

**The Definitions of Managed Objects for
Mobile IP UDP Tunneling
draft-ietf-mip4-udptunnel-mib-02**

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Abstract

This memo defines the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. In particular, it describes managed objects used for managing the Mobile Node, Foreign Agent and Home Agent when Mobile IP Traversal of Network Address Translation (NAT) Devices are used.

Table of Contents

1.	Introduction.....	3
2.	The Internet-Standard Management Framework.....	3
3.	Conventions.....	3
4.	Structure of the MIB.....	3
4.1.	Structure of the Mobile IP UDP Tunneling.....	3
4.2.	MIB Groups.....	4
5.	Mobile IP UDP Tunnel MIB Definitions.....	5
6.	Security Considerations.....	11
7.	IANA Considerations.....	11
8.	References.....	12
8.1.	Normative References.....	12
8.2.	Informative References.....	12
	APPENDIX A: Changes in draft versions.....	13
A.1.	Changes in draft-ietf-mip4-udptunnel-mib-00.....	13
A.2.	Changes in draft-ietf-mip4-udptunnel-mib-02.....	13
	Author's Address.....	14

1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects used for managing the Mobile Node, Foreign Agent and Home Agent when Mobile IP Traversal of Network Address Translation (NAT) Devices are used.

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 RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

3. Conventions

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](#) [[RFC2119](#)].

4. Structure of the MIB

This memo defines a portion of the Management Information Base (MIB) for the use with network management protocols in the Internet community. In particular, it describes managed objects for the Mobile IP Traversal of Network Address Translation (NAT) Devices as defined in [[RFC3519](#)].

4.1. Structure of the Mobile IP UDP Tunneling

The Mobile IP Traversal of Network Address Translation (NAT) Devices specification [[RFC3519](#)] specifies a few managed entities. These are the behavior to force and accept udp tunneling, and the configuration of the keepalive timers.

The Mobile IP Traversal of Network Address Translation (NAT) Devices specification [[RFC3519](#)] also specifies a new error code for

"Requested UDP tunnel encapsulation unavailable". Therefore a counter object for this error code is also included in this mib module.

Further, it's good practice to include object to enable and disable the MIP UDP tuning completely.

Configuration of MIP UDP tunneling has been deployed in various vendor implementations for years. Field experience have shown that it's indeed a good idea to always use UDP tunneling instead if the original Mobile IP tunneling methods. Therefore, an object is added in the HA to always force the use of UDP tunneling to all UDP tunneling capable nodes, regardless of F-flag or outcome of NAT test.

4.2. MIB Groups

Objects in this MIB are arranged into groups. Each group is related to the Mobile IP entities Mobile Node, Foreign Agent and Home Agent. The Mobile IP entities Mobile Node, Foreign Agent and Home Agent are described in [[RFC3344](#)].

The managed objects in this document extend the management of the Mobile IP entities Mobile Node, Foreign Agent and Home Agent as described in [[I-D.ietf-mip4-rfc2006bis](#)].

5. Mobile IP UDP Tunnel MIB Definitions

MIP-UDPTUNNEL-MIB DEFINITIONS ::= BEGIN

IMPORTS

```
Counter32, Unsigned32, MODULE-IDENTITY,
OBJECT-TYPE, mib-2
    FROM SNMPv2-SMI                    -- [RFC2578]
TruthValue
    FROM SNMPv2-TC                    -- [RFC2579]
MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF;                -- [RFC2580]
```

```
mipUdpTunnelMIB      MODULE-IDENTITY
    LAST-UPDATED      "200902230000Z"
    ORGANIZATION      "IETF Mobility for IPv4 Group"
    CONTACT-INFO
        "Hans Sjostrand
        Transmode
        hans.sjostrand@transmode.com
```

Comments about this document should be emailed
directly to the Mip4 working group mailing list at
mip4@ietf.org"

DESCRIPTION

"The MIB module for configuring and displaying Mobile
IP Traversal of Network Address Translation (NAT)
Devices information.

Copyright (C) IETF Trust (2009). This version
of this MIB module is part of RFC yyyy; see the RFC
itself for full legal notices."

```
REVISION      "200902230000Z"
```

DESCRIPTION

"Initial version issued as part of RFC yyyy."

-- RFC Ed.: replace yyyy with actual RFC number & remove this note

```
::= { mib-2 XXX }
```

-- RFC Ed.: replace XXX with IANA-assigned number & remove this note

```
mipUdpTunnelMIBObjects  OBJECT IDENTIFIER ::= { mipUdpTunnelMIB 1 }
```

```
mnUdpTunnel             OBJECT IDENTIFIER ::= { mipUdpTunnelMIBObjects 1 }
```

```
haUdpTunnel             OBJECT IDENTIFIER ::= { mipUdpTunnelMIBObjects 2 }
```

```
faUdpTunnel             OBJECT IDENTIFIER ::= { mipUdpTunnelMIBObjects 3 }
```



```
-- =====
-- mnUdpTunnel Group

mnUdpTunnelEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "This parameter enables and disables the RFC 3519 UDP
        tunneling function in the MN completely."
    DEFVAL       { true }
    ::= { mnUdpTunnel 1 }

mnUdpTunnelForce OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "This parameter enables (or disables) the MN to set
        the F (force) flag. It indicates that the mobile
        node wants to use traversal regardless of the
        outcome of NAT detection performed by the home agent."
    REFERENCE
        "RFC3519, MIP Traversal of NAT Devices, Section 3.1.1"
    DEFVAL       { false }
    ::= { mnUdpTunnel 2 }

mnUdpTunnelKeepaliveInterval OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS        "seconds"
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "Defines the default NAT keepalive interval that the
        mobile node will use in the case that the HA does
        not impose another value by setting the Keepalive
        Interval in the UDP Tunnel Reply Extension."
    REFERENCE
        "RFC3519, MIP Traversal of NAT Devices, Section 4.9"
    DEFVAL       { 110 }
    ::= { mnUdpTunnel 3 }

-- =====
-- haUdpTunnel Group
```


haUdpTunnelEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This parameter enables and disables the [RFC 3519](#) UDP tunneling function in the HA completely."

DEFVAL { true }

::= { haUdpTunnel 1 }

haUdpTunnelKeepaliveInterval OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This parameter sets the keepalive interval override. Normally, the MN uses the keepalive time that was configured using UDP tunneling and sending keepalive messages. The HA can override this configured keepalive time by setting a new interval value for this parameter to a value other than zero."

REFERENCE

"[RFC3519](#), MIP Traversal of NAT Devices, [Section 3.2](#)"

DEFVAL { 0 }

::= { haUdpTunnel 2 }

haUdpTunnelForce OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This parameter enables and disables the HA forcing all connections from MNs which support [RFC 3519](#) UDP tunneling to use tunneling whether or not the presence of a NAT is detected."

REFERENCE

"[RFC3519](#), MIP Traversal of NAT Devices, [Section 6.3](#)"

DEFVAL { false }

::= { haUdpTunnel 3 }

haUdpTunnelEncapUnavail OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION
"Total number of Registration Requests denied by the
home agent -- Requested UDP tunnel encapsulation
unavailable (code 142)."

REFERENCE
"[RFC3519](#), MIP Traversal of NAT Devices, [Section 3.5](#)"
 ::= { haUdpTunnel 4 }

-- =====
-- faUdpTunnel Group

faUdpTunnelEnable OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This parameter enables and disables the [RFC 3519](#) UDP
tunneling function in the FA completely."
DEFVAL { true }
 ::= { faUdpTunnel 1 }

faUdpTunnelForce OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This parameter enables (or disables) the FA to set
the F (force) flag. It indicates that the foreign
agent wants to use traversal regardless of the
outcome of NAT detection performed by the home agent."
REFERENCE
"[RFC3519](#), MIP Traversal of NAT Devices, [Section 3.1.1](#)"
DEFVAL { false }
 ::= { faUdpTunnel 2 }

faUdpTunnelKeepaliveInterval OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"Defines the default NAT keepalive interval that the
foreign agent will use in the case that the HA does
not impose another value by setting the Keepalive
Interval in the UDP Tunnel Reply Extension."
REFERENCE
"[RFC3519](#), MIP Traversal of NAT Devices, [Section 4.9](#)"


```
DEFVAL      { 110 }
 ::= { faUdpTunnel 3 }

-- =====
-- MIP Conformance Statements

mipUdpTunnelConformance
  OBJECT IDENTIFIER ::= { mipUdpTunnelMIB 2 }

mipUdpTunnelGroups
  OBJECT IDENTIFIER ::= { mipUdpTunnelConformance 1 }
mipUdpTunnelCompliances
  OBJECT IDENTIFIER ::= { mipUdpTunnelConformance 2 }

--
-- compliance statements
--

mipUdpTunnelCompliance      MODULE-COMPLIANCE
  STATUS      current
  DESCRIPTION
    "The compliance statement for SNMPv2 entities which
    implement the Mobile IP UDP Tunnel MIB."
  MODULE

    GROUP      mnUdpTunnelGroup
    DESCRIPTION
      "This group is mandatory for a mobile node."

    GROUP      haUdpTunnelGroup
    DESCRIPTION
      "This group is mandatory for a home agent."

    GROUP      faUdpTunnelGroup
    DESCRIPTION
      "This group is mandatory for a foreign agent."

  ::= { mipUdpTunnelCompliances 1 }

--
-- Units of conformance
--

mnUdpTunnelGroup  OBJECT-GROUP
  OBJECTS      { mnUdpTunnelEnable, mnUdpTunnelForce,
```



```
mnUdpTunnelKeepaliveInterval }
STATUS      current
DESCRIPTION
    "A collection of objects providing management
    information for the use of UDP tunneling according to
    RFC3519 within a mobile node."
 ::= { mipUdpTunnelGroups 1 }
```

```
haUdpTunnelGroup OBJECT-GROUP
OBJECTS { haUdpTunnelEnable, haUdpTunnelForce,
          haUdpTunnelKeepaliveInterval,
          haUdpTunnelEncapUnavail }
STATUS      current
DESCRIPTION
    "A collection of objects providing management
    information for the use of UDP tunneling according to
    RFC3519 within a home agent."
 ::= { mipUdpTunnelGroups 2 }
```

```
faUdpTunnelGroup OBJECT-GROUP
OBJECTS { faUdpTunnelEnable, faUdpTunnelForce,
          faUdpTunnelKeepaliveInterval }
STATUS      current
DESCRIPTION
    "A collection of objects providing management
    information for the use of UDP tunneling according to
    RFC3519 within a foreign agent."
 ::= { mipUdpTunnelGroups 3 }
```

END

6. Security Considerations

Assuming that secure network management (such as SNMP v3) is implemented, the objects represented in this MIB do not pose a threat to the security of the network.

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

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.

7. IANA Considerations

The IANA is requested to assign a value for "XXX" under the 'mib-2' subtree and to record the assignment in the SMI Numbers registry.

Note to RFC Editor. When the assignment has been made, the RFC Editor is asked to replace "XXX" in this document with the assigned value (here and in the MIB module) and to remove this note.

8. References

8.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.
- [RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, [RFC 2580](#), April 1999.
- [RFC3344] Perkins, C., "IP Mobility Support for IPv4", [RFC 3344](#), August 2002.
- [RFC3519] H. Levkowetz and S. Vaarala, "Mobile IP Traversal of Network Address Translation (NAT) Devices", [RFC 3519](#), April 2003
- [I-D.ietf-mip4-rfc2006bis] K. Leung, R. Rathi and H. Sjostrand, "The Definitions of Managed Objects for IP Mobility Support using SMIv2, revised", Work in progress

8.2. Informative References

- [RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.

APPENDIX A: Changes in draft versions

Note to RFC Editor. At time of publication, this appendix should be removed.

A.1. Changes in [draft-ietf-mip4-udptunnel-mib-00](#)

Changes compared with [draft-sjostrand-mip4-udptunnel-mib-01](#) which was accepted as WG doc in Prague March 21, 2007.

- Minor boilerplate updates, date changes, version numbers, spelling errors etc.
- Added reference clauses to [RFC3519](#) where applicable
- Removed "haUdpTunnelPermitMnForce". It was meant to provide configuration to an ambiguous SHOULD in [RFC3519, section 3.1.1](#) but I think it created more ambiguity than it clarified.
- Clarified that IANA shall handle mipMIB OID, in <http://www.iana.org/assignments/smi-numbers>. IANA considerations chapter written and open issue about OID placement removed.

A.2. Changes in [draft-ietf-mip4-udptunnel-mib-02](#)

Changes compared with [draft-ietf-mip4-udptunnel-mib-01](#) (which just had editorial updates compared with the 00-version).

- Changed OID root from {mipMIB X} to {mib-2 XXX} according to [RFC4181](#) recommendations. And updated IANA considerations accordingly.
- Updated boilerplate according to "Legal Provisions Relating to IETF Documents" from IETF Trust
- Removed open issue about default values, the values has been like this now for 2 years and no other suggestions have been made.
- Updated contact data.

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