Definitions of Managed Objects for MAP-E

draft-fu-softwire-map-mib-05

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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 MAP encapsulation mode.

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1. Introduction

MAP [I-D. draft-ietf-softwire-map] is a stateless mechanism for running IPv4 over IPv6-only infrastructure. In particular, it includes two mode, translation mode or encapsulation mode. For the encapsulation mode, it provides an automatic tunnelling mechanism for providing IPv4 connectivity service to end users over a service provider’s IPv6 network.

This document defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. This MIB module may be used for monitoring the devices in the MAP scenario, especially, for the encapsulation mode.

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. Structure of the MIB Module

The MAP-E MIB provides a way to configure and manage the devices in MAP encapsulation mode through SNMP.

MAP-E MIB is configurable on a per-interface basis. It depends on several parts of the IF-MIB [RFC2863].
4.1. The mapMIBObjects

4.1.1. The mapRule Subtree

The mapRule subtree describes managed objects used for managing the multiple mapping rules in the MAP encapsulation mode.

According to the MAP specification, the mapping rules are divided into two categories, which are BMR (Basic Mapping Rule), and FMR (Forwarding Mapping Rule).

4.1.2. The mapSecurityCheck Subtree

The mapSecurityCheck subtree is to statistic the number of invalid packets that been identified. There are two kind of invalid packets which are defined in the MAP specification as the following.

- The BR MUST perform a validation of the consistency of the source IPv6 address and source port number for the packet using BMR.
- The CE SHOULD check that MAP received packets’ transport-layer destination port number is in the range configured by MAP for the CE.

4.2. The mapMIBConformance Subtree

The mapMIBConformance subtree provides conformance information of MIB objects.

5. Definitions

MAP-E-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY, OBJECT-TYPE, mib-2, transmission,
  Gauge32, Integer32, Counter64
  FROM SNMPv2-SMI  --[RFC2578]

  RowStatus, StorageType, DisplayString
  FROM SNMPv2-TC  --[RFC2579]

  ifIndex, InterfaceIndexOrZero
  FROM IF-MIB  --[RFC2863]

  InetAddressType, InetAddress,
  InetPortNumber, InetAddressPrefixLength
  FROM INET-ADDRESS-MIB  --[RFC4001]
mapMIB MODULE-IDENTITY
LAST-UPDATED "201302070000Z" -- February 6, 2013
ORGANIZATION "IETF Softwire Working Group"
CONTACT-INFO
"Yu Fu
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd., Hai-Dian District
Beijing, P.R. China 100095
EMail: eleven.fuyu@huawei.com

Sheng Jiang
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd., Hai-Dian District
Beijing, P.R. China 100095
EMail: jiangsheng@huawei.com

Bing Liu
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd., Hai-Dian District
Beijing, P.R. China 100095
EMail: leo.liubing@huawei.com

Jiang Dong
Tsinghua University
Department of Computer Science, Tsinghua University
Beijing 100084
P.R. China
Email: dongjiang@csnet1.cs.tsinghua.edu.cn

Peng Wu
Tsinghua University
Department of Computer Science, Tsinghua University
Beijing 100084
P.R. China
Email: weapon@csnet1.cs.tsinghua.edu.cn"

DESCRIPTION
"The MIB module is defined for management of objects in the
MAP-E BRs or CEs."

REVISION "201305140000Z"
mapMIBObjects OBJECT IDENTIFIER ::= {mapMIB 1}

mapRule OBJECT IDENTIFIER ::= {mapMIBObjects 1}

mapSecurityCheck OBJECT IDENTIFIER ::= {mapMIBObjects 2}

mapRuleTable OBJECT-TYPE
SYNTAX      SEQUENCE OF mapRuleEntry
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
   "The (conceptual) table containing rule Information of specific mapping rule. It can also be used for row creation."
 ::= { mapRule 1 }

mapRuleEntry OBJECT-TYPE
SYNTAX      MapRuleEntry
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
   "Each entry in this table contains the information on a particular mapping rule."
INDEX      { mapRuleID }
 ::= { mapRuleTable 1 }

mapRuleEntry ::= SEQUENCE {
   mapRuleID                  Integer32,
   mapRuleIPv6PrefixType      InetAddressType,
   mapRuleIPv6Prefix          InetAddress,
   mapRuleIPv6PrefixLen       InetAddressPrefixLength,
   mapRuleIPv4PrefixType      InetAddressType,
   mapRuleIPv4Prefix          InetAddress,
   mapRuleIPv4PrefixLen       InetAddressPrefixLength,
   mapRuleStartPort          InetPortNumber,
   mapRuleEndPort            InetPortNumber,
   mapRuleEALEN              Integer32,
   mapRuleStatus             RowStatus,
   mapRuleStorageType        StorageType,
mapRuleType                 Integer32

mapRuleID OBJECT-TYPE
SYNTAX Integer32 (1..2147483647)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
   "An identifier used to distinguish the multiple mapping rule which is unique with each CE in the same BR."
 ::= { mapRuleEntry 1 }

mapRuleIPv6PrefixType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
   "In this object, it MUST be set to the value of 2 to present IPv6 type. It complies the textule convention of IPv6 address defined in [RFC4001]."
 ::= { mapRuleEntry 2 }

mapRuleIPv6Prefix OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-create
STATUS current
DESCRIPTION
   "The IPv6 prefix defined in mapping rule which will be assigned to CE ."
 ::= { mapRuleEntry 3 }

mapRuleIPv6PrefixLen OBJECT-TYPE
SYNTAX InetAddressPrefixLength
MAX-ACCESS read-create
STATUS current
DESCRIPTION
   "The length of the IPv6 prefix defined in the mapping rule. As a parameter for mapping rule, it will be also assigned to CE."
 ::= { mapRuleEntry 4 }

mapRuleIPv4PrefixType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
   "In this object, it MUST be set to the value of 1 to
present IPv4 type. It complies the textual convention of IPv6 address defined in [RFC4001]."
::= { mapRuleEntry 5 }

mapRuleIPv4Prefix OBJECT-TYPE
SYNTAX     InetAddress
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
  " The IPv4 prefix defined in mapping rule which will be assigned to CE."
::= { mapRuleEntry 6 }

mapRuleIPv4PrefixLen OBJECT-TYPE
SYNTAX     InetAddressPrefixLength
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
  "The length of the IPv4 prefix defined in the mapping rule. As a parameter for mapping rule, it will be also assigned to CE."
::= { mapRuleEntry 7 }

mapRuleStartPort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
  "The start port number of the port range derived from the mapping rule which will be assigned to CE."
::= { mapRuleEntry 8 }

mapRuleEndPort OBJECT-TYPE
SYNTAX     InetPortNumber
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
  " The end port number of the port range derived from the mapping rule which will be assigned to CE."
::= { mapRuleEntry 9 }

mapRuleEALen OBJECT-TYPE
SYNTAX     Integer32
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
  "The length of the Embedded-Address (EA) defined in Fu, et al. Expires November 15, 2013 [Page 8]
mapping rule which will be assigned to CE."
 ::= { mapRuleEntry 10 }

mapRuleStatus OBJECT-TYPE
 SYNTAX     RowStatus
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "The status of this row, by which new entries may be
 created, or old entries deleted from this table.
 ::= { mapRuleEntry 11 }

mapRuleStorageType OBJECT-TYPE
 SYNTAX     StorageType
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "The storage type of this row. If the row is
 permanent(4), no objects in the row need be
 writable."
 ::= { mapRuleEntry 12 }

mapRuleType OBJECT-TYPE
 SYNTAX     Integer32
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "The type of the mapping rule. A value of 0 means it
 is a BMR; a non-zero value means it is a FMR."
 ::= { mapRuleEntry 12 }

mapSecurityCheckTable OBJECT-TYPE
 SYNTAX     SEQUENCE OF MapSecurityCheckEntry
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "The (conceptual) table containing information on
 MAP security checks. This table can be used to statistic
 the number of invalid packets that been identified"
 ::= { mapSecurityCheck 1 }

mapSecurityCheckEntry OBJECT-TYPE
 SYNTAX     mapSecurityCheckEntry
 MAX-ACCESS read-create
 STATUS     current
 DESCRIPTION
 "Each entry in this table contains the information on a
particular MAP SecurityCheck."
INDEX { mapSecurityCheckInvalidv4,
mapSecurityCheckInvalidv6}
::= { mapSecurityCheckTable 1 }

mapSecurityCheckEntry ::= SEQUENCE {
  mapSecurityCheckInvalidv4       Counter64,
  mapSecurityCheckInvalidv6       Counter64,
  mapSecurityCheckStatus          RowStatus,
  mapSecurityCheckStorageType     StorageType
}

mapSecurityCheckInvalidv4 OBJECT-TYPE
SYNTAX     Counter64
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The CE SHOULD check that MAP received packets’
transport-layer destination port number is in the range
configured by MAP for the CE"
::= { mapSecurityCheckEntry 1 }

mapSecurityCheckInvalidv6 OBJECT-TYPE
SYNTAX     Counter64
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The BR MUST perform a validation of the consistency of
the source IPv6 address and source port number for the
packet using BMR."
::= { mapSecurityCheckEntry 2 }

mapSecurityCheckStatus OBJECT-TYPE
SYNTAX     RowStatus
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The status of this row, by which new entries may be
created, or old entries deleted from this table.
::= { mapSecurityCheckEntry 3 }

mapSecurityCheckStorageType OBJECT-TYPE
SYNTAX     StorageType
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
"The storage type of this row. If the row is permanent(4), no objects in the row need be writable."
::= { mapSecurityCheckEntry 4 }

-- Conformance Information

mapMIBConformance OBJECT IDENTIFIER ::= {mapMIB 2}
mapMIBCompliances OBJECT IDENTIFIER ::= { mapMIBConformance 1 }
mapMIBGroups OBJECT IDENTIFIER ::= { mapMIBConformance 2 }

-- compliance statements

mapMIBCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
    " Describes the minimal requirements for conformance to the MAP-E MIB."
  MODULE -- this module
    MANDATORY-GROUPS { mapMIBRuleGroup }
  ::= { mapMIBCompliances 1 }

-- Units of Conformance

mapMIBRuleGroup OBJECT-GROUP
  OBJECTS { mapRuleBRAddress, mapMapRuleID, mapRuleIPv6Prefix, mapRuleIPv6PrefixLen, mapRuleIPv4Prefix, mapRuleIPv4PrefixLen, mapRuleStartPort, mapRuleEndPort mapRuleEALen, mapRuleStorageType }
  STATUS current
  DESCRIPTION
    " The collection of this objects are used to give the information of mapping rules in MAP-E."
  ::= { mapMIBGroups 1 }

END
6. IANA Considerations

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

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>OBJECT IDENTIFIER value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP-E-MIB</td>
<td>{ transmission XXX }</td>
</tr>
</tbody>
</table>

7. Security Considerations

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

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 principles (users) that have legitimate
rights to indeed GET or SET (change/create/delete) them.

8. Acknowledgments

The authors would like to thank for valuable comments from David
Harrington, Mark Townsley, and Shishio Tsuchiya.

9. References

9.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate


[I-D.ietf-softwire-map] Troan, O., etc., "Mapping of Address and Port (MAP)", draft-ietf-softwire-map, working in progress.


9.2. Informative References


10. Change Log [RFC Editor please remove]

draft-fu-softwire-map-mib-00, original version, 2012-03-01
draft-fu-softwire-map-mib-01, 01 version, 2012-07-16
draft-fu-softwire-map-mib-03, deleted tunnel object according to the discussion in IETF85, 2013-02-04
draft-fu-softwire-map-mib-04, added security check object according to discussion in IETF86
draft-fu-softwire-map-mib-05, distinguishing FMR and BMR in mapRule object definition; added some description in section 4; modifying a little bit to the mapRuleEntry definition

Author’s Addresses

Yu Fu
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd.
Hai-Dian District, Beijing 100095
P.R. China
Email: eleven.fuyu@huawei.com

Sheng Jiang
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd.
Hai-Dian District, Beijing 100095
P.R. China
Email: jiangsheng@huawei.com

Bing Liu
Huawei Technologies Co., Ltd
Huawei Building, 156 Beiqing Rd.,
Hai-Dian District, Beijing 100095
P.R. China
Email: leo.liubing@huawei.com

Jiang Dong
Tsinghua University
Department of Computer Science, Tsinghua University
Beijing  100084
P.R. China
Email: dongjiang@csnet1.cs.tsinghua.edu.cn

Peng Wu
Tsinghua University
Department of Computer Science, Tsinghua University
Beijing  100084
P.R. China
Email: weapon@csnet1.cs.tsinghua.edu.cn