IEEE 802.5 Station Source Routing MIB

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Status of this Memo

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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:

- RFC 1442 [1] which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management.
- STD 17, RFC 1213 [2] defines MIB-II, the core set of managed objects for the Internet suite of protocols.
- RFC 1445 [3] which defines the administrative and other architectural aspects of the framework.
- 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

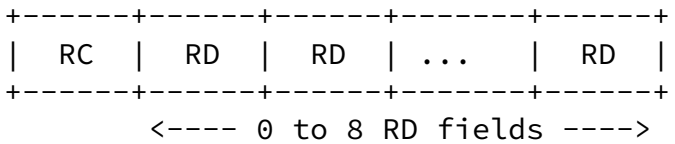
Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively 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

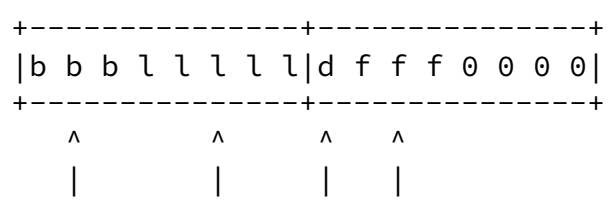
This memo defines a single table: the 802.5 Station Source Routing Table, which contains the source routes known by a end-station on an IEEE 802.5 Token Ring network in which IEEE source-routing is in use.

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:



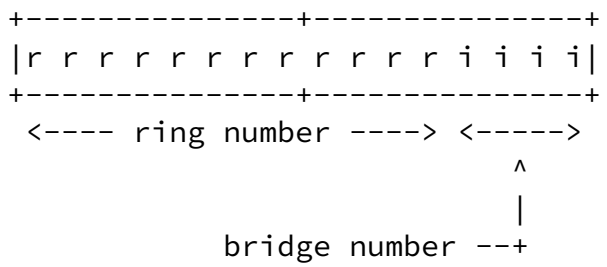
The format of the Routing Control (RC) field is:



```
     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:



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, Integer32,
    experimental                            FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, RowStatus, MacAddress
                                            FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP         FROM SNMPv2-CONF;

dot5SrMIB MODULE-IDENTITY
    LAST-UPDATED "9408260220Z"
    ORGANIZATION "IETF Interfaces MIB Working Group"
    CONTACT-INFO
            "Keith McCloghrie
             cisco Systems, Inc.
```

```
              1525 O'Brien Dr.
              Menlo Park, California 94025

              Phone: (415) 324-5260
              EMail: kzm@cisco.com"
    DESCRIPTION
            "The MIB module for managing source routes in
            end-stations on IEEE 802.5 Token Ring networks."
    ::= { experimental 58 }

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
--
-- This Source Route Table represents the 802.5 RIF database.
-- Entries are created whenever an 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.

dot5SrRouteTable   OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF Dot5SrRouteEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
                "The table of source-routing routes."
    ::= { dot5SrMIBObjects 1 }

dot5SrRouteEntry  OBJECT-TYPE
    SYNTAX      Dot5SrRouteEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
                "Information on a specific route."
    INDEX  { dot5SrRouteIfIndex, dot5SrRouteDestination }
    ::= { dot5SrRouteTable 1 }

Dot5SrRouteEntry ::= SEQUENCE {
    dot5SrRouteIfIndex       Integer32,
    dot5SrRouteDestination   MacAddress,
    dot5SrRouteControl       OCTET STRING,
    dot5SrRouteDescr         RouteDescriptor,
    dot5SrRouteStatus        RowStatus
}

dot5SrRouteIfIndex  OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
                "The value of MIB-II's ifIndex object for the
                interface on which this route is in effect."
    ::= { dot5SrRouteEntry 1 }

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."
    ::= { 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."

    ::= { 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., July 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).

7. Security Considerations

Security issues are not discussed in this memo.

8. Author's Address

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