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DS-Lite Management Information Base (MIB)
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Abstract

This memo defines a portion of the Management Information Base (MIB) for using with network management protocols in the Internet community. In particular, it defines managed objects for DS-Lite.

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1. Introduction

Dual-Stack Lite [[RFC 6333](#)] is a solution to offer both IPv4 and IPv6 connectivity to customers crossing IPv6 only infrastructure. One of its key components is an IPv4-over-IPv6 tunnel, which is used to provide IPv4 connection across service provider's IPv6 network. Another key component is a carrier-grade IPv4-IPv4 NAT to share service provider IPv4 addresses among customers.

This document defines a portion of the Management Information Base (MIB) for using with network management protocols in the Internet community. This MIB module may be used for configuration and monitoring the devices in the Dual-Stack Lite scenario. This MIB also can be extended to the application for Gateway Initiated Dual-Stack Lite [[RFC 6674](#)].

2. 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 \[RFC3410\]](#).

Managed objects are accessed via a virtual information store, termed the 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 [[RFC2578](#)], [[RFC2579](#)] and [[RFC2580](#)].

3. Terminology

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

4. Difference from the IP tunnel MIB and NAT MIB

The key technologies for DS-Lite are IP in IP (IPv4-in-IPv6) tunnel and NAT (IPv4 to IPv4 translation).

Notes: According to the [section 5.2 of RFC6333](#), DS-Lite only defines IPv4 in IPv6 tunnels at this moment, but other types of encapsulation could be defined in the future. So this DS-Lite MIB only support IP

in IP encapsulation, if the [RFC6333](#) defined other tunnel types in the future, this DS-Lite MIB will be updated then.

The NAT-MIB [[RFC4008](#)] is designed to carry translation from any address family to any address family, therefore it supports IPv4 to IPv4 translation.

The tunnel MIB [[RFC4087](#)] is designed for managing tunnels of any type over IPv4 and IPv6 networks, therefore it supports IP in IP tunnels.

However, NAT MIB and tunnel MIB together are not sufficient to support DS-Lite. This document describes the specific MIB requirements for DS-Lite, as below.

In DS-Lite scenario, the tunnel type is IP in IP, more precisely, is IPv4 in IPv6. Therefore, it is unnecessary to describe tunnel type in DS-Lite MIB.

In DS-Lite scenario, the translation type is IPv4 private address to IPv4 public address. Therefore, it is unnecessary to describe the type of address in the corresponding tunnelIfLocalInetAddress and tunnelIfRemoteInetAddress objects which are defined in tunnel MIB for DS-Lite MIB.

In DS-Lite scenario, the AFTR is not only the tunnel end concentrator, but also a 4-4 translator. Within the AFTR, tunnel information and translation information MUST be mapped each other. Two independent MIB is not able to reflect this mapping relationship. Therefore, a combined MIB is necessary.

If the Gateway Initiated Dual-Stack Lite scenario[RFC 6674] is required, the MIB defined in this document could be easily extended for GI-DS-Lite. CID (Context Identifier) can be extended to the tunnel MIB to identifier the access devices which have the same IPv4 address. And both CID and SWID (Softwire Identifier) can be extended to the NAT MIB for performing the NAT binding look up.

The implementation of the IP Tunnel MIB is required for DS-Lite. The tunnelIfEncapsMethod in the tunnelIfEntry should be set to dsLite("xx"), and corresponding entry in the DS-Lite module will exist for every tunnelIfEntry with this tunnelIfEncapsMethod. The tunnelIfRemoteInetAddress must be set to "::".

5. Relationship to the IF-MIB

The Interfaces MIB [[RFC2863](#)] defines generic managed objects for managing interfaces. Each logical interface (physical or virtual) has an ifEntry. Tunnels are handled by creating a logical interface (ifEntry) for each tunnel. DS-Lite tunnel also acts as a virtual interface, which has corresponding entries in IP Tunnel MIB and Interface MIB. Those corresponding entries are indexed by ifIndex.

The ifOperStatus in ifTable would be used to represent whether the DS-Lite tunnel function has been originated. The ifInUcastPkts defined in ifTable will represent the number of IPv4 packets which have been encapsulated into IPv6 packets sent to B4. The ifOutUcastPkts defined in ifTable contains the number of IPv6 packets which can be decapsulated to IPv4 in the virtual interface. Also, the IF-MIB defines ifMtu for the MTU of this tunnel interface, so DS-Lite MIB does not need to define the MTU for tunnel.

6. Structure of the MIB Module

The DS-Lite MIB provides a way to monitor and manage the devices (AFTRs) in DS-Lite scenario through SNMP.

DS-Lite MIB is configurable on a per-interface basis. It depends on several parts of the IF-MIB [[RFC2863](#)], tunnel MIB [[RFC4087](#)], and NAT MIB [[RFC4008](#)].

6.1. The Object Group

This Group defines objects which are needed for DS-Lite MIB.

6.1.1. The dsliteTunnel Subtree

The dsliteTunnel subtree describes managed objects used for managing tunnels in the DS-Lite scenario. Because some objects defined in Tunnel MIB are not access, a few new objects are defined in DS-Lite MIB.

6.1.2. The dsliteNAT Subtree

The dsliteNAT Subtree describes managed objects used for configuration as well as monitoring of AFTR which is capable of NAT function. Because the NAT MIB supports the NAT management function in DS-Lite, we may reuse it in DS-Lite MIB. The dsliteNAT Subtree also provides the information of mapping relationship between the tunnel MIB and NAT MIB by extending the IPv6 address of B4 to the bind table in NAT MIB.

6.1.3. The dsliteInfo Subtree

The dsliteInfo Subtree provides the statistical information for DSLite.

6.2. The Notification Group

This Group defines some notification objects for DS-Lite MIB.

6.2.1. The dsliteTrap Subtree

The dsliteTrap Subtree provides trap information in DS-Lite instance.

6.3. The Conformance Group

The dsliteConformance Subtree provides conformance information of MIB objects.

7. MIB modules required for IMPORTS

This MIB module IMPORTs objects from [\[RFC4008\]](#), [\[RFC2580\]](#), [\[RFC2578\]](#), [\[RFC2863\]](#), [\[RFC4001\]](#), [\[RFC3411\]](#).

8. Definitions

```
DSLite-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE, transmission,  
    NOTIFICATION-TYPE, Gauge32, TimeTicks,  
    Integer32, Counter64  
    FROM SNMPv2-SMI
```

```
    OBJECT-GROUP, MODULE-COMPLIANCE,  
    NOTIFICATION-GROUP  
    FROM SNMPv2-CONF
```

```
    RowStatus, StorageType, DisplayString  
    FROM SNMPv2-TC
```

```
    ifIndex, InterfaceIndexOrZero  
    FROM IF-MIB
```

```
    IANA tunnelType  
    FROM IANAifType-MIB
```

InetAddress, InetAddressIPv6, InetPortNumber
FROM INET-ADDRESS-MIB

NatAddrMapId, NatBindId
FROM NAT-MIB;

dsliteMIB MODULE-IDENTITY

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DESCRIPTION

"The MIB module is defined for management of object in the
DS-Lite scenario. "

REVISION "201302250000Z"

DESCRIPTION

"Initial version. Published as RFC xxxx."

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

::= { transmission xxx }

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

--Top level components of this MIB module

dsliteMIBObjects OBJECT IDENTIFIER
 ::= { dsliteMIB 1 }

dsliteTunnel OBJECT IDENTIFIER
 ::= { dsliteMIBObjects 1 }

dsliteNAT OBJECT IDENTIFIER
 ::= { dsliteMIBObjects 2 }

dsliteInfo OBJECT IDENTIFIER
 ::= { dsliteMIBObjects 3 }

--Notifications section

dsliteTraps OBJECT IDENTIFIER
 ::= { dsliteMIB 2 }

--Conformance

dsliteConformance OBJECT IDENTIFIER
 ::= { dsliteMIB 3 }

--dsliteTunnel

--dsliteTunnelTable

dsliteTunnelTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DsliteTunnelEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "The (conceptual) table containing information on configured
 tunnels. This table can be used to map CPE address to the
 associated AFTR address. It can also be used for row
 creation."
 ::= { dsliteTunnel 1 }

dsliteTunnelEntry OBJECT-TYPE
 SYNTAX DsliteTunnelEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "Each entry in this table contains the information on a
 particular configured tunnel."
 INDEX { dsliteTunnelStartAddress,


```
        dsliteTunnelEndAddress,
        ifIndex }
 ::= { dsliteTunnelTable 1 }

DsliteTunnelEntry ::=
  SEQUENCE {
    dsliteTunnelStartAddress      InetAddressIPv6,
    dsliteTunnelStartAddPreLen    Integer32,
    dsliteTunnelEndAddress        InetAddressIPv6
  }

dsliteTunnelStartAddress OBJECT-TYPE
  SYNTAX      InetAddressIPv6
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "The address of the start point of the tunnel."
  ::= { dsliteTunnelEntry 1 }

dsliteTunnelStartAddPreLen OBJECT-TYPE
  SYNTAX Integer32 (0..128)
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "IPv6 prefix length of the IP address of the
     start point of the tunnel."
  ::= { dsliteTunnelEntry 2 }

dsliteTunnelEndAddress OBJECT-TYPE
  SYNTAX      InetAddressIPv6
  MAX-ACCESS  read-create
  STATUS      current
  DESCRIPTION
    "The address of the endpoint of the tunnel."
  ::= { dsliteTunnelEntry 3 }

--dsliteNAT
--dsliteNATMapTable(define address pool)
--dsliteNATBindTable(NAPT)

dsliteNATMapTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF DsliteNATMapEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table contains information about address map
```



```
parameters."  
 ::= { dsliteNAT 1 }
```

dsliteNATMapEntry OBJECT-TYPE

```
SYNTAX      DsliteNATMapEntry  
MAX-ACCESS  not-accessible  
STATUS      current  
DESCRIPTION  
    " This entry represents an address map to be used for  
      NAT and contributes to the address mapping tables of  
      AFTR."  
INDEX       { ifIndex,  
              dsliteNATMapIndex }  
 ::= { dsliteNATMapTable 1 }
```

DsliteNATMapEntry ::=

```
SEQUENCE {  
    dsliteNATMapIndex          NatAddrMapId,  
    dsliteNATMapLocalAddrFrom  InetAddress,  
    dsliteNATMapLocalAddrTo    InetAddress,  
    dsliteNATMapLocalPortFrom  InetPortNumber,  
    dsliteNATMapLocalPortTo    InetPortNumber,  
    dsliteNATMapGlobalAddrFrom InetAddress,  
    dsliteNATMapGlobalAddrTo   InetAddress,  
    dsliteNATMapGlobalPortFrom InetPortNumber,  
    dsliteNATMapGlobalPortTo   InetPortNumber,  
    dsliteNATMapAddrUsed       Gauge32  
}
```

dsliteNATMapIndex OBJECT-TYPE

```
SYNTAX      NatAddrMapId  
MAX-ACCESS  not-accessible  
STATUS      current  
DESCRIPTION  
    "Along with ifIndex, this object uniquely  
      identifies an entry in the dsliteNATMapTable.  
      Address map entries are applied in the order  
      specified by dsliteNATMapIndex."  
 ::= { dsliteNATMapEntry 1 }
```

dsliteNATMapLocalAddrFrom OBJECT-TYPE

```
SYNTAX      InetAddress  
MAX-ACCESS  read-create  
STATUS      current  
DESCRIPTION  
    "This object specifies the first IP address of the range  
      of IP addresses mapped by this translation entry."
```


The value of this object must be less than or equal to the value of the dsliteNATMapLocalAddrTo object."

::= { dsliteNATMapEntry 2 }

dsliteNATMapLocalAddrTo OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object specifies the last IP address of the range of IP addresses mapped by this translation entry. If only a single address is being mapped, the value of this object is equal to the value of natAddrMapLocalAddrFrom. The value of this object must be greater than or equal to the value of the natAddrMapLocalAddrFrom object."

::= { dsliteNATMapEntry 3 }

dsliteNATMapLocalPortFrom OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The value of this object must be less than or equal to the value of the dsliteNATMapLocalPortTo object. If the translation specifies a single port, then the value of this object is equal to the value of dsliteNATMapLocalPortTo."

DEFVAL { 0 }

::= { dsliteNATMapEntry 4 }

dsliteNATMapLocalPortTo OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The value of this object must be greater than or equal to the value of the dsliteNATMapLocalPortFrom object. If the translation specifies a single port, then the value of this object is equal to the value of dsliteNATMapLocalPortFrom."

DEFVAL { 0 }

::= { dsliteNATMapEntry 5 }

dsliteNATMapGlobalAddrFrom OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create


```
STATUS      current
DESCRIPTION
    "This object specifies the first IP address of
    the range of IP addresses being mapped to.
    The value of this object must be less than
    or equal to the value of the
    dsliteNATMapGlobalAddrTo object."
 ::= { dsliteNATMapEntry 6 }

dsliteNATMapGlobalAddrTo OBJECT-TYPE
SYNTAX      InetAddress
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This object specifies the last IP address of the range
    of IP addresses being mapped to. If only a single
    address is being mapped to, the value of this object
    is equal to the value of dsliteNATMapGlobalAddrFrom.
    The value of this object must be greater than or equal
    to the value of the dsliteNATMapGlobalAddrFrom object."
 ::= { dsliteNATMapEntry 7 }

dsliteNATMapGlobalPortFrom OBJECT-TYPE
SYNTAX      InetPortNumber
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The value of this object must be less than or equal
    to the value of the dsliteNATMapGlobalPortTo object.
    If the translation specifies a single port, then the
    value of this object is equal to the value
    dsliteNATMapGlobalPortTo."
DEFVAL { 0 }
 ::= { dsliteNATMapEntry 8 }

dsliteNATMapGlobalPortTo OBJECT-TYPE
SYNTAX      InetPortNumber
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The value of this object must be greater than or
    equal to the value of the dsliteNATMapGlobalPortFrom
    object. If the translation specifies a single port,
    then the value of this object is equal to the
    value of dsliteNATMapGlobalPortFrom."
DEFVAL { 0 }
 ::= { dsliteNATMapEntry 9 }
```


dsliteNATMapAddrUsed OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of addresses pertaining to this address map that are currently being used from the NAT pool."

::= { dsliteNATMapEntry 10 }

dsliteNATBindTable OBJECT-TYPE

SYNTAX SEQUENCE OF DsliteNATBindEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains information about currently active NAT binds in AFTR. This table extends the natAddrPortBindTable designed in NAT MIB ([RFC 4008](#)) by IPv6 address of B4."

::= { dsliteNAT 2 }

dsliteNATBindEntry OBJECT-TYPE

SYNTAX DsliteNATBindEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry in this table holds the relationship between tunnel information and nat bind information. These entries are lost upon agent restart."

INDEX { ifIndex,
dsliteNATBindLocalAddr,
dsliteNATBindLocalPort,
dsliteTunnelStartAddress,
dsliteTunnelStartAddPreLen }

::= { dsliteNATBindTable 1 }

DsliteNATBindEntry ::=

SEQUENCE {

dsliteNATBindLocalAddr	InetAddress,
dsliteNATBindLocalPort	InetPortNumber,
dsliteNATBindGlobalAddr	InetAddress,
dsliteNATBindGlobalPort	InetPortNumber,
dsliteNATBindId	NatBindId,
dsliteNATBindMapIndex	NatAddrMapId,
dsliteNATBindSessions	Gauge32,
dsliteNATBindMaxIdleTime	TimeTicks,
dsliteNATBindCurrentIdleTime	TimeTicks,
dsliteNATBindInTranslates	Counter64,


```
    dsliteNATBindOutTranslates      Counter64
}
```

dsliteNATBindLocalAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object represents the private IP address of host."

::= { dsliteNATBindEntry 1 }

dsliteNATBindLocalPort OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"For a protocol value TCP or UDP, this object represents the private-realm specific port number. On the other hand, for ICMP a bind is created only for query/response type ICMP messages such as ICMP echo, Timestamp, and Information request messages, and this object represents the private-realm specific identifier in the ICMP message, as defined in [RFC 792](#) for ICMPv4."

::= { dsliteNATBindEntry 2 }

dsliteNATBindGlobalAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object represents the public-realm IP address of host."

::= { dsliteNATBindEntry 3 }

dsliteNATBindGlobalPort OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For a protocol value TCP or UDP, this object represents the public-realm specific port number. On the other hand, for ICMP a bind is created only for query/response type ICMP messages such as ICMP echo, Timestamp, and Information request messages, and this object represents the public-realm specific identifier in the ICMP message, as defined in [RFC 792](#) for ICMPv4."

::= { dsliteNATBindEntry 4 }

dsliteNATBindId OBJECT-TYPE

SYNTAX NatBindId

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object represents a bind id that is dynamically assigned to each bind by AFTR. Each bind is represented by a unique bind id across the dsliteNATBindTable."

::= { dsliteNATBindEntry 5 }

dsliteNATBindMapIndex OBJECT-TYPE

SYNTAX NatAddrMapId

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is a pointer to the dsliteNATMapTable entry used in creating this BIND."

::= { dsliteNATBindEntry 6 }

dsliteNATBindSessions OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

" This object represents the number of sessions currently using this BIND."

::= { dsliteNATBindEntry 7 }

dsliteNATBindMaxIdleTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the maximum time for which this bind can be idle without any sessions attached to it."

::= { dsliteNATBindEntry 8 }

dsliteNATBindCurrentIdleTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"At any given instance, this object indicates the time that this bind has been idle without any sessions


```
        attached to it."
 ::= { dsliteNATBindEntry 9 }

dsliteNATBindInTranslates OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of inbound packets that were
         translated as per this bind entry."
 ::= { dsliteNATBindEntry 10 }

dsliteNATBindOutTranslates OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of outbound packets that were
         translated as per this bind entry."
 ::= { dsliteNATBindEntry 11 }

--dsliteInfo

dsliteSessionLimitTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsliteSessionLimitEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The (conceptual) table containing information about session
         limit. It can also be used for row creation."
 ::= { dsliteInfo 1 }

dsliteSessionLimitEntry OBJECT-TYPE
    SYNTAX      DsliteSessionLimitEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry in this table contains the information to be
         used for configuring session limits for DS-lite."
    INDEX      { dsliteSessionLimitInstanceName,
                 dsliteSessionLimitType }
 ::= { dsliteSessionLimitTable 1 }

DsliteSessionLimitEntry ::=
    SEQUENCE {
        dsliteSessionLimitInstanceName      DisplayString,
        dsliteSessionLimitType              INTEGER,
```



```
    dsliteSessionLimitNumber          Integer32
}

dsliteSessionLimitInstanceName OBJECT-TYPE
    SYNTAX      DisplayString (SIZE (1..31))
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        " This object represents the instance name
          that is limited."
    ::= { dsliteSessionLimitEntry 1 }

dsliteSessionLimitType OBJECT-TYPE
    SYNTAX      INTEGER
    {
        tcp(0),
        udp(1),
        icmp(2),
        total(3)
    }
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object represents the session limit type:
          tcp or udp or totally."
    ::= { dsliteSessionLimitEntry 2 }

dsliteSessionLimitNumber OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS   read-create
    STATUS      current
    DESCRIPTION
        " This table represents the limit number of the session."
    ::= { dsliteSessionLimitEntry 3 }

dslitePortLimitTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DslitePortLimitEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table is used to configure port limits for a
          DS-Lite instance."
    ::= { dsliteInfo 2 }

dslitePortLimitEntry OBJECT-TYPE
    SYNTAX      DslitePortLimitEntry
    MAX-ACCESS   not-accessible
```



```
STATUS current
DESCRIPTION
    "Each entry in this table contains the information to be
    used for configuring port limits for DS-lite."
    INDEX { dslitePortLimitInstanceName,
            dslitePortLimitType }
    ::= { dslitePortLimitTable 1 }

DslitePortLimitEntry ::=
    SEQUENCE {
        dslitePortLimitInstanceName      DisplayString,
        dslitePortLimitType               INTEGER,
        dslitePortLimitNumber             Integer32
    }

dslitePortLimitInstanceName OBJECT-TYPE
    SYNTAX DisplayString (SIZE (1..31))
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        " This object represents the instance name
        that is limited."
    ::= { dslitePortLimitEntry 1 }

dslitePortLimitType OBJECT-TYPE
    SYNTAX  INTEGER
    {
        tcp(0),
        udp(1),
        icmp(2),
        total(3)
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "This object represents the port limit
        type: tcp or udp or totally."
    ::= { dslitePortLimitEntry 2 }

dslitePortLimitNumber OBJECT-TYPE
    SYNTAX Integer32 (1..300000)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "This object represents the limit number of the
        port usage."
    ::= { dslitePortLimitEntry 3 }
```


dsliteAFTRAlarmScalar OBJECT IDENTIFIER ::= { dsliteInfo 3 }

dsliteAFTRAlarmB4Addr OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object indicate the IP address of
B4 that send alarm "

::= { dsliteAFTRAlarmScalar 1 }

dsliteAFTRAlarmProtocolType OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object indicate the procotol type of alarm,
0:tcp,1:udp,2:icmp,3:total "

::= { dsliteAFTRAlarmScalar 2 }

dsliteAFTRAlarmMapAddrName OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object indicate the name of dsliteNATMapAddrName "

::= { dsliteAFTRAlarmScalar 3 }

dsliteAFTRAlarmSpecificIP OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

" This object indicate the IP address whose port usage
reach threshold "

::= { dsliteAFTRAlarmScalar 4 }

dsliteAFTRAlarmConnectNumber OBJECT-TYPE

SYNTAX Integer32 (60..90)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

" This object indicate the threshold of DS-Lite
connections alarm."

::= { dsliteAFTRAlarmScalar 5 }


```
dsliteStatisticTable OBJECT-TYPE
    SYNTAX SEQUENCE OF DsliteStatisticEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table provides statistical information
        of DS-Lite."
    ::= { dsliteInfo 4 }
```

```
dsliteStatisticEntry OBJECT-TYPE
    SYNTAX DsliteStatisticEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table provides statistical information
        of DS-Lite."
    INDEX { dsliteStatisticInstanceName }
    ::= { dsliteStatisticTable 1 }
```

```
DsliteStatisticEntry ::=
    SEQUENCE {
        dsliteStatisticInstanceName      DisplayString,
        dsliteStatisticDiscard           Counter64,
        dsliteStatisticReceived          Counter64,
        dsliteStatisticTransmitted       Counter64,
        dsliteStatisticIpv4Session       Counter64,
        dsliteStatisticIpv6Session       Counter64
    }
```

```
dsliteStatisticInstanceName OBJECT-TYPE
    SYNTAX DisplayString (SIZE (1..31))
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        " This object indicate the instance name
        that is limited."
    ::= { dsliteStatisticEntry 1 }
```

```
dsliteStatisticDiscard OBJECT-TYPE
    SYNTAX Counter64
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        " This object indicate the count number of
        the discarded packet."
    ::= { dsliteStatisticEntry 2 }
```


dsliteStatisticReceived OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicate the count number of
received packet count."

::= { dsliteStatisticEntry 3 }

dsliteStatisticTransmitted OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicate the count number of
transmitted packet count."

::= { dsliteStatisticEntry 4 }

dsliteStatisticIpv4Session OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-create

STATUS current

DESCRIPTION

" This object indicate the number of the
current IPv4 Session."

::= { dsliteStatisticEntry 5 }

dsliteStatisticIpv6Session OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-create

STATUS current

DESCRIPTION

" This object indicate the number of the
current IPv6 Session."

::= { dsliteStatisticEntry 6 }

---dslite trap

dsliteTunnelNumAlarm NOTIFICATION-TYPE

STATUS current

DESCRIPTION

"This trap is triggered when dslite tunnel
reach the threshold."

::= { dsliteTraps 1 }

dsliteAFTRUserSessionNumAlarm NOTIFICATION-TYPE

OBJECTS { dsliteAFTRAlarmProtocolType,


```
        dsliteAFTRAlarmB4Addr }
STATUS current
DESCRIPTION
" This trap is triggered when sessions of
  user reach the threshold."
::= { dsliteTraps 2 }

dsliteAFTRPortUsageOfSpecificIpAlarm NOTIFICATION-TYPE
OBJECTS { dsliteAFTRAlarmMapAddrName,
          dsliteAFTRAlarmSpecificIP }
STATUS current
DESCRIPTION
  "This trap is triggered when used NAT
    ports of map address reach the threshold."
::= { dsliteTraps 3 }

--Module Conformance statement

dsliteCompliances OBJECT IDENTIFIER ::= { dsliteConformance 1 }

dsliteCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
  "Description."
MODULE -- this module
  MANDATORY-GROUPS { dsliteNATMapGroup, dsliteNATBindGroup,
                     dsliteTunnelGroup }
::= { dsliteCompliances 1 }

dsliteGroups OBJECT IDENTIFIER ::= { dsliteConformance 2 }

dsliteAFTRAlarmScalarGroup OBJECT-GROUP
OBJECTS { dsliteAFTRAlarmB4Addr, dsliteAFTRAlarmProtocolType,
          dsliteAFTRAlarmMapAddrName, dsliteAFTRAlarmSpecificIP,
          dsliteAFTRAlarmConnectNumber }
STATUS current
DESCRIPTION
  " The collection of this objects are used to give the
    information about AFTR alarming Scalar."
::= { dsliteGroups 1 }

dsliteNATMapGroup OBJECT-GROUP
OBJECTS {
  dsliteNATMapLocalAddrFrom,
  dsliteNATMapLocalAddrTo, dsliteNATMapLocalPortFrom,
  dsliteNATMapLocalPortTo, dsliteNATMapGlobalAddrFrom,
  dsliteNATMapGlobalAddrTo, dsliteNATMapGlobalPortFrom,
```



```
        dsliteNATMapGlobalPortTo, dsliteNATMapAddrUsed }
STATUS current
DESCRIPTION
    " The collection of this objects are used to give the
        information about NAT address mapping."
::= { dsliteGroups 2 }

dsliteTunnelGroup OBJECT-GROUP
OBJECTS { dsliteTunnelStartAddress, dsliteTunnelStartAddPreLen,
          dsliteTunnelEndAddress }
STATUS current
DESCRIPTION
    " The collection of this objects are used to give the
        information of tunnel in ds-lite."
::= { dsliteGroups 3 }

dsliteNATBindGroup OBJECT-GROUP
OBJECTS {
    dsliteNATBindGlobalAddr, dsliteNATBindGlobalPort,
    dsliteNATBindId, dsliteNATBindMapIndex,
    dsliteNATBindSessions, dsliteNATBindMaxIdleTime,
    dsliteNATBindCurrentIdleTime,
    dsliteNATBindInTranslates,
    dsliteNATBindOutTranslates }
STATUS current
DESCRIPTION
    " The collection of this objects are used to give the
        information about NAT Bind."
::= { dsliteGroups 4 }

dsliteSessionLimitGroup OBJECT-GROUP
OBJECTS { dsliteSessionLimitInstanceName,
          dsliteSessionLimitType, dsliteSessionLimitNumber }
STATUS current
DESCRIPTION
    " The collection of this objects are used to give the
        information about port limit."
::= { dsliteGroups 5 }

dslitePortLimitGroup OBJECT-GROUP
OBJECTS { dslitePortLimitInstanceName,
          dslitePortLimitType, dslitePortLimitNumber }
STATUS current
DESCRIPTION
    " The collection of this objects are used to give the
        information about port limit."
::= { dsliteGroups 6 }
```



```
dsliteStatisticGroup OBJECT-GROUP
    OBJECTS { dsliteStatisticInstanceName,
              dsliteStatisticDiscard,
              dsliteStatisticReceived,
              dsliteStatisticTransmitted,
              dsliteStatisticIpv4Session,
              dsliteStatisticIpv6Session }
    STATUS current
    DESCRIPTION
        " The collection of this objects are used to give the
          statistical information of ds-lite."
        ::= { dsliteGroups 7 }

dsliteTrapsGroup NOTIFICATION-GROUP
    NOTIFICATIONS { dsliteTunnelNumAlarm,
                   dsliteAFTRUserSessionNumAlarm,
                   dsliteAFTRPortUsageOfSpecificIpAlarm }
    STATUS current
    DESCRIPTION
        "The collection of this objects are used to give the
          trap information of ds-lite."
        ::= { dsliteGroups 8 }

    END
```

9. Extending this MIB for Gateway Initiated Dual-Stack Lite

Similar to DS-lite, GI-DS-lite enables the service provider to share public IPv4 addresses among different customers by combining tunneling and NAT. GI-DS-lite extends existing access tunnels beyond the access gateway to an IPv4-IPv4 NAT using softwires with an embedded context identifier that uniquely identifies the end host the tunneled packets belong to. The MIB defined in this document can easily be extended to use for GI-DS-Lite scenario. New object as CID SHOULD be extended to the dsliteTunnelTable. And a new object as dsliteTunnelID can be defined in DS-Lite MIB as SWID in GI-DS-Lite. Both CID and SWID SHOULD be extended to the dsliteNATBindTable. The combination of CID and SWID will be used as the unique identifier for the end host and store it in the NAT binding entry.

10. IANA Considerations

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

Descriptor	OBJECT IDENTIFIER value
-----	-----
DSLite-MIB	{ transmission XXX }

IANA tunnelType ::= TEXTUAL-CONVENTION

```
SYNTAX      INTEGER {  
  
              dslite ("XX")          -- dslite tunnel  
  
            }
```

Notes: As the [Appendix A](#) of the IP Tunnel MIB[RFC4087] described that it has already assigned the value direct(2) to indicate the tunnel type is IP in ip tunnel, but it is still difficult to distinguish the DS-Lite tunnel packets and the normal IP in IP tunnel packets in the scenario of the AFTR connecting to both the DS-lite tunnel and IP in IP tunnel.

11. Security Considerations

The DS-Lite MIB module can be used for configuration of certain objects, and anything that can be incorrectly configured, with potentially disastrous results. Because this MIB module reuses the IP tunnel MIB and nat MIB, the security considerations for these MIBs are also applicable to the DS-Lite MIB.

Unauthorized read access to dsliteTunnelEndAddress, or any object in the dsliteBindRelationTable or dslitePortBindRelationTable would reveal information about the mapping information.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, 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 this MIB module 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.

12. References

12.1. Normative References

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12.2. Informative References

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