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Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol and VLAN Classification Extensions

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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 defines three MIB modules for managing the new capabilities of MAC bridges defined by the IEEE P802.1t [[802.1t](#)], P802.1u [[802.1u](#)], P802.1v [[802.1v](#)] and P802.1w [[802.1w](#)] amendments to IEEE Std 802.1D-1998 for bridging between Local Area Network (LAN) segments. One MIB module defines objects for managing Rapid Spanning Tree Protocol, one for controlling Restricted VLAN Registration, and one for VLAN Classification.

Provisions are made for support of transparent bridging. Provisions

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are also made so that these objects apply to bridges connected by subnetworks other than LAN segments. This memo also includes several MIB modules in a manner that is compliant to SMIV2 [[RFC2578](#)].

This memo supplements [RFC 1493](#) [[BRIDGEMIB](#)] and [RFC 2674](#) [[Q-BRIDGE-MIB](#)].

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1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2571](#) [[RFC2571](#)].
- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [[RFC1155](#)], STD 16, [RFC 1212](#) [[RFC1212](#)] and [RFC 1215](#) [[RFC1215](#)]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [[RFC1901](#)] and [RFC 1906](#) [[RFC1906](#)]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [[RFC1906](#)], [RFC 2572](#) [[RFC2572](#)] and [RFC 2574](#) [[RFC2574](#)].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [[RFC1905](#)].
- o A set of fundamental applications described in [RFC 2573](#) [[RFC2573](#)] and the view-based access control mechanism described in [RFC 2575](#) [[RFC2575](#)].

A more detailed introduction to the current SNMP Management Framework can be found in [RFC 2570](#) [[RFC2570](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine

readable information is not considered to change the semantics of the MIB.

2. Overview

A common device present in many networks in the Bridge. This device is used to connect Local Area Network segments below the network layer. These devices are often known as 'layer 2 switches'.

There are two major modes defined for this bridging: Source-Route and transparent. Source-Route bridging is described by IEEE 802.5 [802.5] and is not discussed further in this document.

The transparent method of bridging is defined by IEEE 802.1D-1998 [802.1D]. Managed objects for that original specification of transparent bridging were defined in RFC 1493 [BRIDGEMIB].

2.1. Scope

This MIB includes a comprehensive set of managed objects which attempts to match the set defined in IEEE P802.1t [802.1t], P802.1u [802.1u], P802.1v [802.1v] and P802.1w [802.1w].

3. Structure of MIBs

This document defines additional objects, on top of those existing in the original BRIDGE-MIB module defined in [BRIDGEMIB]: that MIB module is to be maintained unchanged for backwards compatibility. [Section 3.4.3](#) of the present document contains some recommendations

regarding usage of objects in the original bridge MIB by devices implementing the enhancements defined here.

Three MIB modules are defined here:

- (1) Managed objects for an extended bridge MIB module RSTP-MIB for Rapid Spanning Tree Protocol defined by IEEE P802.1t and IEEE P802.1w.
- (2) Managed Objects for an extended virtual bridge MIB module U-BRIDGE-MIB for Restricted VLAN Registration control enhancement defined by IEEE P802.1u.
- (3) Managed Objects for an extended bridge MIB module V-BRIDGE-MIB for VLAN classification by Protocol and Port enhancement defined by IEEE P802.1v.

[3.1.](#) Structure of RSTP-MIB

Objects in this MIB are defined as an addition to the dot1dStp group in the original bridge MIB [BRIDGE-MIB]. The overall structure is shown below:

Bridge MIB Name	IEEE P802.1t(t) or 802.1w(w) Reference
dot1dStp	
dot1dStpVersion	(w) 17.6.1 ForceVersion
dot1dStpTxHoldCount	(w) 17.16.6 TxHoldCount
dot1dStpPathCostDefault	
dot1dStpExtPortTable	
dot1dStpPortProtocolMigration	(w) 17.18.10 mcheck
dot1dStpPortAdminEdgePort	(t) 18.3.3 adminEdgePort
dot1dStpPortOperEdgePort	(t) 18.3.4 operEdgePort
dot1dStpPortAdminPointToPoint	(w) 6.4.3 adminPointToPointMAC
dot1dStpPortOperPointToPoint	(w) 6.4.3 operPointToPointMAC

[3.2.](#) Structure of U-BRIDGE-MIB

Objects in this MIB are defined as an addition to the dot1qVlan group in the Virtual Bridge MIB [Q-BRIDGE-MIB]. The overall structure is shown below:

Virtual Bridge MIB Name	IEEE P802.1u(u) or P802.1t(t) Reference
dot1dGmrp	
dot1dExtPortGmrpTable	
dot1dPortRestrictedGroupRegistration	(t) 10.3.2.3 Restricted Group Registration
dot1qVlan	
dot1qExtPortVlanTable	
dot1qPortRestrictedVlanRegistration	(u) 11.2.3.2.3 Restricted VLAN Registration
gmrpFailure	(t) 14.10.1.2 GMRP failure notification
gvrpFailure	(t) 12.10.1.6 GVRP failure notification

[3.3.](#) Structure of V-BRIDGE-MIB

Objects in this MIB are arranged in a single group which is organized as a set of related objects. The overall structure and assignment of objects to the group is shown below:

Bridge MIB Name	IEEE P802.1v Reference
dot1vProtocol	
dot1vProtocolGroupTable	8.6.4 Protocol Group Database, 8.6.2 Protocol Template
dot1vProtocolTemplateFrameType	
dot1vProtocolTemplateProtocolValue	
dot1vProtocolGroupId	8.6.3 Protocol Group Identifier
dot1vProtocolPortTable	8.4.4 VID Set for each Port

dot1vProtocolPortGroupId
dot1vProtocolGroupVid

[3.3.1.](#) The dot1vProtocol Group

This group contains objects that describe the bridge's state with respect to VLAN classification by Protocol and Port. If VLAN classification is not supported, this group will not be implemented.

[3.4.](#) Relationship to Other MIBs

As described above, some IEEE 802.1D management objects have not been included in this MIB because they overlap with objects in other MIBs applicable to a bridge implementing this MIB. In particular, it is assumed that a bridge implementing this MIB will implement the original bridge MIB [[BRIDGEMIB](#)]. If the U-BRIDGE-MIB and V-BRIDGE-MIB modules are implemented, a bridge will also implement the P-BRIDGE-MIB and the Q-BRIDGE-MIB modules defined in [RFC 2674](#) [[RFC2674](#)].

[3.4.1.](#) Relation to Original Bridge MIB

This section defines how objects in the original bridge MIB module [[BRIDGEMIB](#)] should be represented for devices which implement all the MIB modules described in this memo. Some of the old objects are less useful in such devices but must still be implemented for reasons of backwards compatibility.

[3.4.1.1.](#) The dot1dBase Group

This mandatory group contains the objects which are applicable to all types of bridges. Interpretation of this group is unchanged.

[3.4.1.2.](#) The dot1dStp Group

This group contains the objects that denote the bridge's state with respect to the Spanning Tree Protocol. If a node does not implement the Spanning Tree Protocol, this group will not be implemented.

In a device supporting the Spanning Tree Algorithm and Protocol defined in IEEE 802.1D-1998 Clause 8, interpretation of this group is

unchanged.

In a device supporting the Rapid Spanning Tree Algorithm and Protocol defined in IEEE 802.1w Clause 17, the interpretation of objects in this group is unchanged except for those listed below:

`dot1dStpPriority`

Definition remains unchanged, but the permissible values are changed to 0-61440, in steps of 4096.

`dot1dStpPortPriority`

Definition remains unchanged, but the permissible values are changed to 0-240, in steps of 16.

`dot1dStpTimeSinceTopologyChange`

The time since the `tcWhile` timer for any port on this Bridge was non-zero.

`dot1dStpTopChanges`

The number of times that there have been at least one non-zero `tcWhile` timer on this Bridge.

In a device supporting the 32-bit default Path Costs defined in IEEE 802.1t Table 8-5, the interpretation of objects in this group is unchanged except for the following:

`dot1dStpPortPathCost`

Definition remains unchanged, but the permissible values are extended to 1-200,000,000.

[3.4.1.3](#). The `dot1dTp` Group

This group contains objects that describe the entity's state with respect to transparent bridging. Interpretation for this group is unchanged.

[3.4.1.4](#). The `dot1dStatic` Group

This group contains objects that describe the entity's state with respect to destination-address filtering. Interpretation for this group is unchanged.

[3.4.2.](#) Relation to the P-BRIDGE-MIB module defined in [RFC 2674](#)

The P-BRIDGE-MIB module contains managed objects for the traffic class and multicast filtering enhancements defined by IEEE 802.1D-1998 [[802.1D](#)]. Interpretation for all groups defined in this module is unchanged.

[3.4.3.](#) Relation to the Q-BRIDGE-MIB module defined in [RFC 2674](#)

The Q-BRIDGE-MIB module contains managed objects for the Virtual LAN bridging enhancements defined by IEEE 802.1Q-1998 [[802.1Q](#)]. Interpretation for all groups defined in this module is unchanged.

[4.](#) Definitions for RSTP-MIB

```
RSTP-MIB DEFINITIONS ::= BEGIN
```

```
-- -----  
-- MIB for IEEE 802.1w Rapid Spanning Tree Protocol  
-- -----
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE  
        FROM SNMPv2-SMI  
    TruthValue  
        FROM SNMPv2-TC  
    MODULE-COMPLIANCE, OBJECT-GROUP  
        FROM SNMPv2-CONF  
    dot1dBridge, dot1dStp, dot1dStpPortEntry  
        FROM BRIDGE-MIB;
```

```
rstpMIB MODULE-IDENTITY
```

```
    LAST-UPDATED "200111160000Z"  
    ORGANIZATION "IETF Bridge MIB Working Group"  
    CONTACT-INFO  
        "Email: Bridge-mib@ietf.org"  
    DESCRIPTION  
        "The Bridge MIB Extension module for managing devices  
        that support the Rapid Spanning Tree Protocol defined  
        by IEEE 802.1w."  
    REVISION "200111160000Z"  
    DESCRIPTION
```

```
"Draft 1"  
 ::= { dot1dBridge 11 }
```

```
-----  
-- Addition to the dot1dStp group  
-----
```

```
dot1dStpVersion OBJECT-TYPE  
    SYNTAX      INTEGER {  
                    stpCompatible(0),  
                    rstp(2)  
                    }  
    MAX-ACCESS  read-write  
    STATUS      current  
    DESCRIPTION  
        "The version of Spanning Tree Protocol the bridge is  
        currently running. The value 'stpCompatible(0)'  
        indicates the Spanning Tree Protocol specified in  
        IEEE 802.1D and 'rstp(2)' indicates the Rapid Spanning  
        Tree Protocol specified in IEEE 802.1w. New value may  
        be defined as future versions of the protocol become  
        available."  
    REFERENCE  
        "IEEE 802.1w clause 14.8.1, 17.12, 17.16.1"  
    DEFVAL      { rstp }  
    ::= { dot1dStp 16 }
```

```
dot1dStpTxHoldCount OBJECT-TYPE  
    SYNTAX      INTEGER (1..10)  
    MAX-ACCESS  read-write  
    STATUS      current  
    DESCRIPTION  
        "The value used by the Port Transmit state machine to limit  
        the maximum transmission rate."  
    REFERENCE  
        "IEEE 802.1w clause 17.16.6"  
    DEFVAL      { 3 }  
    ::= { dot1dStp 17 }
```

```
dot1dStpPathCostDefault OBJECT-TYPE  
    SYNTAX      INTEGER {  
                    stp8021d1998(1),  
                    stp8021t2001(2)  
                    }  
    MAX-ACCESS  read-write  
    STATUS      current
```

DESCRIPTION

"The version of the Spanning Tree default Path Costs that

are to be used by this Bridge. A value of 8021d1998(1) uses the 16-bit default Path Costs from IEEE Std. 802.1D-1998. A value of stp8021t2001(2) uses the 32-bit default Path Costs from IEEE Std. 802.1t."

REFERENCE

"IEEE 802.1D & 802.1t Table 8-5"

::= { dot1dStp 18 }

dot1dStpExtPortTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1dStpExtPortEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains port-specific Rapid Spanning Tree information."

::= { dot1dStp 19 }

dot1dStpExtPortEntry OBJECT-TYPE

SYNTAX Dot1dStpExtPortEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A list of Rapid Spanning Tree information maintained by each port."

AUGMENTS { dot1dStpPortEntry }

::= { dot1dStpExtPortTable 1 }

Dot1dStpExtPortEntry ::=

SEQUENCE {

dot1dStpPortProtocolMigration

TruthValue,

dot1dStpPortAdminEdgePort

TruthValue,

dot1dStpPortOperEdgePort

TruthValue,

dot1dStpPortAdminPointToPoint

INTEGER,

dot1dStpPortOperPointToPoint

TruthValue

}

dot1dStpPortProtocolMigration OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"When operating in RSTP (version 2) mode, writing TRUE(1) to this object forces this port to transmit RSTP BPDUs.

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Any other operation on this object has no effect and it always returns FALSE(2) when read."

REFERENCE

"IEEE 802.1w clause 14.8.2.4, 17.18.10, 17.26"

::= { dot1dStpExtPortEntry 1 }

dot1dStpPortAdminEdgePort OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The administrative value of the Edge Port parameter. A value of TRUE(1) indicates that this port should be assumed as an edge-port and a value of FALSE(2) indicates that this port should be assumed as a non-edge-port."

REFERENCE

"IEEE 802.1t clause 14.8.2, 18.3.3"

::= { dot1dStpExtPortEntry 2 }

dot1dStpPortOperEdgePort OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The operational value of the Edge Port parameter. The object is initialized to the value of dot1dStpPortAdminEdgePort and is set FALSE on reception of a BPDU."

REFERENCE

"IEEE 802.1t clause 14.8.2, 18.3.4"

::= { dot1dStpExtPortEntry 3 }

dot1dStpPortAdminPointToPoint OBJECT-TYPE

SYNTAX INTEGER {
forceTrue(0),
forceFalse(1),
auto(2)
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The administrative point-to-point status of the LAN segment attached to this port. A value of forceTrue(0) indicates that this port should always be treated as if it is connected to a point-to-point link. A value of forceFalse(1) indicates that this port should be treated as having a shared media connection. A value of auto(2) indicates that this port is considered to have a point-to-point link if it is an Aggregator

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and all of its members are aggregatable, or if the MAC entity is configured for full duplex operation, either through auto-negotiation or by management means."

REFERENCE

"IEEE 802.1w clause 6.4.3, 6.5, 14.8.2"

::= { dot1dStpExtPortEntry 4 }

dot1dStpPortOperPointToPoint OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The operational point-to-point status of the LAN segment attached to this port. It indicates whether a port is considered to have a point-to-point connection or not. The value is determined by management or by auto-detection, as described in the dot1dStpPortAdminPointToPoint object."

REFERENCE

"IEEE 802.1w clause 6.4.3, 6.5, 14.8.2"

::= { dot1dStpExtPortEntry 5 }

-- rstpMIB - Conformance Information

```
rstpConformance OBJECT IDENTIFIER ::= { rstpMIB 1 }

rstpGroups OBJECT IDENTIFIER ::= { rstpConformance 1 }

rstpCompliances OBJECT IDENTIFIER ::= { rstpConformance 2 }
```

```
-----
-- Units of conformance
-----
```

```
rstpBridgeGroup OBJECT-GROUP
  OBJECTS {
    dot1dStpVersion,
    dot1dStpTxHoldCount
  }
  STATUS      current
  DESCRIPTION
    "Rapid Spanning Tree information for the bridge."
  ::= { rstpGroups 1 }
```

```
rstpDefaultPathCostGroup OBJECT-GROUP
  OBJECTS {
    dot1dStpPathCostDefault
```

```
  }
  STATUS      current
  DESCRIPTION
    "Default Spanning Tree path cost information."
  ::= { rstpGroups 2 }
```

```
rstpPortGroup OBJECT-GROUP
  OBJECTS {
    dot1dStpPortProtocolMigration,
    dot1dStpPortAdminEdgePort,
    dot1dStpPortOperEdgePort,
    dot1dStpPortAdminPointToPoint,
    dot1dStpPortOperPointToPoint
  }
  STATUS      current
  DESCRIPTION
    "Rapid Spanning Tree information for individual ports."
  ::= { rstpGroups 3 }
```

```

-----
-- Compliance statements
-----

rstpCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for device support of bridging
        services."

    MODULE
        MANDATORY-GROUPS {
            rstpBridgeGroup,
            rstpPortGroup
        }

        GROUP rstpDefaultPathCostGroup
            DESCRIPTION
                "Support for this group is mandatory only if
                both 16-bit and 32-bit Path Costs are supported."
    ::= { rstpCompliances 1 }

END

```

[5.](#) Definitions for U-BRIDGE-MIB

```

U-BRIDGE-MIB DEFINITIONS ::= BEGIN

```

```

-----
-- MIB for IEEE 802.1u Restricted Group Registration
-----

```

```

IMPORTS

```

```

    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE
    FROM SNMPv2-SMI

```

```
TruthValue, MacAddress
    FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
    FROM SNMPv2-CONF
dot1dBridge, dot1dBasePort, dot1dBasePortEntry
    FROM BRIDGE-MIB
dot1qPvid, dot1qVlan
    FROM Q-BRIDGE-MIB
dot1dGmrp
    FROM P-BRIDGE-MIB;
```

```
uBridgeMIB MODULE-IDENTITY
    LAST-UPDATED "200111160000Z"
    ORGANIZATION "IETF Bridge MIB Working Group"
    CONTACT-INFO
        "Email: Bridge-mib@ietf.org"
    DESCRIPTION
        "The Bridge MIB Extension module for managing devices
         that allow control over dynamic VLAN registration through
         Restricted VLAN Registration as defined by IEEE 802.1u."
    REVISION      "200111160000Z"
    DESCRIPTION
        "Draft 1"
    ::= { dot1dBridge 12 }
```

```
-----
-- Augmentation to the dot1dGmrpTable
-----
```

```
dot1dExtPortGmrpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1dExtPortGmrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing per port Restricted Group Registration
         control information."
    ::= { dot1dGmrp 2 }
```

```
dot1dExtPortGmrpEntry OBJECT-TYPE
    SYNTAX      Dot1dExtPortGmrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```


DESCRIPTION

"Information controlling Group Registration for a port on the device. This is indexed by dot1dBasePort."

AUGMENTS { dot1dBasePortEntry }

::= { dot1dExtPortGmrpTable 1 }

Dot1dExtPortGmrpEntry ::=

SEQUENCE {

dot1dPortRestrictedGroupRegistration

TruthValue,

dot1dPortLastGroupFailed

MacAddress,

dot1dPortGmrpFailingReason

INTEGER

}

dot1dPortRestrictedGroupRegistration OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The state of Restricted Group Registration on this port. If the value of this control is true(1), then creation of a new dynamic entry is permitted only if there is a Static Filtering Entry for the VLAN concerned, in which the Registrar Administrative Control value is Normal Registration."

REFERENCE

"IEEE 802.1t clause 10.3.2.3, 14.10.1.3."

DEFVAL { false }

::= { dot1dExtPortGmrpEntry 1 }

dot1dPortLastGroupFailed OBJECT-TYPE

SYNTAX MacAddress

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"The MAC address of the Group GMRP failed to register on this port. This object is accessible only through gmrpFailure notification."

REFERENCE

"IEEE 802.1t clause 14.10.1.2.3a."

::= { dot1dExtPortGmrpEntry 2 }

dot1dPortGmrpFailingReason OBJECT-TYPE

```
SYNTAX      INTEGER {
                lackOfResources(1),
                registrationRestricted(2)
            }
```

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"The reason for the last registration failure on this port. The value 'lackofResources(1)' indicates that GMRP failed due to lack of resources in the Filtering Database for the creation of a Group Registration Entry. The value 'registrationRestricted(2)' indicates that GMRP failed because dynamic group is restricted. This object is accessible only through gmrpFailure notification."

REFERENCE

"IEEE 802.1t clause 14.10.1.2.3c."

::= { dot1dExtPortGmrpEntry 3 }

 -- Augmentation to the dot1qPortVlanTable

dot1qExtPortVlanTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF Dot1qExtPortVlanEntry
```

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing per port Restricted VLAN Registration control information."

::= { dot1qVlan 11 }

dot1qExtPortVlanEntry OBJECT-TYPE

```
SYNTAX      Dot1qExtPortVlanEntry
```

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information controlling VLAN Registration for a port on the device. This is indexed by dot1dBasePort."

AUGMENTS { dot1dBasePortEntry }

::= { dot1qExtPortVlanTable 1 }

Dot1qExtPortVlanEntry ::=

```
SEQUENCE {
    dot1qPortRestrictedVlanRegistration
    TruthValue,
```

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```
        INTEGER
    }
```

dot1qPortRestrictedVlanRegistration OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The state of Restricted VLAN Registration on this port. If the value of this control is true(1), then creation of a new dynamic VLAN entry is permitted only if there is a Static VLAN Registration Entry for the VLAN concerned, in which the Registrar Administrative Control value for this port is Normal Registration."

REFERENCE

"IEEE 802.1u clause 11.2.3.2.3, 12.10.1.7."

DEFVAL { false }

::= { dot1qExtPortVlanEntry 1 }

dot1qPortGvrpFailingReason OBJECT-TYPE

```
SYNTAX      INTEGER {
                lackOfResources(1),
                registrationRestricted(2),
                unsupportedVID(3)
            }
```

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"The reason for the last registration failure on this port. The value 'lackofResources(1)' indicates that GVRP failed due to lack of resources in the Filtering Database for the creation of a VLAN Registration Entry. The value 'registrationRestricted(2)' indicates that GVRP failed because dynamic VLAN registration is restricted. And the value 'unsupportedVID(3)' indicates that a registration request for an unsupported VID is received."

REFERENCE

"IEEE 802.1u clause 12.10.1.6.3c."

::= { dot1qExtPortVlanEntry 2 }

-- Traps for Registration Failures

```
gmrpFailure NOTIFICATION-TYPE
  OBJECTS    { dot1dPortLastGroupFailed,
               dot1dBasePort,
               dot1dPortGmrpFailingReason }
```

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STATUS current

DESCRIPTION

"The trap that is generated when there is a GMRP failure. dot1dPortLastGroupFailed indicates the MAC address of the Group that has failed to be registered, dot1dBasePort indicates the port on which the registration is received, and dot1dPortGmrpFailingReason indicates the reason for the failure."

REFERENCE

"IEEE 802.1t 14.10.1.2."
 ::= { dot1dBridge 0 3 }

gvrpFailure NOTIFICATION-TYPE

```
OBJECTS    { dot1qPvid,
               dot1dBasePort,
               dot1qPortGvrpFailingReason }
```

STATUS current

DESCRIPTION

"The trap that is generated when there is a GVRP failure. dot1qPvid indicates the VID of the VLAN that GVRP has failed to register, dot1dBasePort indicates the port on which the registration is received, and dot1qPortGvrpFailingReason indicates the reason for the failure."

REFERENCE

"IEEE 802.1t 12.10.1.6."
 ::= { dot1dBridge 0 4 }

-- uBridgeMIB - Conformance Information

```
uBridgeConformance OBJECT IDENTIFIER ::= { uBridgeMIB 1 }
uBridgeGroups OBJECT IDENTIFIER ::= { uBridgeConformance 1 }
uBridgeCompliances OBJECT IDENTIFIER ::= { uBridgeConformance 2 }
```

```
-----
-- Units of conformance
-----
```

```
uBridgePortVlanGroup OBJECT-GROUP
  OBJECTS {
    dot1qPortRestrictedVlanRegistration,
    dot1qPortGvrpFailingReason
  }
```

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```
STATUS      current
DESCRIPTION
  "Per-port Restricted VLAN Registration Control parameter"
 ::= { uBridgeGroups 1 }
```

```
uBridgePortGmrpGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortRestrictedGroupRegistration,
    dot1dPortLastGroupFailed,
    dot1dPortGmrpFailingReason
  }
  STATUS      current
  DESCRIPTION
    "Per-port Restricted Group Registration Control parameter"
 ::= { uBridgeGroups 2 }
```

```
uBridgeTrapGroup NOTIFICATION-GROUP
  NOTIFICATIONS {
    gmrpFailure,
    gvrpFailure
  }
  STATUS      current
  DESCRIPTION
    "GMRP and GVRP notifications"
 ::= { uBridgeGroups 3 }
```

```
-- -----  
-- Compliance statements  
-- -----
```

```
uBridgeCompliance MODULE-COMPLIANCE  
    STATUS          current  
    DESCRIPTION  
        "The compliance statement for device support of bridging  
        services."  
  
    MODULE  
        GROUP uBridgePortVlanGroup  
        DESCRIPTION  
            "Support for this object group is optional."  
  
        GROUP uBridgePortGmrpGroup  
        DESCRIPTION  
            "Support for this object group is optional."  
  
        GROUP uBridgeTrapGroup  
        DESCRIPTION  
            "Support for this notification group is optional."
```

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```
::= { uBridgeCompliances 1 }
```

END

6. Definitions for V-BRIDGE-MIB

```
V-BRIDGE-MIB DEFINITIONS ::= BEGIN
```

```
-- -----  
-- MIB for IEEE 802.1v VLAN Classification by Protocol and Port  
-- -----
```

IMPORTS

```
    MODULE-IDENTITY, OBJECT-TYPE  
        FROM SNMPv2-SMI  
    MODULE-COMPLIANCE, OBJECT-GROUP  
        FROM SNMPv2-CONF  
    dot1dBridge, dot1dBasePort
```

FROM BRIDGE-MIB;

vBridgeMIB MODULE-IDENTITY

LAST-UPDATED "200106300000Z"

ORGANIZATION "IETF Bridge MIB Working Group"

CONTACT-INFO

"Email: Bridge-mib@ietf.org"

DESCRIPTION

"The Bridge MIB Extension module for managing devices
that support VLAN Classification by Protocol and Port
defined in IEEE 802.1v."

REVISION "200106300000Z"

DESCRIPTION

"Draft 0"

::= { dot1dBridge 13 }

vBridgeMIBObjects OBJECT IDENTIFIER ::= { vBridgeMIB 1 }

-- group in this MIB

dot1vProtocol OBJECT IDENTIFIER ::= { vBridgeMIBObjects 1 }

-- dot1vProtocol group

dot1vProtocolGroupTable OBJECT-TYPE

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SYNTAX SEQUENCE OF Dot1vProtocolGroupEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains mappings from Protocol
Templates to Protocol Group Identifiers used for
Port-and-Protocol-based VLAN Classification."

REFERENCE

"IEEE 802.1v clause 8.6.4"

::= { dot1vProtocol 1 }

dot1vProtocolGroupEntry OBJECT-TYPE

SYNTAX Dot1vProtocolGroupEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A mapping from a Protocol Template to a Protocol
Group Identifier."
INDEX { dot1vProtocolTemplateFrameType,
dot1vProtocolTemplateProtocolValue }
::= { dot1vProtocolGroupTable 1 }

Dot1vProtocolGroupEntry ::=

```
SEQUENCE {
    dot1vProtocolTemplateFrameType
        INTEGER,
    dot1vProtocolTemplateProtocolValue
        OCTET STRING,
    dot1vProtocolGroupId
        INTEGER
}
```

dot1vProtocolTemplateFrameType OBJECT-TYPE
SYNTAX INTEGER {
ethernet (1),
[rfc1042](#) (2),
snap8021H (3),
snapOther (4),
llcOther (5)
}
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The data-link encapsulation format or the
'detagged_frame_type' in a Protocol Template."
REFERENCE
"IEEE 802.1v clause 8.6.2"
::= { dot1vProtocolGroupEntry 1 }

dot1vProtocolTemplateProtocolValue OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (2 | 5))
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The identification of the protocol above the data-link layer in a Protocol Template. Depending on the frame type, the octet string will have one of the following values:

For 'ethernet', '[rfc1042](#)' and 'snap8021H',
this is the 16-bit (2-octet) IEEE 802.3 Type Field.

For 'snapOther',
this is the 40-bit (5-octet) PID.

For 'llcOther',
this is the 2-octet IEEE 802.2 LSAP pair:
first octet for DSAP and second octet for SSAP."

REFERENCE

"IEEE 802.1v clause 8.6.2"
 ::= { dot1vProtocolGroupEntry 2 }

dot1vProtocolGroupId OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Represents a group of protocols that are associated together when assigning a VID to a frame."

REFERENCE

"IEEE 802.1v clause 8.6.3, 12.10.2.1"
 ::= { dot1vProtocolGroupEntry 3 }

dot1vProtocolPortTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1vProtocolPortEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains VID sets used for Port-and-Protocol-based VLAN Classification."

REFERENCE

"IEEE 802.1v clause 8.4.4"
 ::= { dot1vProtocol 2 }

dot1vProtocolPortEntry OBJECT-TYPE

SYNTAX Dot1vProtocolPortEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

```

        "A VID set for a port."
INDEX      { dot1dBasePort,
              dot1vProtocolPortGroupId }
 ::= { dot1vProtocolPortTable 1 }

Dot1vProtocolPortEntry ::=
SEQUENCE {
    dot1vProtocolPortGroupId
        INTEGER,
    dot1vProtocolPortGroupVid
        INTEGER
}

dot1vProtocolPortGroupId OBJECT-TYPE
SYNTAX      INTEGER (1..2147483647)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Designates a group of protocols in the Protocol
    Group Database."
REFERENCE
    "IEEE 802.1v clause 8.6.3, 12.10.1.2"
 ::= { dot1vProtocolPortEntry 1 }

dot1vProtocolPortGroupVid OBJECT-TYPE
SYNTAX      INTEGER (1..4094)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The VID associated with a group of protocols for
    each port."
REFERENCE
    "IEEE 802.1v clause 8.4.4, 12.10.1.2"
 ::= { dot1vProtocolPortEntry 2 }

-----
-- vBridgeMIB - Conformance Information
-----

vBridgeConformance OBJECT IDENTIFIER ::= { vBridgeMIB 2 }

vBridgeGroups OBJECT IDENTIFIER ::= { vBridgeConformance 1 }

vBridgeCompliances OBJECT IDENTIFIER ::= { vBridgeConformance 2 }

-----
-- Units of conformance
-----

```

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vBridgeDeviceGroup OBJECT-GROUP

OBJECTS {

dot1vProtocolGroupId

}

STATUS current

DESCRIPTION

"VLAN classification information for the bridge."

::= { vBridgeGroups 1 }

vBridgePortGroup OBJECT-GROUP

OBJECTS {

dot1vProtocolPortGroupVid

}

STATUS current

DESCRIPTION

"VLAN classification information for individual ports."

::= { vBridgeGroups 2 }

-- Compliance statements

vBridgeCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for device support of bridging services."

MODULE

MANDATORY-GROUPS {

vBridgeDeviceGroup,

vBridgePortGroup

}

::= { vBridgeCompliances 1 }

END

7. Acknowledgments

This document was produced on behalf of the Bridge MIB Working Group in the Operations and Management area of the Internet Engineering Task Force.

The authors wish to thank the members of the Bridge MIB Working Group and Anders SW Christensen in particular for their comments and suggestions which improved this effort.

8. Security Considerations

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMPv1 by itself is not a secure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [USM] and the View-based Access Control Model [VACM] is recommended.

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