
|       +--rw protocol?          uint8
|       +--rw ip-tos?             int32
|       +--rw local-port-low?     inet:port-number
|       +--rw local-port-high?    inet:port-number
|       +--rw remote-port-low?    inet:port-number
|       +--rw remote-port-high?   inet:port-number
+---:(geo-coordinates)
|   +--rw geo-coordinates
|       +--rw latitude?           bits
|       +--rw latitude-degrees?   uint8
|       +--rw latitude-minutes?   uint8
|       +--rw latitude-seconds?   uint8
|       +--rw longitude?          bits
|       +--rw longitude-degrees?   uint16
|       +--rw longitude-minutes?   uint8
|       +--rw longitude-seconds?   uint8
|       +--rw altitude?           int32
|       +--rw address?            simple-address
+---:(nat-traversal)
|   +--rw nat-traversal

```

```

|         +--rw ms-udp-port?          uint16
|         +--rw etr-udp-port?         uint16
|         +--rw global-etr-rloc?      simple-address
|         +--rw ms-rloc?              simple-address
|         +--rw private-etr-rloc?     simple-address
|         +--rw rtr-rlocs*            simple-address
|     +---:(explicit-locator-path)
|     |   +--rw explicit-locator-path
|     |   |   +--rw hop* [hop-id]
|     |   |   |   +--rw hop-id        string
|     |   |   |   +--rw address?      simple-address
|     |   |   |   +--rw lrs-bits?     bits
|     |   +---:(source-dest-key)
|     |   |   +--rw source-dest-key
|     |   |   |   +--rw source?       simple-address
|     |   |   |   +--rw dest?        simple-address
|     |   +---:(key-value-address)
|     |   |   +--rw key-value-address
|     |   |   |   +--rw key?          simple-address
|     |   |   |   +--rw value?       simple-address
|     |   +---:(service-path)
|     |   |   +--rw service-path
|     |   |   |   +--rw service-path-id?  service-path-id-type
|     |   |   |   +--rw service-index?    uint8
|     +--rw rlocs?                        -> /lisp:lisp/locator-sets/loc
ator-set/locator-set-name
|     +--rw record-ttl?                   uint32
|     +--rw want-map-notify?              boolean
|     +--rw proxy-reply?                  boolean
|     +--rw registration-interval?        uint16

```

#### 4.2. Module Definition

```

<CODE BEGINS> file "ietf-lisp-etr@2017-07-01.yang"
module ietf-lisp-etr {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp-etr";
  prefix lisp-etr;
  import ietf-lisp {
    prefix lisp;
  }
  import ietf-lisp-address-types {
    prefix lacf;
  }
  import ietf-inet-types {
    prefix inet;
  }
  organization
    "IETF LISP (Locator/ID Separation Protocol) Working Group";
  contact

```

```
"lisp@ietf.org";
description
  "This YANG module defines the generic parameters for a LISP
  ETR. The module can be extended by vendors to define
  vendor-specific parameters and policies.

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  authors of the code. All rights reserved.

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  (http://trustee.ietf.org/license-info).

  This version of this YANG module is part of RFC 6338; see
  the RFC itself for full legal notices.
  ";
revision 2017-07-01 {
  description
    "Initial revision.";
  reference
    "https://tools.ietf.org/html/rfc6830";
}
augment "/lisp:lisp/lisp:lisp-router-instances/lisp:lisp-router-instance" {
  when "lisp:lisp-role/lisp:lisp-role-type = 'lisp:etr' or
        lisp:lisp-role/lisp:lisp-role-type = 'lisp:petr'" {
    description
      "Augment is valid when LISP device type is (P)ETR.";
  }
  description
    "This augments LISP devices list with (P)ETR specific
    parameters.";
  container etr {
    presence "LISP (P)ETR operation enabled";
    description
      "(P)ETR parameters.";

    container map-servers {
      when "../lisp:lisp-role/lisp:lisp-role-type = 'lisp:etr'" {
        description
          "Container exists only when LISP device type is ETR.";
      }
      description
        "Map-Servers that the ETR uses.";
      list map-server {
        key "ms-address";
```



```
description
  "Each Map-Server within the list of Map-Servers.";
leaf ms-address {
  type inet:ip-address;
  description
    "Map-Server address.";
}
leaf auth-key {
  type string;
  description
    "Map-Server authentication key.";
}
leaf auth-key-type {
  type lisp:auth-key-type;
  description
    "Map-Server authentication type.";
}
}
}

container local-eids {
  when "../lisp:lisp-role/lisp:lisp-role-type = 'lisp:etr'" {
    description
      "Container exists only when LISP device type is ETR.";
  }
  description
    "Virtual networks served by the ETR.";
  list virtual-network {
    key "vni";
    description
      "Virtual network for local-EIDs.";
    leaf vni {
      type lisp:instance-id-type;
      description
        "Virtual network identifier.";
    }
  }
  container eids {
    description
      "EIDs served by the ETR.";
    list local-eid {
      key "id";
      min-elements 1;
      description
        "List of local EIDs.";
      leaf id {
        type lisp:eid-id;
        description
          "Unique id of local EID.";
      }
    }
  }
}
```

```

    }
    container eid-address {
        uses lcaf:lisp-address;
        description
            "EID address in generic LISP address format.";
    }
    leaf rlocs {
        type leafref {
            path "/lisp:lisp/lisp:locator-sets/lisp:locator-set/"
                + "lisp:locator-set-name";
        }
        description
            "Locator set mapped to this local EID.";
    }
    leaf record-ttl {
        type uint32;
        units minutes;
        description
            "Validity period of the EID to RLOCs mapping provided
            in Map-Replies.";
    }
    leaf want-map-notify {
        type boolean;
        default "true";
        description
            "Flag which if set in a Map-Register requests that a
            Map-Notify be sent in response.";
    }
    leaf proxy-reply {
        type boolean;
        default "false";
        description
            "Flag which if set in a Map-Register requests that the
            Map-Server proxy Map-Replies for the ETR.";
    }
    leaf registration-interval {
        type uint16;
        units "seconds";
        default "60";
        description
            "Interval between consecutive Map-Register messages.";
    }
}
}
}
}
}
}

```

```

}
<CODE ENDS>

```

## 5. LISP-Map-Server Module

This module captures the configuration data model of a LISP Map Server [RFC6833]. The model also captures some operational data elements.

### 5.1. Module Structure

```

module: ietf-lisp-mapserver
augment /lisp:lisp/lisp-router-instances/lisp:lisp-router-instance:
  +--rw map-server!
    +--rw sites
      +--rw site* [site-id]
        +--rw site-id      uint64
        +--rw auth-key
          +--rw auth-key-value?  string
          +--rw auth-key-type*   lisp:auth-key-type
    +--rw virtual-network-ids
      +--rw virtual-network-identifier* [vni]
        +--rw vni          lcaf:instance-id-type
        +--rw mappings
          +--rw mapping* [eid-id]
            +--rw eid-id          lisp:eid-id
            +--rw eid-address
              +--rw address-type  lisp-address-family-ref
              +--rw virtual-network-id?  instance-id-type
              +--rw (address)?
                +--:(no-address)
                | +--rw no-address?          empty
                +--:(ipv4)
                | +--rw ipv4?          inet:ipv4-address
                +--:(ipv4-prefix)
                | +--rw ipv4-prefix?    inet:ipv4-prefix
                +--:(ipv6)
                | +--rw ipv6?          inet:ipv6-address
                +--:(ipv6-prefix)
                | +--rw ipv6-prefix?    inet:ipv6-prefix
                +--:(mac)
                | +--rw mac?          yang:mac-address
                +--:(distinguished-name)
                | +--rw distinguished-name? distinguished-name-ty
            +--:(as-number)
            | +--rw as-number?          inet:as-number
            +--:(null-address)
            | +--rw null-address

```

```

|         +--rw address?    empty
+---:(afi-list)
|         +--rw afi-list
|         +--rw address-list*  simple-address
+---:(instance-id)
|         +--rw instance-id
|         +--rw iid?          instance-id-type
|         +--rw mask-length?  uint8
|         +--rw address?      simple-address
+---:(as-number-lcaf)
|         +--rw as-number-lcaf
|         +--rw as?          inet:as-number
|         +--rw address?     simple-address
+---:(application-data)
|         +--rw application-data
|         +--rw address?      simple-address
|         +--rw protocol?     uint8
|         +--rw ip-tos?       int32
|         +--rw local-port-low?  inet:port-number
|         +--rw local-port-high? inet:port-number
|         +--rw remote-port-low? inet:port-number
|         +--rw remote-port-high? inet:port-number
+---:(geo-coordinates)
|         +--rw geo-coordinates
|         +--rw latitude?      bits
|         +--rw latitude-degrees? uint8
|         +--rw latitude-minutes? uint8
|         +--rw latitude-seconds? uint8
|         +--rw longitude?     bits
|         +--rw longitude-degrees? uint16
|         +--rw longitude-minutes? uint8
|         +--rw longitude-seconds? uint8
|         +--rw altitude?      int32
|         +--rw address?      simple-address
+---:(nat-traversal)
|         +--rw nat-traversal
|         +--rw ms-udp-port?    uint16
|         +--rw etr-udp-port?   uint16
|         +--rw global-etr-rloc? simple-address
|         +--rw ms-rloc?        simple-address
|         +--rw private-etr-rloc? simple-address
|         +--rw rtr-rlocs*      simple-address
+---:(explicit-locator-path)
|         +--rw explicit-locator-path
|         +--rw hop* [hop-id]
|         +--rw hop-id          string
|         +--rw address?        simple-address
|         +--rw lrs-bits?       bits

```

|          |  |  |   |
|----------|--|--|---|
|          |  |  | <pre> +---:(source-dest-key)     +--rw source-dest-key         +--rw source?    simple-address         +--rw dest?     simple-address +---:(key-value-address)     +--rw key-value-address         +--rw key?      simple-address         +--rw value?    simple-address +---:(service-path)     +--rw service-path         +--rw service-path-id?  service-path-id-type         +--rw service-index?    uint8 +---rw site-id*                  uint64 +---rw more-specifics-accepted?  boolean +---rw mapping-expiration-timeout? int16 +---rw mapping-records     +--rw mapping-record* [xtr-id]         +--rw xtr-id          lisp:xtr-id-type         +--rw site-id?        uint64         +--rw eid             +--rw address-type          lisp-address-family-r </pre> |
| ef       |  |  | <pre> +--rw virtual-network-id?  instance-id-type +--rw (address)?     +---:(no-address)         +--rw no-address?          empty     +---:(ipv4)         +--rw ipv4?                inet:ipv4-addre </pre>   |
| ss       |  |  |   |
| x        |  |  | <pre> +---:(ipv4-prefix)     +--rw ipv4-prefix?          inet:ipv4-prefi </pre>   |
|          |  |  |   |
| ss       |  |  | <pre> +---:(ipv6)     +--rw ipv6?                inet:ipv6-addre </pre>   |
|          |  |  |   |
| x        |  |  | <pre> +---:(ipv6-prefix)     +--rw ipv6-prefix?          inet:ipv6-prefi </pre>   |
|          |  |  |   |
| s        |  |  | <pre> +---:(mac)     +--rw mac?                  yang:mac-addres </pre>   |
|          |  |  |   |
| ame-type |  |  | <pre> +---:(distinguished-name)     +--rw distinguished-name?    distinguished-n </pre>   |
|          |  |  | <pre> +---:(as-number)     +--rw as-number?            inet:as-number +---:(null-address)     +--rw null-address         +--rw address?          empty +---:(afi-list)     +--rw afi-list         +--rw address-list*      simple-address +---:(instance-id)     +--rw instance-id         +--rw iid?               instance-id-type </pre>   |

```

|         +--rw mask-length?    uint8
|         +--rw address?        simple-address
+---:(as-number-lcaf)
|         +--rw as-number-lcaf
|         +--rw as?             inet:as-number
|         +--rw address?        simple-address
+---:(application-data)
|         +--rw application-data
|         +--rw address?        simple-address
|         +--rw protocol?       uint8
|         +--rw ip-tos?         int32
|         +--rw local-port-low?  inet:port-number
|         +--rw local-port-high? inet:port-number
|         +--rw remote-port-low? inet:port-number
|         +--rw remote-port-high? inet:port-number
+---:(geo-coordinates)
|         +--rw geo-coordinates
|         +--rw latitude?        bits
|         +--rw latitude-degrees? uint8
|         +--rw latitude-minutes? uint8
|         +--rw latitude-seconds? uint8
|         +--rw longitude?       bits
|         +--rw longitude-degrees? uint16
|         +--rw longitude-minutes? uint8
|         +--rw longitude-seconds? uint8
|         +--rw altitude?        int32
|         +--rw address?        simple-address
+---:(nat-traversal)
|         +--rw nat-traversal
|         +--rw ms-udp-port?     uint16
|         +--rw etr-udp-port?    uint16
|         +--rw global-etr-rloc? simple-address
|         +--rw ms-rloc?         simple-address
|         +--rw private-etr-rloc? simple-address
|         +--rw rtr-rlocs*       simple-address
+---:(explicit-locator-path)
|         +--rw explicit-locator-path
|         +--rw hop* [hop-id]
|         |         +--rw hop-id    string
|         |         +--rw address?  simple-address
|         |         +--rw lrs-bits? bits
+---:(source-dest-key)
|         +--rw source-dest-key
|         +--rw source?          simple-address
|         +--rw dest?           simple-address
+---:(key-value-address)
|         +--rw key-value-address
|         +--rw key?            simple-address

```

|                      |  |  |  |  |                           |                    |
|----------------------|--|--|--|--|---------------------------|--------------------|
|                      |  |  |  |  | +--rw value?              | simple-address     |
|                      |  |  |  |  | +++:(service-path)        |                    |
|                      |  |  |  |  | +--rw service-path        |                    |
|                      |  |  |  |  | +--rw service-path-id?    | service-path-id-ty |
| pe                   |  |  |  |  | +--rw service-index?      | uint8              |
|                      |  |  |  |  | +++rw time-to-live?       | uint32             |
|                      |  |  |  |  | +++rw creation-time?      | yang:date-and-time |
|                      |  |  |  |  | +++rw authoritative?      | bits               |
|                      |  |  |  |  | +++rw static?             | boolean            |
|                      |  |  |  |  | +++rw (locator-list)?     |                    |
|                      |  |  |  |  | +++:(negative-mapping)    |                    |
|                      |  |  |  |  | +--rw map-reply-action?   | map-reply-action   |
|                      |  |  |  |  | +++:(positive-mapping)    |                    |
|                      |  |  |  |  | +--rw rlocs               |                    |
|                      |  |  |  |  | +--rw locator* [id]       |                    |
|                      |  |  |  |  | +--rw id                  | string             |
|                      |  |  |  |  | +--rw locator-address     |                    |
| ess-family-ref       |  |  |  |  | +--rw address-type        | lisp-addr          |
| id-type              |  |  |  |  | +--rw virtual-network-id? | instance-          |
|                      |  |  |  |  | +--rw (address)?          |                    |
|                      |  |  |  |  | +++:(no-address)          |                    |
| ty                   |  |  |  |  | +--rw no-address?         | emp                |
|                      |  |  |  |  | +--:(ipv4)                |                    |
| t:ipv4-address       |  |  |  |  | +--rw ipv4?               | ine                |
|                      |  |  |  |  | +--:(ipv4-prefix)         |                    |
| t:ipv4-prefix        |  |  |  |  | +--rw ipv4-prefix?        | ine                |
|                      |  |  |  |  | +--:(ipv6)                |                    |
| t:ipv6-address       |  |  |  |  | +--rw ipv6?               | ine                |
|                      |  |  |  |  | +--:(ipv6-prefix)         |                    |
| t:ipv6-prefix        |  |  |  |  | +--rw ipv6-prefix?        | ine                |
|                      |  |  |  |  | +--:(mac)                 |                    |
| g:mac-address        |  |  |  |  | +--rw mac?                | yan                |
|                      |  |  |  |  | +--:(distinguished-name)  |                    |
| tinguished-name-type |  |  |  |  | +--rw distinguished-name? | dis                |
|                      |  |  |  |  | +--:(as-number)           |                    |
| t:as-number          |  |  |  |  | +--rw as-number?          | ine                |
|                      |  |  |  |  | +--:(null-address)        |                    |
|                      |  |  |  |  | +--rw null-address        |                    |
|                      |  |  |  |  | +--rw address?            | empty              |
|                      |  |  |  |  | +--:(afi-list)            |                    |
|                      |  |  |  |  | +--rw afi-list            |                    |
| dress                |  |  |  |  | +--rw address-list*       | simple-ad          |
|                      |  |  |  |  | +--:(instance-id)         |                    |
|                      |  |  |  |  | +--rw instance-id         |                    |
| d-type               |  |  |  |  | +--rw iid?                | instance-i         |
|                      |  |  |  |  | +--rw mask-length?        | uint8              |
| ress                 |  |  |  |  | +--rw address?            | simple-add         |
|                      |  |  |  |  | +--:(as-number-lcaf)      |                    |





|             |  |  |  |  |                               |  |
|-------------|--|--|--|--|-------------------------------|--|
|             |  |  |  |  | +--rw as-number-lcaf          |  |
|             |  |  |  |  | +--rw as? inet:as-number      |  |
|             |  |  |  |  | +--rw address? simple-address |  |
|             |  |  |  |  | +++:(application-data)        |  |
|             |  |  |  |  | +--rw application-data        |  |
| e-address   |  |  |  |  | +--rw address? simpl          |  |
|             |  |  |  |  | +--rw protocol? uint8         |  |
| port-number |  |  |  |  | +--rw ip-tos? int32           |  |
|             |  |  |  |  | +--rw local-port-low? inet:   |  |
| port-number |  |  |  |  | +--rw local-port-high? inet:  |  |
|             |  |  |  |  | +--rw remote-port-low? inet:  |  |
| port-number |  |  |  |  | +--rw remote-port-high? inet: |  |
|             |  |  |  |  | +++:(geo-coordinates)         |  |
|             |  |  |  |  | +--rw geo-coordinates         |  |
|             |  |  |  |  | +--rw latitude? bits          |  |
| 8           |  |  |  |  | +--rw latitude-degrees? uint  |  |
|             |  |  |  |  | +--rw latitude-minutes? uint  |  |
| 8           |  |  |  |  | +--rw latitude-seconds? uint  |  |
|             |  |  |  |  | +--rw longitude? bits         |  |
| 16          |  |  |  |  | +--rw longitude-degrees? uint |  |
|             |  |  |  |  | +--rw longitude-minutes? uint |  |
| 8           |  |  |  |  | +--rw longitude-seconds? uint |  |
|             |  |  |  |  | +--rw altitude? int3          |  |
| 2           |  |  |  |  | +--rw address? simp           |  |
| le-address  |  |  |  |  | +++:(nat-traversal)           |  |
|             |  |  |  |  | +--rw nat-traversal           |  |
| 6           |  |  |  |  | +--rw ms-udp-port? uint1      |  |
|             |  |  |  |  | +--rw etr-udp-port? uint1     |  |
| 6           |  |  |  |  | +--rw global-etr-rloc? simpl  |  |
| e-address   |  |  |  |  | +--rw ms-rloc? simpl          |  |
| e-address   |  |  |  |  | +--rw private-etr-rloc? simpl |  |
| e-address   |  |  |  |  | +--rw rtr-rlocs* simpl        |  |
| e-address   |  |  |  |  | +++:(explicitLocator-path)    |  |
|             |  |  |  |  | +--rw explicitLocator-path    |  |
|             |  |  |  |  | +--rw hop* [hop-id]           |  |
|             |  |  |  |  | +--rw hop-id string           |  |
| ress        |  |  |  |  | +--rw address? simple-add     |  |
|             |  |  |  |  | +--rw lrs-bits? bits          |  |
|             |  |  |  |  | +++:(sourceDest-key)          |  |
|             |  |  |  |  | +--rw sourceDest-key          |  |
|             |  |  |  |  | +--rw source? simple-address  |  |
|             |  |  |  |  | +--rw dest? simple-address    |  |
|             |  |  |  |  | +++:(key-value-address)       |  |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  | <pre> +--rw key-value-address +--rw key?      simple-address +--rw value?    simple-address +--:(service-path) +--rw service-path </pre> |
|--|--|--|--|--|

```
e-path-id-type |      +--rw service-path-id?    servic
|               |      +--rw service-index?   uint8
|               |      +--rw priority?        uint8
|               |      +--rw weight?          uint8
|               |      +--rw multicast-priority?  uint8
|               |      +--rw multicast-weight?   uint8
|               +--ro counters
|                 +--ro map-registers-in?       yang:counter32
|                 +--ro map-registers-in-auth-failed?  yang:counter32
|                 +--ro map-notify-records-out?  yang:counter32
|                 +--ro proxy-reply-records-out?  yang:counter32
|                 +--ro map-requests-forwarded-out? yang:counter32
+--rw mapping-system-type?  lisp:mapping-system-ref
+--ro summary
|   +--ro number-configured-sites?  uint32
|   +--ro number-registered-sites?  uint32
|   +--ro af-datum
|     +--ro af-data* [address-type]
|       +--ro address-type           lcac:lisp-address-family-ref
|       +--ro number-configured-eids? uint32
|       +--ro number-registered-eids? uint32
+--ro counters
|   +--ro map-registers-in?         yang:counter32
|   +--ro map-registers-in-auth-failed? yang:counter32
|   +--ro map-notify-records-out?    yang:counter32
|   +--ro proxy-reply-records-out?   yang:counter32
|   +--ro map-requests-forwarded-out? yang:counter32
```

## 5.2. Module Definition

```
<CODE BEGINS> file "ietf-lisp-mapserver@2017-07-01.yang"
module ietf-lisp-mapserver {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp-mapserver";
  prefix lisp-ms;
  import ietf-lisp {
    prefix lisp;
  }
  import ietf-lisp-address-types {
    prefix lacf;
  }
  import ietf-yang-types {
    prefix yang;
    revision-date 2013-07-15;
  }

  organization
    "IETF LISP (Locator/ID Separation Protocol) Working Group";
  contact
```

```
"lisp@ietf.org";
description
  "This YANG module defines the generic parameters for a LISP
  Map-Server. The module can be extended by vendors to define
  vendor-specific parameters and policies.

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  authors of the code. All rights reserved.

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  (http://trustee.ietf.org/license-info).

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  the RFC itself for full legal notices.
";

revision 2017-07-01 {
  description
    "Initial revision.";
  reference
    "https://tools.ietf.org/html/rfc6833";
}

identity ms {
  base lisp:lisp-role;
  description
    "LISP Map-Server.";
}

grouping ms-counters {
  description "Group that defines map-server counters.";
  container counters {
    config false;
    description "Container for the counters";

    leaf map-registers-in {
      type yang:counter32;
      description "Number of incoming Map-Register messages";
    }

    leaf map-registers-in-auth-failed {
      type yang:counter32;
      description
        "Number of incoming Map-Register messages failed

```

```
        authentication";
    }

    leaf map-notify-records-out {
        type yang:counter32;
        description
            "Number of outgoing Map-Notify records";
    }

    leaf proxy-reply-records-out {
        type yang:counter32;
        description
            "Number of outgoing proxy Map-Reply records";
    }

    leaf map-requests-forwarded-out {
        type yang:counter32;
        description
            "Number of outgoing Map-Requests forwarded to ETR";
    }
}

augment "/lisp:lisp/lisp:lisp-router-instances"
+ "/lisp:lisp-router-instance" {
    when "lisp:lisp-role/lisp:lisp-role-type = 'lisp-ms:ms'" {
        description
            "Augment is valid when LISP device type is Map-Server.";
    }
    description
        "This augments LISP devices list with Map-Server specific
        parameters.";
    container map-server {
        presence "LISP Map-Server operation enabled";
        description
            "Map-Server parameters.";
        container sites{
            description
                "Sites to accept registrations from.";
            list site {
                key site-id;
                description
                    "Site that can send registrations.";
                leaf site-id {
                    type uint64;
                    description "Site ID";
                }
                container auth-key {
```

```
        description
        "Site authentication key.";
        leaf auth-key-value {
            type string;
            description
            "Clear text authentication key";
        }
        leaf-list auth-key-type {
            type lisp:auth-key-type;
            description
            "Authentication key type.";
        }
    }
}

container virtual-network-ids {
    description
    "Sites for which the Map-Server accepts registrations.";
    list virtual-network-identifier {
        key "vni";
        description
        "Virtual network instances in the Map-Server.";
        leaf vni {
            type lcaf:instance-id-type;
            description
            "Virtual network identifier.";
        }
    }
    container mappings {
        description
        "EIDs registered by device.";
        list mapping {
            key "eid-id";
            description
            "List of EIDs registered by device.";
            leaf eid-id {
                type lisp:eid-id;
                description
                "Id of the EID registered.";
            }
        }
        container eid-address {
            uses lcaf:lisp-address;
            description
            "EID in generic LISP address format registered
            with the Map-Server.";
        }
    }
    leaf-list site-id {
        type uint64;
        description "Site ID";
    }
}
```

```
    }
    leaf more-specifics-accepted {
        type boolean;
        default "false";
        description
            "Flag indicating if more specific prefixes
             can be registered.";
    }
    leaf mapping-expiration-timeout {
        type int16;
        units "seconds";
        default "180"; //3 times the mapregister int
        description
            "Time before mapping is expired if no new
             registrations are received.";
    }
    container mapping-records {
        description
            "Datastore of registred mappings.";
        list mapping-record{
            key xtr-id;
            description
                "Registered mapping.";
            leaf xtr-id {
                type lisp:xtr-id-type;
                description "xTR ID";
            }
            leaf site-id {
                type uint64;
                description "Site ID";
            }
            uses lisp:mapping;
        }
    }
    }
    }
    }
    uses ms-counters;
}
leaf mapping-system-type {
    type lisp:mapping-system-ref;
    description
        "A reference to the mapping system";
}

container summary {
    config false;
    description "Summary state information";
}
```

```

    leaf number-configured-sites {
        type uint32;
        description "Number of configured LISP sites";
    }
    leaf number-registered-sites {
        type uint32;
        description "Number of registered LISP sites";
    }
    container af-datum {
        description "Number of configured EIDs per each AF";

        list af-data {
            key "address-type";
            description "Number of configured EIDs for this AF";
            leaf address-type {
                type lcaf:lisp-address-family-ref;
                description "AF type";
            }
            leaf number-configured-eids {
                type uint32;
                description "Number of configured EIDs for this AF";
            }
            leaf number-registered-eids {
                type uint32;
                description "Number of registered EIDs for this AF";
            }
        }
    }
}
uses ms-counters;
}
}
}
<CODE ENDS>

```

## 6. LISP-Map-Resolver Module

This module captures the configuration data model of a LISP Map Resolver [RFC6833]. The model also captures some operational data elements.

### 6.1. Module Structure

```

module: ietf-lisp-mapresolver
augment /lisp:lisp/lisp:lisp-router-instances/lisp:lisp-router-instance:
  +--rw map-resolver!
    +--rw mapping-system-type?    lisp:mapping-system-ref
    +--rw ms-address?             inet:ip-address

```



## 6.2. Module Definition

```
<CODE BEGINS> file "ietf-lisp-mapresolver@2017-07-01.yang"
module ietf-lisp-mapresolver {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp-mapresolver";
  prefix lisp-mr;
  import ietf-lisp {
    prefix lisp;
  }
  import ietf-inet-types {
    prefix inet;
  }

  organization
    "IETF LISP (Locator/ID Separation Protocol) Working Group";
  contact
    "lisp@ietf.org";
  description
    "This YANG module defines the generic parameters for a LISP
    Map-Resolver. The module can be extended by vendors to define
    vendor-specific parameters and policies.

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    the RFC itself for full legal notices.
    ";
  revision 2017-07-01 {
    description
      "Initial revision.";
    reference
      "https://tools.ietf.org/html/rfc6833";
  }
  identity mr {
    base lisp:lisp-role;
    description
      "LISP Map-Resolver.";
  }
  augment "/lisp:lisp/lisp:lisp-router-instances"
    +"/lisp:lisp-router-instance" {
```

```

    when "lisp:lisp-role/lisp:lisp-role-type = 'lisp-mr:mr'" {
      description
        "Augment is valid when LISP device type is Map-Resolver.";
    }
  description
    "This augments LISP devices list with Map-Resolver specific
    parameters.";
  container map-resolver {
    presence "LISP Map-Resolver operation enabled";
    description
      "Map-Resolver parameters.";
    leaf mapping-system-type {
      type lisp:mapping-system-ref;
      description
        "A reference to the mapping system";
    }
    leaf ms-address {
      when "../mapping-system-type='lisp-mr:single-node-mapping-system'";
      type inet:ip-address;
      description
        "address to reach the Map Server when "
        + "lisp-mr:single-node-mapping-system is being used.";
    }
  }
}
}
<CODE ENDS>

```

## 7. LISP-Address-Types Module

This module captures the various LISP address types, and is an essential building block used in other LISP modules.

### 7.1. Module Definition

```

<CODE BEGINS> file "ietf-lisp-address-types@2015-11-05.yang"
module ietf-lisp-address-types {
  namespace "urn:ietf:params:xml:ns:yang:ietf-lisp-address-types";
  prefix laddr;
  import ietf-inet-types {
    prefix inet;
    revision-date 2013-07-15;
  }
  import ietf-yang-types {
    prefix yang;
    revision-date 2013-07-15;
  }
  organization

```

```
"IETF LISP (Locator/ID Separation Protocol) Working Group";
contact
  "lisp@ietf.org";
description
  "This YANG module defines the LISP Canonical Address Formats
  (LCAF) for LISP. The module can be extended by vendors to
  define vendor-specific parameters.

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  the RFC itself for full legal notices.

  ";
revision 2015-11-05 {
  description
    "Initial revision.";
  reference
    "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10";
}
identity lisp-address-family {
  description
    "Base identity from which identities describing LISP address
    families are derived.";
}
identity no-address-afi {
  base lisp-address-family;
  description
    "IANA Reserved.";
}
identity ipv4-afi {
  base lisp-address-family;
  description
    "IANA IPv4 address family.";
}
identity ipv4-prefix-afi {
  base lisp-address-family;
  description
    "IANA IPv4 address family prefix.";
}
```

```
identity ipv6-afi {
  base lisp-address-family;
  description
    "IANA IPv6 address family.";
}
identity ipv6-prefix-afi {
  base lisp-address-family;
  description
    "IANA IPv6 address family prefix.";
}
identity mac-afi {
  base lisp-address-family;
  description
    "IANA MAC address family.";
}
identity distinguished-name-afi {
  base lisp-address-family;
  description
    "IANA Distinguished Name address family.";
}
identity as-number-afi {
  base lisp-address-family;
  description
    "IANA AS Number address family.";
}
identity lcaf {
  base lisp-address-family;
  description
    "IANA LISP Canonical Address Format address family.";
}
identity null-address-lcaf {
  base lcaf;
  description
    "Null body LCAF type.";
}
identity afi-list-lcaf {
  base lcaf;
  description
    "AFI-List LCAF type.";
}
identity instance-id-lcaf {
  base lcaf;
  description
    "Instance-ID LCAF type.";
}
identity as-number-lcaf {
  base lcaf;
  description
```

```
        "AS Number LCAF type.";
    }
    identity application-data-lcaf {
        base lcaf;
        description
            "Application Data LCAF type.";
    }
    identity geo-coordinates-lcaf {
        base lcaf;
        description
            "Geo-coordinates LCAF type.";
    }
    identity opaque-key-lcaf {
        base lcaf;
        description
            "Opaque Key LCAF type.";
    }
    identity nat-traversal-lcaf {
        base lcaf;
        description
            "NAT-Traversal LCAF type.";
    }
    identity nonce-locator-lcaf {
        base lcaf;
        description
            "Nonce-Locator LCAF type.";
    }
    identity multicast-info-lcaf {
        base lcaf;
        description
            "Multicast Info LCAF type.";
    }
    identity explicit-locator-path-lcaf {
        base lcaf;
        description
            "Explicit Locator Path LCAF type.";
    }
    identity security-key-lcaf {
        base lcaf;
        description
            "Security Key LCAF type.";
    }
    identity source-dest-key-lcaf {
        base lcaf;
        description
            "Source/Dest LCAF type.";
    }
    identity replication-list-lcaf {
```

```
    base lcaf;
    description
      "Replication-List LCAF type.";
  }
  identity json-data-model-lcaf {
    base lcaf;
    description
      "JSON Data Model LCAF type.";
  }
  identity key-value-address-lcaf {
    base lcaf;
    description
      "Key/Value Address LCAF type.";
  }
  identity encapsulation-format-lcaf {
    base lcaf;
    description
      "Encapsulation Format LCAF type.";
  }
  identity service-path-lcaf {
    base lcaf;
    description
      "Service Path LCAF type.";
  }
  typedef instance-id-type {
    type uint32 {
      range "0..16777215";
    }
    description
      "Defines the range of values for an Instance ID.";
  }
  typedef service-path-id-type {
    type uint32 {
      range "0..16777215";
    }
    description
      "Defines the range of values for a Service Path ID.";
  }
  typedef distinguished-name-type {
    type string;
    description
      "Distinguished Name address.";
    reference
      "http://www.iana.org/assignments/address-family-numbers/
      address-family-numbers.xhtml";
  }
  typedef simple-address {
    type union {
```

```
    type inet:ip-address;
    type inet:ip-prefix;
    type yang:mac-address;
    type distinguished-name-type;
    type inet:as-number;
  }
  description
    "Union of address types that can be part of LCAFs.";
}

typedef lisp-address-family-ref {
  type identityref {
    base lisp-address-family;
  }
  description
    "LISP address family reference.";
}
typedef lcac-ref {
  type identityref {
    base lcac;
  }
  description
    "LCAF types reference.";
}

grouping lisp-address {
  description
    "Generic LISP address.";
  leaf address-type {
    type lisp-address-family-ref;
    mandatory true;
    description
      "Type of the LISP address.";
  }
  leaf virtual-network-id {
    type instance-id-type;
    description
      "Virtual Network Identifier (instance-id) of the address.";
  }
  choice address {
    description
      "Various LISP address types, including IP, MAC, and LCAF.";

    leaf no-address {
      when "../address-type = 'laddr:no-addr-afi'" {
        description
          "When AFI is 0.";
      }
    }
  }
}
```

```
    type empty;
    description
        "No address.";
}
leaf ipv4 {
    when "../address-type = 'laddr:ipv4-afi'" {
        description
            "When AFI is IPv4.";
    }
    type inet:ipv4-address;
    description
        "IPv4 address.";
}
leaf ipv4-prefix {
    when "../address-type = 'laddr:ipv4-prefix-afi'" {
        description
            "When AFI is IPv4.";
    }
    type inet:ipv4-prefix;
    description
        "IPv4 prefix.";
}
leaf ipv6 {
    when "../address-type = 'laddr:ipv6-afi'" {
        description
            "When AFI is IPv6.";
    }
    type inet:ipv6-address;
    description
        "IPv6 address.";
}
leaf ipv6-prefix {
    when "../address-type = 'laddr:ipv6-prefix-afi'" {
        description
            "When AFI is IPv6.";
    }
    type inet:ipv6-prefix;
    description
        "IPv6 address.";
}
leaf mac {
    when "../address-type = 'laddr:mac-afi'" {
        description
            "When AFI is MAC.";
    }
    type yang:mac-address;
    description
        "MAC address.";
```



```
}
leaf distinguished-name {
  when "../address-type = 'laddr:distinguished-name-afi'" {
    description
      "When AFI is distinguished-name.";
  }
  type distinguished-name-type;
  description
    "Distinguished Name address.";
}
leaf as-number {
  when "../address-type = 'laddr:as-number-afi'" {
    description
      "When AFI is as-number.";
  }
  type inet:as-number;
  description
    "AS Number.";
}
container null-address {
  when "../address-type = 'laddr:null-address-lcaf'" {
    description
      "When LCAF type is null.";
  }
  description
    "Null body LCAF type";
  leaf address {
    type empty;
    description
      "AFI address.";
  }
}
container afi-list {
  when "../address-type = 'laddr:afi-list-lcaf'" {
    description
      "When LCAF type is AFI-List.";
  }
  description
    "AFI-List LCAF type.";
  reference
    "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10#section-4.16.1";
  leaf-list address-list {
    type simple-address;
    description
      "List of AFI addresses.";
  }
}
```

```
container instance-id {
  when "../address-type = 'laddr:instance-id-lcaf'" {
    description
      "When LCAF type is Instance-ID";
  }
  description
    "Instance ID LCAF type.";
  reference
    "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
    #section-4.2";
  leaf iid {
    type instance-id-type;
    description
      "Instance ID value.";
  }
  leaf mask-length {
    type uint8;
    description
      "Mask length.";
  }
  leaf address {
    type simple-address;
    description
      "AFI address.";
  }
}
container as-number-lcaf {
  when "../address-type = 'laddr:as-number-lcaf'" {
    description
      "When LCAF type is AS-Number.";
  }
  description
    "AS Number LCAF type.";
  reference
    "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
    #section-4.3";
  leaf as {
    type inet:as-number;
    description
      "AS number.";
  }
  leaf address {
    type simple-address;
    description
      "AFI address.";
  }
}
container application-data {
```

```
when "../address-type = 'laddr:application-data-lcaf'" {
  description
    "When LCAF type is Application Data.";
}
description
  "Application Data LCAF type.";
reference
  "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
  #section-4.4";
leaf address {
  type simple-address;
  description
    "AFI address.";
}
leaf protocol {
  type uint8;
  description
    "Protocol number.";
}
leaf ip-tos {
  type int32;
  description
    "Type of service field.";
}
leaf local-port-low {
  type inet:port-number;
  description
    "Low end of local port range.";
}
leaf local-port-high {
  type inet:port-number;
  description
    "High end of local port range.";
}
leaf remote-port-low {
  type inet:port-number;
  description
    "Low end of remote port range.";
}
leaf remote-port-high {
  type inet:port-number;
  description
    "High end of remote port range.";
}
}
container geo-coordinates {
  when "../address-type = 'laddr:geo-coordinates-lcaf'" {
    description
```

```
        "When LCAF type is Geo-coordinates.";
    }
    description
        "Geo-coordinates LCAF type.";
    reference
        "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
        #section-4.5";
    leaf latitude {
        type bits {
            bit N {
                description
                    "Latitude bit.";
            }
        }
        description
            "Bit that selects between North and South latitude.";
    }
    leaf latitude-degrees {
        type uint8 {
            range "0 .. 90";
        }
        description
            "Degrees of latitude.";
    }
    leaf latitude-minutes {
        type uint8 {
            range "0..59";
        }
        description
            "Minutes of latitude.";
    }
    leaf latitude-seconds {
        type uint8 {
            range "0..59";
        }
        description
            "Seconds of latitude.";
    }
    leaf longitude {
        type bits {
            bit E {
                description
                    "Longitude bit.";
            }
        }
        description
            "Bit that selects between East and West longitude.";
    }
}
```

```
leaf longitude-degrees {
  type uint16 {
    range "0 .. 180";
  }
  description
    "Degrees of longitude.";
}
leaf longitude-minutes {
  type uint8 {
    range "0..59";
  }
  description
    "Minutes of longitude.";
}
leaf longitude-seconds {
  type uint8 {
    range "0..59";
  }
  description
    "Seconds of longitude.";
}
leaf altitude {
  type int32;
  description
    "Height relative to sea level in meters.";
}
leaf address {
  type simple-address;
  description
    "AFI address.";
}
}
container nat-traversal {
  when "../address-type = 'laddr:nat-traversal-lcaf'" {
    description
      "When LCAF type is NAT-Traversal.";
  }
  description
    "NAT-Traversal LCAF type.";
  reference
    "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
    #section-4.6";
  leaf ms-udp-port {
    type uint16;
    description
      "Map-Server UDP port (set to 4342).";
  }
  leaf etr-udp-port {
```

```
        type uint16;
        description
            "ETR UDP port.";
    }
    leaf global-etr-rloc {
        type simple-address;
        description
            "Global ETR RLOC address.";
    }
    leaf ms-rloc {
        type simple-address;
        description
            "Map-Server RLOC address.";
    }
    leaf private-etr-rloc {
        type simple-address;
        description
            "Private ETR RLOC address.";
    }
    leaf-list rtr-rlocs {
        type simple-address;
        description
            "List of RTR RLOC addresses.";
    }
}
container explicit-locator-path {
    when "../address-type = 'laddr:explicit-locator-path-lcaf'" {
        description
            "When LCAF type type is Explicit Locator Path.";
    }
    description
        "Explicit Locator Path LCAF type.";
    reference
        "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
        #section-4.9";
    list hop {
        key "hop-id";
        ordered-by user;
        description
            "List of locator hops forming the explicit path.";
        leaf hop-id {
            type string {
                length "1..64";
            }
            description
                "Unique identifier for the hop.";
        }
        leaf address {
```

```

        type simple-address;
        description
            "AFI address.";
    }
    leaf lrs-bits {
        type bits{
            bit lookup {
                description
                    "Lookup bit.";
            }
            bit rloc-probe {
                description
                    "RLOC-probe bit.";
            }
            bit strict {
                description
                    "Strict bit.";
            }
        }
        description
            "Flag bits per hop.";
    }
}

container source-dest-key {
    when "../address-type = 'laddr:source-dest-key-lcaf'" {
        description
            "When LCAF type type is Source/Dest.";
    }
    description
        "Source/Dest LCAF type.";
    reference
        "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10#section-4.11";
    leaf source {
        type simple-address;
        description
            "Source address.";
    }
    leaf dest {
        type simple-address;
        description
            "Destination address.";
    }
}

container key-value-address {
    when "../address-type = 'laddr:key-value-address-lcaf'" {
        description

```

```
        "When LCAF type type is Key/Value Address.";
    }
    description
        "Key/Value Address LCAF type.";
    reference
        "http://tools.ietf.org/html/draft-ietf-lisp-lcaf-10
        #section-4.11";
    leaf key {
        type simple-address;
        description
            "Address as Key.";
    }
    leaf value {
        type simple-address;
        description
            "Address as Value.";
    }
}
container service-path {
    when "../address-type = 'laddr:service-path-lcaf'" {
        description
            "When LCAF type service path identifier.";
    }
    description
        "Service Path LCAF type.";
    reference
        "http://tools.ietf.org/html/draft-ermagan-lisp-nsh-00";
    leaf service-path-id {
        type service-path-id-type;
        description
            "Service path identifier for the path for NSH header";
    }
    leaf service-index {
        type uint8;
        description
            "Service path index for NSH header";
    }
}
}
}
```

<CODE ENDS>



## 8. Acknowledgments

The tree view and the YANG model shown in this document have been formatted with the 'pyang' tool.

## 9. IANA Considerations

This memo includes no request to IANA.

## 10. Security Considerations

Security Considerations TBD

## 11. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC6830] Farinacci, D., Fuller, V., Meyer, D., and D. Lewis, "The Locator/ID Separation Protocol (LISP)", RFC 6830, DOI 10.17487/RFC6830, January 2013, <<http://www.rfc-editor.org/info/rfc6830>>.
- [RFC6832] Lewis, D., Meyer, D., Farinacci, D., and V. Fuller, "Interworking between Locator/ID Separation Protocol (LISP) and Non-LISP Sites", RFC 6832, DOI 10.17487/RFC6832, January 2013, <<http://www.rfc-editor.org/info/rfc6832>>.
- [RFC6833] Fuller, V. and D. Farinacci, "Locator/ID Separation Protocol (LISP) Map-Server Interface", RFC 6833, DOI 10.17487/RFC6833, January 2013, <<http://www.rfc-editor.org/info/rfc6833>>.
- [RFC6836] Fuller, V., Farinacci, D., Meyer, D., and D. Lewis, "Locator/ID Separation Protocol Alternative Logical Topology (LISP+ALT)", RFC 6836, DOI 10.17487/RFC6836, January 2013, <<http://www.rfc-editor.org/info/rfc6836>>.
- [RFC8060] Farinacci, D., Meyer, D., and J. Snijders, "LISP Canonical Address Format (LCAF)", RFC 8060, DOI 10.17487/RFC8060, February 2017, <<http://www.rfc-editor.org/info/rfc8060>>.

[RFC8111] Fuller, V., Lewis, D., Ermagan, V., Jain, A., and A. Smirnov, "Locator/ID Separation Protocol Delegated Database Tree (LISP-DDT)", RFC 8111, DOI 10.17487/RFC8111, May 2017, <<http://www.rfc-editor.org/info/rfc8111>>.

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