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

Status of this Memo

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.

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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

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:

- The PPP Link Group
- The PPP LQR Group
- The PPP LQR Extensions Group
- The PPP IP Group
- The PPP Bridge Group
- 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
```

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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

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