

Network Working Group
Request for Comments: 1749
Updates: 1748
Category: Standards Track

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December 1994

IEEE 802.5 Station Source Routing MIB using SMIv2

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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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 1748 [6]. It is documented separately from the RFC 1748 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

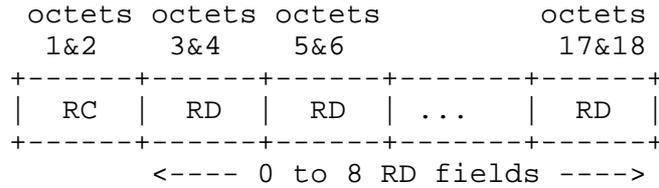
Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively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

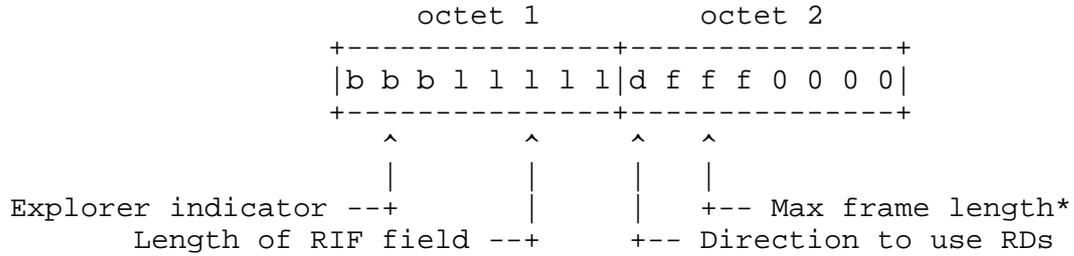
This memo defines a single table: the 802.5 Station Source Routing Table, which contains the source routes known by a end-station on an IEEE 802.5 Token Ring network in which IEEE source-routing is in use.

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:

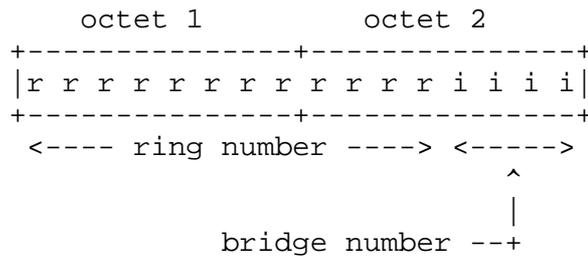


The format of the Routing Control (RC) field is:



* 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 1748

RFC 1748 [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 1748, and is documented independently solely due to the maturity of the definitions contained within RFC 1748.

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
        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 "9412161000Z"
    ORGANIZATION "IETF Interfaces MIB Working Group"
    CONTACT-INFO
        "
            Keith McCloghrie
            Postal: Cisco Systems, Inc.
                170 West Tasman Drive
                San Jose, CA 95134-1706
                US

            Phone: +1 408 526 5260
            Email: kzm@cisco.com"
```

```
DESCRIPTION
```

```
    "The MIB module for managing source routes in
    end-stations on IEEE 802.5 Token Ring networks."
```

```
::= { mib-2 42 }
```

```
dot5SrMIBObjects OBJECT IDENTIFIER ::= { dot5SrMIB 1 }
```

```
SourceRoute ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "1x:"
    STATUS      current
    DESCRIPTION
        "Represents a Source Route, containing an
         embedded sequence of bridge and ring ID's,
         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 (e.g., 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       SourceRoute,
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      SourceRoute
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The 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. Decker, "IEEE 802.5 Token Ring MIB using SMIV2", RFC 1748 cisco Systems, Inc., December 1994.

- [7] McCloghrie, K., Decker, E., Langville, P., 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. Authors' Addresses

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