IEEE 802.5 Station Source Routing MIB

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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 by
IEEE 802.5 end-stations for managing source routes on a Token Ring
network where IEEE source-routing is in use. IEEE source-routing
is described in 802.5 Token Ring Access Method and Physical Layer
Specifications [8] and related ISO publications [9, 10, 11].

This memo is an incremental update to RFC XXXX [6]. It is
documented separately from the RFC XXXX solely due to the latter's
maturity within the Internet standardization process.

2. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework consists of four major
components. They are:

o   RFC 1442 [1] which defines the SMI, the mechanisms used for
     describing and naming objects for the purpose of management.

o   STD 17, RFC 1213 [2] defines MIB-II, the core set of managed
     objects for the Internet suite of protocols.

o   RFC 1445 [3] which defines the administrative and other
     architectural aspects of the framework.

o   RFC 1448 [4] which defines the protocol used for network
     access to managed objects.

The Framework permits new objects to be defined for the purpose of
experimentation and evaluation.

2.1. Object Definitions

Managed objects are accessed via a virtual information store,
termed the Management Information Base or MIB. Objects in the MIB
are defined using the subset of Abstract Syntax Notation One
(ASN.1) defined in the SMI. In particular, each object type is
named by an OBJECT IDENTIFIER, an administratively assigned name.
The object type together with an object instance serves to
uniquely identify a specific instantiation of the object. For
human convenience, we often use a textual string, termed the
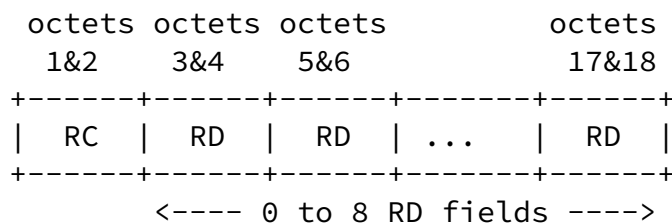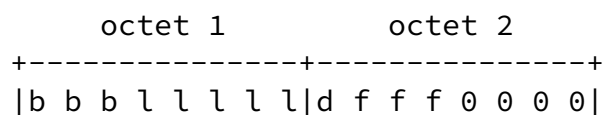descriptor, to refer to the object type.

3. Overview

This memo defines a single table: the 802.5 Station Source Routing
Table, which contains the source routes known by a end-station on
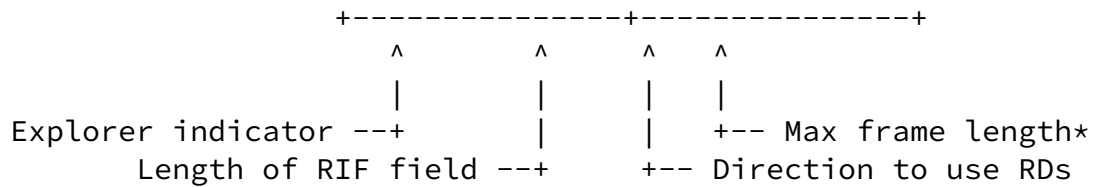an IEEE 802.5 Token Ring network in which IEEE source-routing is
in use.

3.1. Source Routing

Source routing extends the 802.5 protocol [8] by assigning a
unique ring number to each ring within the extended LAN, and a
bridge number to each source routing bridge's connection to a
ring. A Routing Information Field (RIF) must be included in
frames which need to traverse multiple rings. The format of the
RIF is:

```
            octets octets octets        octets
             1&2    3&4    5&6           17&18
            +------+------+------+-------+------+
            |  RC  |  RD  |  RD  | ...   |  RD  |
            +------+------+------+-------+------+
                <---- 0 to 8 RD fields ---->
```

The format of the Routing Control (RC) field is:

```
                    octet 1         octet 2
                +--------------+--------------+
                |b b b l l l l l|d f f f 0 0 0 0|
```

```
                          +--------------+--------------+
                           ^        ^       ^   ^
                           |        |       |   |
             Explorer indicator --+       |       |   +-- Max frame length*
                     Length of RIF field --+       +-- Direction to use RDs


         * Note that the length of the Maximum frame length subfield
           has recently been extended to 6 bits.
```

The format of each Routing Descriptor (RD) field is:

```
                  octet 1          octet 2
                 +--------------+--------------+
                 |r r r r r r r r r r r r i i i i|
                 +--------------+--------------+
                  <---- ring number ----> <----->
                                             ^
                                             |
                           bridge number --+
```
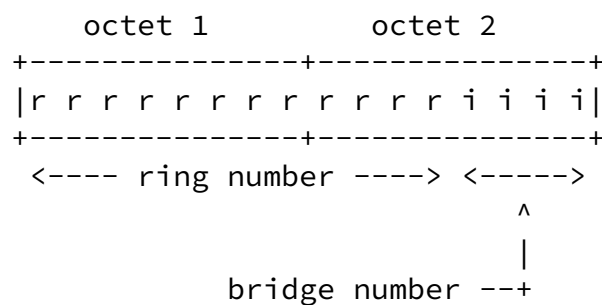
3.2. Relationship to RFC XXXX

RFC XXXX [6], the IEEE 802.5 MIB, defines managed objects used for
interfaces to IEEE 802.5 Token Ring subnetworks. This memo is an
incremental update to RFC XXXX, and is documented independently
solely due to the maturity of the definitions contained within RFC
XXXX.

3.3. Relationship to RFC 1525

RFC 1525 [7] defines the MIB objects specific to source-routing
for source-routing and SRT bridges. This memo defines the MIB
objects specific to source-routing for source-routing end-
stations.

3.4. Static Source Routes

It is unclear how many, if any, existing systems allow the
creation or deletion of "static" 802.5 source routes by network
management. However, SNMPv2 SMI defines that the MAX-ACCESS
clause as specifying the maximal level of access which makes
"protocol sense". Thus, this memo provides support for static
source routes through the dot5SrRouteStatus object, but the
conformance statements allow for stations which do not support
static source routes, by requiring that compliant agents only need
provide read-access to dot5SrRouteStatus.

3.5. Destinations on the Local Ring

Entries should be included in the dot5SrRouteTable for destination
MAC addresses which are on the same ring as the instrumented 802.5
interface. For such entries, dot5SrRouteDescr has the value of
the zero-length string, and dot5SrRouteControl has the
corresponding value.

---

[4](#). Definitions

```
TOKENRING-STATION-SR-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
    experimental                              -- to be removed by IANA
                                              FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, RowStatus, MacAddress
                                              FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP      FROM SNMPv2-CONF
```

```
    mib-2, ifIndex                    FROM RFC1213-MIB;

dot5SrMIB MODULE-IDENTITY
    LAST-UPDATED "9410231620Z"
    ORGANIZATION "IETF Interfaces MIB Working Group"
    CONTACT-INFO
            "        Keith McCloghrie
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                  170 West Tasman Drive,
                  San Jose CA 95134-1706.

           Phone: (408) 526-5260
           Email: kzm@cisco.com"
    DESCRIPTION
            "The MIB module for managing source routes in
            end-stations on IEEE 802.5 Token Ring networks."
    ::= { experimental 58 } -- to be assigned as { mib-2 xx } by IANA

dot5SrMIBObjects OBJECT IDENTIFIER ::= { dot5SrMIB 1 }

RouteDescriptor ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "1x:"
    STATUS      current
    DESCRIPTION
                "Represents a Routing Descriptor (RD) as used
                by 802.5 Source Routing."
    REFERENCE   "Annex C of ISO/IEC 10038: 1993,
                [ANSI/IEEE Std 802.1D, 1993]"
    SYNTAX      OCTET STRING (SIZE(0..30))
```

```
--          The 802.5 Station Source Route Table
--

dot5SrRouteTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot5SrRouteEntry
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
              "The table of source-routing routes.
              This represents the 802.5 RIF database."
    ::= { dot5SrMIBObjects 1 }

dot5SrRouteEntry  OBJECT-TYPE
    SYNTAX      Dot5SrRouteEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
              "Information on a specific route.

              An entry is created whenever a 'Single Path
              Explorer' or an 'All Paths Explorer' discovers
              a route to a neighbor not currently in the table,
              or whenever an 'All Paths Explorer' discovers a
              better (shorter) route than the route currently
              stored in the table.  This is done on behalf of
              any network layer client.

              The ifIndex value in the INDEX clause refers to
              the value of MIB-II's ifIndex object for the
              interface on which the route is in effect."
    INDEX  { ifIndex, dot5SrRouteDestination }
    ::= { dot5SrRouteTable 1 }

Dot5SrRouteEntry ::= SEQUENCE {
    dot5SrRouteDestination   MacAddress,
    dot5SrRouteControl       OCTET STRING,
    dot5SrRouteDescr         RouteDescriptor,
    dot5SrRouteStatus        RowStatus
}

dot5SrRouteDestination  OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
                    "The destination of this route."
    ::= { dot5SrRouteEntry 2 }


dot5SrRouteControl  OBJECT-TYPE
    SYNTAX       OCTET STRING (SIZE(2))
    MAX-ACCESS  read-create
    STATUS       current
    DESCRIPTION
                "The value of Routing Control field for this
                route."
    REFERENCE   "Annex C of ISO/IEC 10038: 1993,
                [ANSI/IEEE Std 802.1D, 1993]"
    ::= { dot5SrRouteEntry 3 }


dot5SrRouteDescr  OBJECT-TYPE
    SYNTAX       RouteDescriptor
    MAX-ACCESS  read-create
    STATUS       current
    DESCRIPTION
                "The Routing Descriptor, containing an
                embedded sequence of bridge and ring ID's,
                for this route.  For destinations on the
                local ring, the value of this object is
                the zero-length string."
    REFERENCE   "Annex C of ISO/IEC 10038: 1993,
                [ANSI/IEEE Std 802.1D, 1993]"
    ::= { dot5SrRouteEntry 4 }


dot5SrRouteStatus  OBJECT-TYPE
    SYNTAX       RowStatus
    MAX-ACCESS  read-create
    STATUS       current
    DESCRIPTION
            "The status of this row.  Values of the instances
            of dot5SrRouteControl and dot5SrRouteDescr can be
            modified while the row's status is 'active."
    ::= { dot5SrRouteEntry 5 }
```

-- conformance information

dot5SrConformance OBJECT IDENTIFIER ::= { dot5SrMIB 2 }

dot5SrGroups   OBJECT IDENTIFIER ::= { dot5SrConformance 1 }
dot5SrCompliances OBJECT IDENTIFIER ::= { dot5SrConformance 2 }

-- compliance statements

dot5SrCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for SNMPv2 entities
        which implement the IEEE 802.5 Station Source Route
        MIB."

    MODULE -- this module
        MANDATORY-GROUPS { dot5SrRouteGroup }

        OBJECT   dot5SrRouteStatus
        SYNTAX   INTEGER { active(1) }   -- subset of values
        MIN-ACCESS read-only
        DESCRIPTION
            "Write access is not required, and only the 'active'
            value need be supported."

        OBJECT   dot5SrRouteControl
        MIN-ACCESS read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT   dot5SrRouteDescr
        MIN-ACCESS read-only
        DESCRIPTION
            "Write access is not required."

    ::= { dot5SrCompliances 1 }

-- units of conformance

```
dot5SrRouteGroup  OBJECT-GROUP
    OBJECTS   { dot5SrRouteControl,
                dot5SrRouteDescr,
                dot5SrRouteStatus
              }
    STATUS    current
    DESCRIPTION
        "A collection of objects providing for the management of
        source routes in stations on IEEE 802.5 source-routing
        networks."
    ::= { dot5SrGroups 1 }

END
```

5. Acknowledgements

The need for this MIB module was agreed upon by the members of the
IETF Interfaces Working Group, and the definitions were derived
from experience with enterprise-specific MIBs presented to the
Working Group.

6. References

[1] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
     "Structure of Management Information for version 2 of the
     Simple Network Management Protocol (SNMPv2)", RFC 1442, SNMP
     Research,Inc., Hughes LAN Systems, Dover Beach Consulting,
     Inc., Carnegie Mellon University, April 1993.

[2] McCloghrie, K., and M. Rose, Editors, "Management Information
     Base for Network Management of TCP/IP-based internets: MIB-
     II", STD 17, RFC 1213, Hughes LAN Systems, Performance
     Systems International, March 1991.

[3] Galvin, J., and K. McCloghrie, "Administrative Model for
     version 2 of the Simple Network Management Protocol
     (SNMPv2)", RFC 1445, Trusted Information Systems, Hughes LAN
     Systems, April 1993.

[4] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
     "Protocol Operations for version 2 of the Simple Network
     Management Protocol (SNMPv2)", RFC 1448, SNMP Research,Inc.,
     Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie
     Mellon University, April 1993.

[5]   Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
       "Textual Conventions for version 2 of the Simple Network
       Management Protocol (SNMPv2)", RFC 1443, SNMP Research Inc.,
       Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie
       Mellon University, April 1993.

[6]   McCloghrie, K., and E. B. Decker, "IEEE 802.5 Token Ring
       MIB", RFC XXXX (update to RFC 1231 in preparation), cisco
       Systems, Inc., October 1994.

[7]   McCloghrie, K., E. B. Decker, P. Langville, and A.
       Rijsinghani, "Definitions of Managed Objects for Source
       Routing Bridges", RFC 1525, Hughes LAN Systems, cisco

       Systems, Inc., Digital Equipment Corporation, September 1993.

[8]   "Token Ring Access Method and Physical Layer Specifications",
       IEEE Standard 802.5-1989, 1989.

[9]   "Information technology – Local and metropolitan area
       networks – Part 5: Token ring access method and physical
       layer specifications", ISO/IEC 8802-5, 1992.

[10]   "Information technology – Telecommunications and information
       exchange between systems – Local area networks – Media access
       control (MAC) bridges", ISO/IEC 10038, 1993 [ANSI/IEEE Std
       802.1D, 1993 Edition].

[11]   "Source Routing Operation by End Systems", ISO/IEC 8802-2
       PDAM5.3 (6N7721).

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[7](). Security Considerations

Security issues are not discussed in this memo.

[8](). Authors Addresses

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