

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	1
2. Objects	2
2.1 Format of Definitions	2
3. Overview	2
3.1 Object Selection Criteria	2
3.2 Structure of the PPP	3
3.3 MIB Groups	3
4. Definitions	4
5. Acknowledgements	13
6. Security Considerations	14
7. References	14
8. Author's Address	15

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:

- 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 initiate 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 initiate 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