Network Working Group   F. Kastenholz
Request for Comments: 1474   FTP Software, Inc.
                                                            June 1993

                    The Definitions of Managed Objects for
                    the Bridge Network Control Protocol of
                         the Point-to-Point Protocol

Status of this Memo

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

Abstract

   This memo defines a portion of 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
   bridge Network Control Protocol [10] on subnetwork interfaces using
   the family of Point-to-Point Protocols.

Table of Contents

1. The Network Management Framework

   The Internet-standard Network Management Framework consists of three
   components. They are:

      STD 16/RFC 1155 which defines the SMI, the mechanisms used for
      describing and naming objects for the purpose of management. STD
      16/RFC 1212 defines a more concise description mechanism, which is

Kastenholz   [Page 1]

   wholly consistent with the SMI.

   STD 17/RFC 1213 which defines MIB-II, the core set of managed
   objects for the Internet suite of protocols.

   STD 15/RFC 1157 which defines the SNMP, 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. Objects

   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) [3]
   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.

2.1. Format of Definitions

   Section 4 contains the specification of all object types contained in
   this MIB module. The object types are defined using the conventions
   defined in the SMI, as amended by the extensions specified in [5,6].

3. Overview

3.1. Object Selection Criteria

   To be consistent with IAB directives and good engineering practice,
   an explicit attempt was made to keep this MIB as simple as possible.
   This was accomplished by applying the following criteria to objects
   proposed for inclusion:

   (1) Require objects be essential for either fault or
        configuration management. In particular, objects for
        which the sole purpose was to debug implementations were
        explicitly excluded from the MIB.

   (2) Consider evidence of current use and/or utility.

   (3) Limit the total number of objects.

   (4) Exclude objects which are simply derivable from others in

this or other MIBs.

3.2. Structure of the PPP

This section describes the basic model of PPP used in developing the
PPP MIB. This information should be useful to the implementor in
understanding some of the basic design decisions of the MIB.

The PPP is not one single protocol but a large family of protocols.
Each of these is, in itself, a fairly complex protocol. The PPP
protocols may be divided into three rough categories:

Control Protocols
    The Control Protocols are used to control the operation of the
    PPP. The Control Protocols include the Link Control Protocol
    (LCP), the Password Authentication Protocol (PAP), the Link
    Quality Report (LQR), and the Challenge Handshake Authentication
    Protocol (CHAP).

Network Protocols
    The Network Protocols are used to move the network traffic over
    the PPP interface. A Network Protocol encapsulates the datagrams
    of a specific higher-layer protocol that is using the PPP as a
    data link. Note that within the context of PPP, the term "Network
    Protocol" does not imply an OSI Layer-3 protocol; for instance,
    there is a Bridging network protocol.

Network Control Protocols (NCPs)
    The NCPs are used to control the operation of the Network
    Protocols. Generally, each Network Protocol has its own Network
    Control Protocol; thus, the IP Network Protocol has its IP Control
    Protocol, the Bridging Network Protocol has its Bridging Network
    Control Protocol and so on.

This document specifies the objects used in managing one of these
protocols, namely the Bridge Network Control Protocol.

3.3. MIB Groups

Objects in this MIB are arranged into several MIB groups. Each group
is organized as a set of related objects.

These groups are the basic unit of conformance: if the semantics of a
group are applicable to an implementation then all objects in the
group must be implemented.

The PPP MIB is organized into several MIB Groups, including, but not
limited to, the following groups:

```
                   o The PPP Link Group
                   o The PPP LQR Group
                   o The PPP LQR Extensions Group
                   o The PPP IP Group
                   o The PPP Bridge Group
                   o The PPP Security Group
```

   This document specifies the following group:

   The PPP Bridge Group
      The PPP Bridge Group contains configuration, status, and control
      variables that apply to the operation of Bridging over PPP.

      Implementation of this group is mandatory for all implementations
      of PPP that support the Bridging over PPP.

4. Definitions

```
           PPP-BRIDGE-NCP-MIB DEFINITIONS ::= BEGIN

           IMPORTS
               Counter
                   FROM RFC1155-SMI
               ifIndex
                   FROM RFC1213-MIB
               OBJECT-TYPE
                   FROM RFC-1212
               ppp
                   FROM PPP-LCP-MIB;

               pppBridge OBJECT IDENTIFIER ::= { ppp 4 }

       --
       -- The PPP Bridge NCP Group.
       -- Implementation of this group is mandatory for all
       -- PPP implementations that support MAC Bridging  over
       -- PPP (RFC1220).
       --

       -- The following object reflect the values of the option
       -- parameters used in the PPP Link Control Protocol
       --    pppBridgeLocalToRemoteTinygramCompression
       --    pppBridgeRemoteToLocalTinygramCompression
       --    pppBridgeLocalToRemoteLanId
       --    pppBridgeRemoteToLocalLanId
       --
       -- These values are not available until after the PPP Option
```

```
        -- negotiation has completed, which is indicated by the link
        -- reaching the open state (i.e. pppBridgeOperStatus is set to
        -- opened).
        --
        -- Therefore, when pppBridgeOperStatus is not opened
        -- the contents of these objects is undefined. The value
        -- returned when accessing the objects is an implementation
        -- dependent issue.


        pppBridgeTable   OBJECT-TYPE
            SYNTAX    SEQUENCE OF PppBridgeEntry
            ACCESS    not-accessible
            STATUS    mandatory
            DESCRIPTION
                    "Table containing the parameters and statistics
                    for the local PPP entity that are related to
                    the operation of Bridging over the PPP."
            ::= { pppBridge 1 }


        pppBridgeEntry   OBJECT-TYPE
            SYNTAX    PppBridgeEntry
            ACCESS    not-accessible
            STATUS    mandatory
            DESCRIPTION
                    "Bridging information for a particular PPP
                    link."
            INDEX     { ifIndex }
            ::= { pppBridgeTable 1 }


        PppBridgeEntry ::= SEQUENCE {
            pppBridgeOperStatus
                INTEGER,
            pppBridgeLocalToRemoteTinygramCompression
                INTEGER,
            pppBridgeRemoteToLocalTinygramCompression
                INTEGER,
            pppBridgeLocalToRemoteLanId
                INTEGER,
            pppBridgeRemoteToLocalLanId
                INTEGER
        }

        pppBridgeOperStatus   OBJECT-TYPE
            SYNTAX    INTEGER {opened(1), not-opened(2)}
            ACCESS    read-only
```

```
        STATUS     mandatory
        DESCRIPTION
                "The operational status of the Bridge network
                protocol. If the value of this object is up
                then the finite state machine for the Bridge
                network protocol has reached the Opened state."
        ::= { pppBridgeEntry 1 }


    pppBridgeLocalToRemoteTinygramCompression   OBJECT-TYPE
        SYNTAX     INTEGER { false(1), true(2) }
        ACCESS     read-only
        STATUS     mandatory
        DESCRIPTION
                "Indicates whether the local node will perform
                Tinygram Compression when sending packets to
                the remote entity. If false then the local
                entity will not perform Tinygram Compression.
                If true then the local entity will perform
                Tinygram Compression. The value of this object
                is meaningful only when the link has reached
                the open state (pppBridgeOperStatus is
                opened)."
        REFERENCE
                "Section 6.7, Tinygram Compression Option, of
                RFC1220"
        ::= { pppBridgeEntry 2 }


    pppBridgeRemoteToLocalTinygramCompression   OBJECT-TYPE
        SYNTAX     INTEGER { false(1), true(2) }
        ACCESS     read-only
        STATUS     mandatory
        DESCRIPTION
                "If false(1) then the remote entity is not
                expected to perform Tinygram Compression. If
                true then the remote entity is expected to
                perform Tinygram Compression. The value of this
                object is meaningful only when the link has
                reached the open state (pppBridgeOperStatus is
                opened)."
        REFERENCE
                "Section 6.7, Tinygram Compression Option, of
                RFC1220"
        ::= { pppBridgeEntry 3 }
```

        pppBridgeLocalToRemoteLanId   OBJECT-TYPE
            SYNTAX   INTEGER { false(1), true(2) }
            ACCESS   read-only
            STATUS   mandatory
            DESCRIPTION
                    "Indicates whether the local node will include
                    the LAN Identification field in transmitted
                    packets or not. If false(1) then the local node
                    will not transmit this field, true(2) means
                    that the field will be transmitted. The value
                    of this object is meaningful only when the link
                    has reached the open state (pppBridgeOperStatus
                    is opened)."
            REFERENCE
                    "Section 6.8, LAN Identification Option, of
                    RFC1220"
            ::= { pppBridgeEntry 4 }

        pppBridgeRemoteToLocalLanId   OBJECT-TYPE
            SYNTAX   INTEGER { false(1), true(2) }
            ACCESS   read-only
            STATUS   mandatory
            DESCRIPTION
                    "Indicates whether the remote node has
                    indicated that it will include the LAN
                    Identification field in transmitted packets or
                    not. If false(1) then the field will not be
                    transmitted, if true(2) then the field will be
                    transmitted. The value of this object is
                    meaningful only when the link has reached the
                    open state (pppBridgeOperStatus is opened)."
            REFERENCE
                    "Section 6.8, LAN Identification Option, of
                    RFC1220"
            ::= { pppBridgeEntry 5 }

        --
        -- The PPP Bridge Configuration table
        --

        pppBridgeConfigTable   OBJECT-TYPE
            SYNTAX   SEQUENCE OF PppBridgeConfigEntry
            ACCESS   not-accessible
            STATUS   mandatory
            DESCRIPTION
                    "Table containing the parameters and statistics

```
                        for the local PPP entity that are related to
                        the operation of Bridging over the PPP."
                ::= { pppBridge 2 }


        pppBridgeConfigEntry   OBJECT-TYPE
            SYNTAX     PppBridgeConfigEntry
            ACCESS     not-accessible
            STATUS     mandatory
            DESCRIPTION
                        "Bridging Configuration information for a
                        particular PPP link."
            INDEX      { ifIndex }
            ::= { pppBridgeConfigTable 1 }


        PppBridgeConfigEntry ::= SEQUENCE {
            pppBridgeConfigAdminStatus
                    INTEGER,
            pppBridgeConfigTinygram
                    INTEGER,
            pppBridgeConfigRingId
                    INTEGER,
            pppBridgeConfigLineId
                    INTEGER,
            pppBridgeConfigLanId
                    INTEGER
        }


        pppBridgeConfigAdminStatus   OBJECT-TYPE
            SYNTAX     INTEGER { open(1), close(2) }
            ACCESS     read-write
            STATUS     mandatory
            DESCRIPTION
                        "The immediate desired status of the Bridging
                        network protocol. Setting this object to open
                        will inject an administrative open event into
                        the Bridging network protocol's finite state
                        machine. Setting this object to close will
                        inject an administrative close event into the
                        Bridging network protocol's finite state
                        machine."
            ::= { pppBridgeConfigEntry 1 }


        pppBridgeConfigTinygram   OBJECT-TYPE
            SYNTAX     INTEGER { false(1), true(2) }
```

```
            ACCESS     read-write
            STATUS     mandatory
            DESCRIPTION
                       "If false then the local BNCP entity will not
                       initiate the Tinygram Compression Option
                       Negotiation. If true then the local BNCP entity
                       will initiate negotiation of this option."
            REFERENCE
                       "Section 6.7, Tinygram Compression Option, of
                       RFC1220"
            DEFVAL     { true }
            ::= { pppBridgeConfigEntry 2 }


        pppBridgeConfigRingId   OBJECT-TYPE
            SYNTAX     INTEGER { false(1), true(2) }
            ACCESS     read-write
            STATUS     mandatory
            DESCRIPTION
                       "If false then the local PPP Entity will not
                       initiate a Remote Ring Identification Option
                       negotiation. If true then the local PPP entity
                       will intiate this negotiation. This MIB object
                       is relevant only if the interface is for 802.5
                       Token Ring bridging."
            REFERENCE
                       "Section 6.4, IEEE 802.5 Remote Ring
                       Identification Option, of RFC1220"
            DEFVAL     { false }
            ::= { pppBridgeConfigEntry 3 }


        pppBridgeConfigLineId   OBJECT-TYPE
            SYNTAX     INTEGER { false(1), true(2) }
            ACCESS     read-write
            STATUS     mandatory
            DESCRIPTION
                       "If false then the local PPP Entity is not to
                       initiate a Line Identification Option
                       negotiation. If true then the local PPP entity
                       will intiate this negotiation. This MIB object
                       is relevant only if the interface is for 802.5
                       Token Ring bridging."
            REFERENCE
                       "Section 6.5, IEEE 802.5 Line Identification
                       Option, of RFC1220"
            DEFVAL     { false }
            ::= { pppBridgeConfigEntry 4 }
```

```
        pppBridgeConfigLanId   OBJECT-TYPE
            SYNTAX    INTEGER { false(1), true(2) }
            ACCESS    read-write
            STATUS    mandatory
            DESCRIPTION
                    "If false then the local BNCP entity will not
                    initiate the LAN Identification Option
                    Negotiation. If true then the local BNCP entity
                    will initiate negotiation of this option."
            REFERENCE
                    "Section 6.8, LAN Identification Option, of
                    RFC1220"
            DEFVAL    { false }
            ::= { pppBridgeConfigEntry 5 }


        --
        -- The PPP Bridge Media Status Table
        --

        pppBridgeMediaTable   OBJECT-TYPE
            SYNTAX    SEQUENCE OF PppBridgeMediaEntry
            ACCESS    not-accessible
            STATUS    mandatory
            DESCRIPTION
                    "Table identifying which MAC media types are
                    enabled for the Bridging NCPs."
            ::= { pppBridge 3 }


        pppBridgeMediaEntry   OBJECT-TYPE
            SYNTAX    PppBridgeMediaEntry
            ACCESS    not-accessible
            STATUS    mandatory
            DESCRIPTION
                    "Status of a specific MAC Type for a specific
                    PPP Link."
            INDEX     { ifIndex, pppBridgeMediaMacType }
            ::= { pppBridgeMediaTable 1 }


        PppBridgeMediaEntry ::= SEQUENCE {
            pppBridgeMediaMacType
                INTEGER,
            pppBridgeMediaLocalStatus
                INTEGER,
            pppBridgeMediaRemoteStatus
                INTEGER
```

```
          }

          pppBridgeMediaMacType   OBJECT-TYPE
              SYNTAX     INTEGER(0..2147483647)
              ACCESS     read-only
              STATUS     mandatory
              DESCRIPTION
                      "The MAC type for which this entry in the
                      pppBridgeMediaTable is providing status
                      information. Valid values for this object are
                      defined in Section 6.6 MAC Type Support
                      Selection of RFC1220 (Bridging Point-to-Point
                      Protocol)."
              REFERENCE
                      "Section 6.6, MAC Type Support Selection, of
                      RFC1212."
              ::= { pppBridgeMediaEntry 1 }


          pppBridgeMediaLocalStatus   OBJECT-TYPE
              SYNTAX     INTEGER { accept(1), dont-accept(2) }
              ACCESS     read-only
              STATUS     mandatory
              DESCRIPTION
                      "Indicates whether the local PPP Bridging
                      Entity will accept packets of the protocol type
                      identified in pppBridgeMediaMacType on the PPP
                      link identified by ifIndex or not. If this
                      object is accept then any packets of the
                      indicated MAC type will be received and
                      properly processed. If this object is dont-
                      accept then received packets of the indicated
                      MAC type will not be properly processed."
              REFERENCE
                      "Section 6.6, MAC Type Support Selection, of
                      RFC1212."
              ::= { pppBridgeMediaEntry 2 }


          pppBridgeMediaRemoteStatus   OBJECT-TYPE
              SYNTAX     INTEGER { accept(1), dont-accept(2) }
              ACCESS     read-only
              STATUS     mandatory
              DESCRIPTION
                      "Indicates whether the local PPP Bridging
                      Entity believes that the remote PPP Bridging
                      Entity will accept packets of the protocol type
                      identified in pppBridgeMediaMacType on the PPP
```

```
                        link identified by ifIndex or not."
            REFERENCE
                        "Section 6.6, MAC Type Support Selection, of
                        RFC1212."
            ::= { pppBridgeMediaEntry 3 }


        --
        -- The PPP Bridge Media Configuration Table
        --

        pppBridgeMediaConfigTable   OBJECT-TYPE
            SYNTAX     SEQUENCE OF PppBridgeMediaConfigEntry
            ACCESS     not-accessible
            STATUS     mandatory
            DESCRIPTION
                        "Table identifying which MAC media types are
                        enabled for the Bridging NCPs."
            ::= { pppBridge 4 }


        pppBridgeMediaConfigEntry   OBJECT-TYPE
            SYNTAX     PppBridgeMediaConfigEntry
            ACCESS     not-accessible
            STATUS     mandatory
            DESCRIPTION
                        "Status of a specific MAC Type for a specific
                        PPP Link."
            INDEX     { ifIndex, pppBridgeMediaConfigMacType }
            ::= { pppBridgeMediaConfigTable 1 }


        PppBridgeMediaConfigEntry ::= SEQUENCE {
            pppBridgeMediaConfigMacType
                    INTEGER,
            pppBridgeMediaConfigLocalStatus
                    INTEGER
        }


        pppBridgeMediaConfigMacType   OBJECT-TYPE
            SYNTAX     INTEGER(0..2147483647)
            ACCESS     read-write
            STATUS     mandatory
            DESCRIPTION
                        "The MAC type for which this entry in the
                        pppBridgeMediaConfigTable is providing status
                        information. Valid values for this object are
```

                    defined in Section 6.6 MAC Type Support
                    Selection of RFC1220 (Bridging Point-to-Point
                    Protocol)."
            REFERENCE
                    "Section 6.6, MAC Type Support Selection, of
                    RFC1212."
            ::= { pppBridgeMediaConfigEntry 1 }

        pppBridgeMediaConfigLocalStatus   OBJECT-TYPE
            SYNTAX   INTEGER { accept(1), dont-accept(2) }
            ACCESS   read-write
            STATUS   mandatory
            DESCRIPTION
                    "Indicates whether the local PPP Bridging
                    Entity should accept packets of the protocol
                    type identified in pppBridgeMediaConfigMacType
                    on the PPP link identified by ifIndex or not.
                    Setting this object to the value dont-accept
                    has the affect of invalidating the
                    corresponding entry in the
                    pppBridgeMediaConfigTable object. It is an
                    implementation-specific matter as to whether
                    the agent removes an invalidated entry from the
                    table. Accordingly, management stations must be
                    prepared to receive tabular information from
                    agents that corresponds to entries not
                    currently in use. Changing this object will
                    have effect when the link is next restarted."
            REFERENCE
                    "Section 6.6, MAC Type Support Selection, of
                    RFC1212."
            ::= { pppBridgeMediaConfigEntry 2 }

        END

6. Acknowledgements

    This document was produced by the PPP working group. In addition to
    the working group, the author wishes to thank the following
    individuals for their comments and contributions:

        Bill Simpson -- Daydreamer
        Glenn McGregor -- Merit
        Jesse Walker -- DEC
        Chris Gunner -- DEC

6. Security Considerations

   The PPP MIB affords the network operator the ability to configure and
   control the PPP links of a particular system, including the PPP
   authentication protocols. This represents a security risk.

   These risks are addressed in the following manners:

       (1) All variables which represent a significant security risk
            are placed in separate, optional, MIB Groups. As the MIB
            Group is the quantum of implementation within a MIB, the
            implementor of the MIB may elect not to implement these
            groups.

       (2) The implementor may choose to implement the variables
            which present a security risk so that they may not be
            written, i.e., the variables are READ-ONLY. This method
            still presents a security risk, and is not recommended,
            in that the variables, specifically the PPP
            Authentication Protocols' variables, may be easily read.

       (3) Using SNMPv2, the operator can place the variables into
            MIB views which are protected in that the parties which
            have access to those MIB views use authentication and
            privacy protocols, or the operator may elect to make
            these views not accessible to any party. In order to
            facilitate this placement, all security-related variables
            are placed in separate MIB Tables. This eases the
            identification of the necessary MIB View Subtree.

7. References

   [1] Rose M., and K. McCloghrie, "Structure and Identification of
       Management Information for TCP/IP-based internets", STD 16, RFC
       1155, Performance Systems International, Hughes LAN Systems, May
       1990.

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

   [3] Information processing systems - Open Systems Interconnection -
       Specification of Abstract Syntax Notation One (ASN.1),
       International Organization for Standardization, International
       Standard 8824, December 1987.

   [4] Information processing systems - Open Systems Interconnection -
       Specification of Basic Encoding Rules for Abstract Notation One

      (ASN.1), International Organization for Standardization,
      International Standard 8825, December 1987.

 [5] Rose, M., and K. McCloghrie, Editors, "Concise MIB Definitions",
      STD 16, RFC 1212, Performance Systems International, Hughes LAN
      Systems, March 1991.

 [6] Rose, M., Editor, "A Convention for Defining Traps for use with
      the SNMP", RFC 1215, Performance Systems International, March
      1991.

 [7] McCloghrie, K., "Extensions to the Generic-Interface MIB", RFC
      1229, Hughes LAN Systems, Inc., May 1991.

 [8] Simpson, W., "The Point-to-Point Protocol for the Transmission of
      Multi-protocol Datagrams over Point-to-Point Links, RFC 1331,
      Daydreamer, May 1992.

 [9] McGregor, G., "The PPP Internet Protocol Control Protocol", RFC
      1332, Merit, May 1992.

[10] Baker, F., "Point-to-Point Protocol Extensions for Bridging", RFC
      1220, ACC, April 1991.

[11] Lloyd, B., and W. Simpson, "PPP Authentication Protocols", RFC
      1334, L&A, Daydreamer, October 1992.

[12] Simpson, W., "PPP Link Quality Monitoring", RFC 1333, Daydreamer,
      May 1992.

8. Author's Address

   Frank Kastenholz
   FTP Software, Inc.
   2 High Street
   North Andover, Mass 01845 USA

   Phone: (508) 685-4000
   EMail: kasten@ftp.com