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Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions

Status of this Memo

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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 two MIB modules for managing the new capabilities of MAC bridges defined by the IEEE 802.1D-1998 MAC Bridges and the IEEE 802.1Q-1998 Virtual LAN (VLAN) standards for bridging between Local Area Network (LAN) segments. One MIB module defines objects for managing the 'Traffic Classes' and 'Enhanced Multicast Filtering' components of IEEE 802.1D-1998. The other MIB module defines objects for managing IEEE 802.1Q VLANs.

Provisions are made for support of transparent bridging. Provisions 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 the SMiv2 [V2SMI].

This memo supplements RFC 1493 [BRIDGEMIB] and (to a lesser extent) RFC 1525 [SBRIDGEMIB].

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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 an Architecture for Describing SNMP Management Frameworks [ARCH].
- 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 [V1SMI], STD 16, RFC 1212 [V1CONCISE] and RFC 1215 [V1TRAPS]. The second version, called SMIV2, is described in STD 58, RFC 2578 [V2SMI], STD 58, RFC 2579 [V2TC] and STD 58, RFC 2580 [V2CONFORM].
- 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 [V1PROTO]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPV2c and described in RFC 1901 [V2COMMUNITY] and RFC 1906 [V2TRANS]. The third version of the message protocol is called SNMPV3 and described in RFC 1906 [V2TRANS], Message Processing and Dispatching [V3MPC] and User-based Security Model [V3USM].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [V1PROTO]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [V2PROTO].
- o A set of fundamental applications described in SNMPV3 Applications [V3APPS] and the view-based access control mechanism described in View-based Access Control Model [V3VACM].

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 is 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] which is an update to the original IEEE 802.1D specification [802.1D-ORIG]. Managed objects for that original specification of transparent bridging were defined in RFC 1493 [BRIDGEMIB].

The original IEEE 802.1D is augmented by IEEE 802.1Q-1998 [802.1Q] to provide support for 'virtual bridged LANs' where a single bridged physical LAN network may be used to support multiple logical bridged LANs, each of which offers a service approximately the same as that defined by IEEE 802.1D. Such virtual LANs (VLANs) are an integral feature of switched LAN networks. A VLAN can be viewed as a group of end-stations on multiple LAN segments and can communicate as if they were on a single LAN. IEEE 802.1Q defines port-based Virtual LANs where membership is determined by the bridge port on which data frames are received. This memo defines the objects needed for the management of port-based VLANs in bridge entities.

This memo defines those objects needed for the management of a bridging entity operating in the transparent mode, as well as some objects applicable to all types of bridges. Managed objects for Source-Route bridging are defined in RFC 1525 [SRBRIDGEMIB].

2.1. Scope

This MIB includes a comprehensive set of managed objects which attempts to match the set defined in IEEE 802.1D and IEEE 802.1Q. However, to be consistent with the spirit of the SNMP Framework, a subjective judgement was made to omit the objects from those standards most 'costly' to implement in an agent and least 'essential' for fault and configuration management. The omissions are described in section 3 below.

Historical note:

The original bridge MIB [BRIDGEMIB] used the following principles for determining inclusion of an object in the BRIDGE-MIB module:

- (1) Start with a small set of essential objects and add only as further objects are needed.
- (2) Require objects be essential for either fault or configuration management.
- (3) Consider evidence of current use and/or utility.
- (4) Limit the total of objects.
- (5) Exclude objects which are simply derivable from others in this or other MIBs.
- (6) Avoid causing critical sections to be heavily instrumented. The guideline that was followed is one counter per critical section per layer.

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.

Two MIB modules are defined here:

- (1) Managed objects for an extended bridge MIB module P-BRIDGE-MIB for the traffic class and multicast filtering enhancements defined by IEEE 802.1D-1998 [802.1D].
- (2) Managed objects for a virtual bridge MIB module Q-BRIDGE-MIB for the Virtual LAN bridging enhancements defined by IEEE 802.1Q-1998 [802.1Q].

3.1. Structure of Extended Bridge MIB module

Objects in this MIB are arranged into groups. Each group is organized as a set of related objects. The overall structure and assignment of objects to their groups is shown below.

3.1.1. Relationship to IEEE 802.1D-1998 Manageable Objects

This section contains a cross-reference to the objects defined in IEEE 802.1D-1998 [802.1D]. It also details those objects that are not considered necessary in this MIB module.

Some objects defined by IEEE 802.1D-1998 have been included in the virtual bridge MIB module rather than this one: entries in `dot1qTpGroupTable`, `dot1qForwardAllTable` and `dot1qForwardUnregisteredTable` are required for virtual bridged LANs with additional indexing (e.g. per-VLAN, per-FDB) and so are not defined here. Instead, devices which do not implement virtual bridged LANs but do implement the Extended Forwarding Services defined by IEEE 802.1D (i.e. dynamic learning of multicast group addresses and group service requirements in the filtering database) should implement these tables with a fixed value for `dot1qFdbId` (the value 1 is recommended) or `dot1qVlanIndex` (the value 1 is recommended). Devices which support Extended Filtering Services should support `dot1qTpGroupTable`, `dot1qForwardAllTable` and `dot1qForwardUnregisteredTable`.

Extended Bridge MIB Name	IEEE 802.1D-1998 Name
dot1dExtBase	Bridge
dot1dDeviceCapabilities	
dot1dExtendedFilteringServices	
dot1dTrafficClasses	
dot1dTrafficClassesEnabled	
dot1dGmrpStatus	.ApplicantAdministrativeControl
dot1dPriority	
dot1dPortPriorityTable	
dot1dPortDefaultUserPriority	.UserPriority
dot1dPortNumTrafficClasses	
dot1dUserPriorityRegenTable	.UserPriorityRegenerationTable
dot1dUserPriority	
dot1dRegenUserPriority	
dot1dTrafficClassTable	.TrafficClassTable
dot1dTrafficClassPriority	
dot1dTrafficClass	
dot1dPortOutboundAccessPriorityTable	
	.OutboundAccessPriorityTable
dot1dPortOutboundAccessPriority	
dot1dGarp	
dot1dPortGarpTable	
dot1dPortGarpJoinTime	.JoinTime
dot1dPortGarpLeaveTime	.LeaveTime
dot1dPortGarpLeaveAllTime	.LeaveAllTime
dot1dGmrp	
dot1dPortGmrpTable	
dot1dPortGmrpStatus	.ApplicantAdministrativeControl
dot1dPortGmrpFailedRegistrations	.FailedRegistrations
dot1dPortGmrpLastPduOrigin	.OriginatorOfLastPDU
dot1dTp	
dot1dTpHCPortTable	
dot1dTpHCPortInFrames	.BridgePort.FramesReceived
dot1dTpHCPortOutFrames	.ForwardOutBound
dot1dTpHCPortInDiscards	.DiscardInbound
dot1dTpPortOverflowTable	
dot1dTpPortInOverflowFrames	.BridgePort.FramesReceived
dot1dTpPortOutOverflowFrames	.ForwardOutBound
dot1dTpPortInOverflowDiscards	.DiscardInbound

The following IEEE 802.1D-1998 management objects have not been included in the Bridge MIB for the indicated reasons.

IEEE 802.1D-1998 Object	Disposition
Bridge.StateValue	not considered useful
Bridge.ApplicantAdministrativeControl	not provided per-attribute (e.g. per-VLAN, per-Group). Only per-{device,port,application} control is provided in this MIB.

3.1.2. Relationship to IEEE 802.1Q Manageable Objects

This section contains section number cross-references to manageable objects defined in IEEE 802.1Q-1998 [802.1Q]. These objects have been included in this MIB as they provide a natural fit with the IEEE 802.1D objects with which they are co-located.

Extended Bridge MIB Name	IEEE 802.1Q-1998 Section and Name
dot1dExtBase	Bridge
dot1dDeviceCapabilities	
dot1qStaticEntryIndividualPort	5.2 implementation options
dot1qIVLCapable	
dot1qSVLCapable	
dot1qHybridCapable	
dot1qConfigurablePvidTagging	12.10.1.1 read bridge vlan config
dot1dLocalVlanCapable	
dot1dPortCapabilitiesTable	
dot1dPortCapabilities	
dot1qDot1qTagging	5.2 implementation options
dot1qConfigurableAcceptableFrameTypes	5.2 implementation options
dot1qIngressFiltering	5.2 implementation options

3.1.3. The dot1dExtBase Group

This group contains the objects which are applicable to all bridges implementing the traffic class and multicast filtering features of IEEE 802.1D-1998 [802.1D]. It includes per-device configuration of GARP and GMRP protocols. This group will be implemented by all devices which implement the extensions defined in 802.1D-1998.

3.1.4. The dotldPriority Group

This group contains the objects for configuring and reporting status of priority-based queuing mechanisms in a bridge. This includes per-port user_priority treatment, mapping of user_priority in frames into internal traffic classes and outbound user_priority and access_priority.

3.1.5. The dotldGarp Group

This group contains the objects for configuring and reporting on operation of the Generic Attribute Registration Protocol (GARP).

3.1.6. The dotldGmrp Group

This group contains the objects for configuring and reporting on operation of the GARP Multicast Registration Protocol (GMRP).

3.1.7. The dotldTpHCPortTable

This table extends the dotldTp group from the original bridge MIB [BRIDGEMIB] and contains the objects for reporting port bridging statistics for high capacity network interfaces.

3.1.8. The dotldTpPortOverflowTable

This table extends the dotldTp group from the original bridge MIB [BRIDGEMIB] and contains the objects for reporting the upper bits of port bridging statistics for high capacity network interfaces for when 32-bit counters are inadequate.

3.2. Structure of Virtual Bridge MIB module

Objects in this MIB are arranged into groups. Each group is organized as a set of related objects. The overall structure and assignment of objects to their groups is shown below. Some manageable objects defined in the original bridge MIB [BRIDGEMIB] need to be indexed differently when they are used in a VLAN bridging environment: these objects are, therefore, effectively duplicated by new objects with different indexing which are defined in the Virtual Bridge MIB.

3.2.1. Relationship to IEEE 802.1Q Manageable Objects

This section contains section-number cross-references to manageable objects defined in clause 12 of IEEE 802.1Q-1998 [802.1Q]. It also details those objects that are not considered necessary in this MIB module.

Note: unlike IEEE 802.1D-1998, IEEE 802.1Q-1998 [802.1Q] did not define exact syntax for a set of managed objects: the following cross-references indicate the section numbering of the descriptions of management operations from clause 12 in the latter document.

Virtual Bridge MIB object	IEEE 802.1Q-1998 Reference
dot1qBase	
dot1qVlanVersionNumber	12.10.1.1 read bridge vlan config
dot1qMaxVlanId	12.10.1.1 read bridge vlan config
dot1qMaxSupportedVlans	12.10.1.1 read bridge vlan config
dot1qNumVlans	
dot1qGvrpStatus	12.9.2.1/2 read/set garp applicant controls
dot1qTp	
dot1qFdbTable	
dot1qFdbId	
dot1qFdbDynamicCount	12.7.1.1.3 read filtering d/base
dot1qTpFdbTable	
dot1qTpFdbAddress	
dot1qTpFdbPort	
dot1qTpFdbStatus	
dot1qTpGroupTable	12.7.7.1 read filtering entry
dot1qTpGroupAddress	
dot1qTpGroupEgressPorts	
dot1qTpGroupLearnt	
dot1qForwardAllTable	12.7.7.1 read filtering entry
dot1qForwardAllPorts	
dot1qForwardAllStaticPorts	
dot1qForwardAllForbiddenPorts	
dot1qForwardUnregisteredTable	12.7.7.1 read filtering entry
dot1qForwardUnregisteredPorts	
dot1qForwardUnregisteredStaticPorts	
dot1qForwardUnregisteredForbiddenPorts	
dot1qStatic	
dot1qStaticUnicastTable	12.7.7.1 create/delete/read filtering entry
	12.7.6.1 read permanent database
dot1qStaticUnicastAddress	
dot1qStaticUnicastReceivePort	
dot1qStaticUnicastAllowedToGoTo	
dot1qStaticUnicastStatus	
dot1qStaticMulticastTable	12.7.7.1 create/delete/read filtering entry
	12.7.6.1 read permanent database
dot1qStaticMulticastAddress	
dot1qStaticMulticastReceivePort	
dot1qStaticMulticastStaticEgressPorts	

```

    dot1qStaticMulticastForbiddenEgressPorts
    dot1qStaticMulticastStatus
dot1qVlan
    dot1qVlanNumDeletes
    dot1qVlanCurrentTable          12.10.2.1 read vlan configuration
                                   12.10.3.5 read VID to FID
                                   allocations
                                   12.10.3.6 read FID allocated to
                                   VID
                                   12.10.3.7 read VIDs allocated to
                                   FID

    dot1qVlanTimeMark
    dot1qVlanIndex
    dot1qVlanFdbId
    dot1qVlanCurrentEgressPorts
    dot1qVlanCurrentUntaggedPorts
    dot1qVlanStatus
    dot1qVlanCreationTime
dot1qVlanStaticTable              12.7.7.1/2/3 create/delete/read
                                   filtering entry
                                   12.7.6.1 read permanent database
                                   12.10.2.2 create vlan config
                                   12.10.2.3 delete vlan config
                                   12.4.1.3 set bridge name

    dot1qVlanStaticName
    dot1qVlanStaticEgressPorts
    dot1qVlanForbiddenEgressPorts
    dot1qVlanStaticUntaggedPorts
    dot1qVlanStaticRowStatus
dot1qNextFreeLocalVlanIndex
dot1qPortVlanTable                12.10.1.1 read bridge vlan
                                   configuration
    dot1qPvid                      12.10.1.2 configure PVID values
    dot1qPortAcceptableFrameTypes 12.10.1.3 configure acceptable
                                   frame types parameter
    dot1qPortIngressFiltering      12.10.1.4 configure ingress
                                   filtering parameters
    dot1qPortGvrpStatus            12.9.2.2 read/set garp applicant
                                   controls

    dot1qPortGvrpFailedRegistrations
    dot1qPortGvrpLastPduOrigin
dot1qPortVlanStatisticsTable      12.6.1.1 read forwarding port
                                   counters

    dot1qTpVlanPortInFrames
    dot1qTpVlanPortOutFrames
    dot1qTpVlanPortInDiscards
    dot1qTpVlanPortInOverflowFrames
    dot1qTpVlanPortOutOverflowFrames
    dot1qTpVlanPortInOverflowDiscards

```

dot1qPortVlanHCStatisticsTable	12.6.1.1 read forwarding port counters
dot1qTpVlanPortHCInFrames	
dot1qTpVlanPortHCOutFrames	
dot1qTpVlanPortHCInDiscards	
dot1qLearningConstraintsTable	12.10.3.1/3/4 read/set/delete vlan learning constraints
	12.10.3.2 read vlan learning constraints for VID
dot1qConstraintVlan	
dot1qConstraintSet	
dot1qConstraintType	
dot1qConstraintStatus	
dot1qConstraintSetDefault	
dot1qConstraintTypeDefault	

The following IEEE 802.1Q management objects have not been included in the Bridge MIB for the indicated reasons.

IEEE 802.1Q-1998 Operation	Disposition
reset bridge (12.4.1.4)	not considered useful
reset vlan bridge (12.10.1.5)	not considered useful
read forwarding port counters (12.6.1.1)	
discard on error details	not considered useful
read permanent database (12.7.6.1)	
permanent database size	not considered useful
number of static filtering entries	count rows in dot1qStaticUnicastTable + dot1qStaticMulticastTable
number of static VLAN registration entries	count rows in dot1qVlanStaticTable
read filtering entry range (12.7.7.4)	use GetNext operation.
read filtering database (12.7.1.1)	
filtering database size	not considered useful
number of dynamic group address entries (12.7.1.3)	count rows applicable to each FDB in dot1dTpGroupTable

read garp state (12.9.3.1)	not considered useful
notify vlan registration failure (12.10.1.6)	not considered useful
notify learning constraint violation (12.10.3.10)	not considered useful

3.2.2. The dot1qBase Group

This mandatory group contains the objects which are applicable to all bridges implementing IEEE 802.1Q virtual LANs.

3.2.3. The dot1qTp Group

This group contains objects that control the operation and report the status of transparent bridging. This includes management of the dynamic Filtering Databases for both unicast and multicast forwarding. This group will be implemented by all bridges that perform destination-address filtering.

3.2.4. The dot1qStatic Group

This group contains objects that control static configuration information for transparent bridging. This includes management of the static entries in the Filtering Databases for both unicast and multicast forwarding.

3.2.5. The dot1qVlan Group

This group contains objects that control configuration and report status of the Virtual LANs known to a bridge. This includes management of the statically configured VLANs as well as reporting VLANs discovered by other means e.g. GVRP. It also controls configuration and reports status of per-port objects relating to VLANs and reports traffic statistics. It also provides for management of the VLAN Learning Constraints.

3.3. Textual Conventions

The datatypes MacAddress, BridgeId, Timeout, EnabledStatus, PortList, VlanIndex and VlanId are used as textual conventions in this document. These textual conventions have NO effect on either the syntax nor the semantics of any managed object. Objects defined using these conventions are always encoded by means of the rules that define their primitive type. Hence, no changes to the SMI or the SNMP are necessary to accommodate these textual conventions which are adopted merely for the convenience of readers.

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 also implement (at least) the 'system' group defined in MIB-II [MIB2], the 'interfaces' group defined in [INTERFACEMIB] and the original bridge MIB [BRIDGEMIB].

3.4.1. Relationship to the 'system' group

In MIB-II, the 'system' group is defined as being mandatory for all systems such that each managed entity contains one instance of each object in the 'system' group. Thus, those objects apply to the entity as a whole irrespective of whether the entity's sole functionality is bridging, or whether bridging is only a subset of the entity's functionality.

3.4.2. Relation to Interfaces MIB

The Interfaces Group MIB [INTERFACEMIB], requires that any MIB which is an adjunct of the Interfaces Group MIB, clarify specific areas within the Interfaces Group MIB. These areas were intentionally left vague in the Interfaces Group MIB to avoid over-constraining the MIB, thereby precluding management of certain media-types.

The Interfaces Group MIB enumerates several areas which a media-specific MIB must clarify. Each of these areas is addressed in a following subsection. The implementor is referred to the Interfaces Group MIB in order to understand the general intent of these areas.

In the Interfaces Group MIB, the 'interfaces' group is defined as being mandatory for all systems and contains information on an entity's interfaces, where each interface is thought of as being attached to a 'subnetwork'. (Note that this term is not to be confused with 'subnet' which refers to an addressing partitioning scheme used in the Internet suite of protocols.) The term 'segment' is used in this memo to refer to such a subnetwork, whether it be an Ethernet segment, a 'ring', a WAN link, or even an X.25 virtual circuit.

Implicit in this Extended Bridge MIB is the notion of ports on a bridge. Each of these ports is associated with one interface of the 'interfaces' group (one row in ifTable) and, in most situations, each port is associated with a different interface. However, there are situations in which multiple ports are associated with the same

interface. An example of such a situation would be several ports each corresponding one-to-one with several X.25 virtual circuits but all on the same interface.

Each port is uniquely identified by a port number. A port number has no mandatory relationship to an interface number, but in the simple case a port number will have the same value as the corresponding interface's interface number. Port numbers are in the range (1..dot1dBaseNumPorts).

Some entities perform other functionality as well as bridging through the sending and receiving of data on their interfaces. In such situations, only a subset of the data sent/received on an interface is within the domain of the entity's bridging functionality. This subset is considered to be delineated according to a set of protocols, with some protocols being bridged, and other protocols not being bridged. For example, in an entity which exclusively performed bridging, all protocols would be considered as being bridged, whereas in an entity which performed IP routing on IP datagrams and only bridged other protocols, only the non-IP data would be considered as being bridged. Thus, this Extended Bridge MIB (and in particular, its counters) is applicable only to that subset of the data on an entity's interfaces which is sent/received for a protocol being bridged. All such data is sent/received via the ports of the bridge.

3.4.2.1. Layering Model

This memo assumes the interpretation of the Interfaces Group to be in accordance with the Interfaces Group MIB [INTERFACEMIB] which states that the interfaces table (ifTable) contains information on the managed resource's interfaces and that each sub-layer below the internetwork layer of a network interface is considered an interface.

This document recommends that, within an entity, VLANs which are instantiated as an entry in dot1qVlanCurrentTable by either management configuration through dot1qVlanStaticTable or by dynamic means (e.g. through GVRP), are NOT also represented by an entry in ifTable.

Where an entity contains higher-layer protocol entities e.g. IP-layer interfaces that transmit and receive traffic to/from a VLAN, these should be represented in the ifTable as interfaces of type propVirtual(53). Protocol-specific types such as l3ipxvlan(137) should not be used here since there is no implication that the bridge will perform any protocol filtering before delivering up to these virtual interfaces.

3.4.2.2. ifStackTable

In addition, the Interfaces Group MIB [INTERFACEMIB] defines a table 'ifStackTable' for describing the relationship between logical interfaces within an entity. It is anticipated that implementors will use this table to describe the binding of e.g. IP interfaces to physical ports, although the presence of VLANs makes the representation less than perfect for showing connectivity: the ifStackTable cannot represent the full capability of the IEEE 802.1Q VLAN bridging standard since that makes a distinction between VLAN bindings on 'ingress' to and 'egress' from a port: these relationships may or may not be symmetrical whereas Interface MIB Evolution assumes a symmetrical binding for transmit and receive. This makes it necessary to define other manageable objects for configuring which ports are members of which VLANs.

3.4.2.3. ifRcvAddressTable

This table contains all MAC addresses, unicast, multicast, and broadcast, for which an interface will receive packets and forward them up to a higher layer entity for local consumption. Note that this does not include addresses for data-link layer control protocols such as Spanning-Tree, GMRP or GVRP. The format of the address, contained in ifRcvAddressAddress, is the same as for ifPhysAddress.

This table does not include unicast or multicast addresses which are accepted for possible forwarding out some other port. This table is explicitly not intended to provide a bridge address filtering mechanism.

3.4.3. Relation to Original Bridge MIB

This section defines how objects in the original bridge MIB module [BRIDGEMIB] should be represented for devices which implement the extensions: some of the old objects are less useful in such devices but must still be implemented for reasons of backwards compatibility. Note that formal conformance statements for that MIB module do not exist since it is defined in SMIV1.

3.4.3.1. The dot1dBase Group

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

3.4.3.2. The dot1dStp Group

This group contains the objects that denote the bridge's state with respect to the Spanning Tree Protocol. Interpretation of this group is unchanged.

3.4.3.3. The dot1dTp Group

This group contains objects that describe the entity's state with respect to transparent bridging.

In a device operating with a single Filtering Database, interpretation of this group is unchanged.

In a device supporting multiple Filtering Databases, this group is interpreted as follows:

dot1dTpLearnedEntryDiscards

The number of times that *any* of the FDBs became full.

dot1dTpAgingTime

This applies to all Filtering Databases.

dot1dTpFdbTable

Report MAC addresses learned on each port, regardless of which Filtering Database they have been learnt in. If an address has been learnt in multiple databases on a single port, report it only once. If an address has been learnt in multiple databases on more than one port, report the entry on any one of the valid ports.

dot1dTpPortTable

This table is port-based and is not affected by multiple Filtering Databases or multiple VLANs. The counters should include frames received or transmitted for all VLANs. Note that equivalent 64-bit port statistics counters, as well as other objects to represent the upper 32 bits of these counters, are defined in this document for high capacity network interfaces. These have conformance statements to indicate for which speeds of interface they are required.

3.4.3.4. The dot1dStatic Group

This optional group contains objects that describe the configuration of destination-address filtering.

In a device operating with a single Filtering Database, interpretation of this group is unchanged.

In a device supporting multiple Filtering Databases, this group is interpreted as follows:

dot1dStaticTable

Entries read from this table include all static entries from all of the Filtering Databases. Entries for the same MAC address and receive port in more than one Filtering Database must appear only once since these are the indices of this table. This table should be implemented as read-only in devices that support multiple Forwarding Databases - instead, write access should be provided through dot1qStaticUnicastTable and dot1qStaticMulticastTable, as defined in this document.

3.4.3.5. Additions to the Original Bridge MIB

In addition to the objects in the original bridge MIB [BRIDGEMIB], this document contains:

- (1) support for multiple traffic classes and dynamic multicast filtering as per IEEE 802.1D-1998 [802.1D].
- (2) support for bridged Virtual LANs as per IEEE 802.1Q-1998 [802.1Q].
- (3) support for 64-bit versions of original bridge MIB [BRIDGEMIB] port counters.

4. Definitions for Extended Bridge MIB

P-BRIDGE-MIB DEFINITIONS ::= BEGIN

```
-- -----
-- MIB for IEEE 802.1p devices
-- -----
```

IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE, Counter32, Counter64
    FROM SNMPv2-SMI
TruthValue, TimeInterval, MacAddress, TEXTUAL-CONVENTION
    FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
dot1dTp, dot1dTpPort, dot1dBridge,
dot1dBasePortEntry, dot1dBasePort
    FROM BRIDGE-MIB;
```

pBridgeMIB MODULE-IDENTITY

LAST-UPDATED "9908250000Z"

ORGANIZATION "IETF Bridge MIB Working Group"

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Email: kzm@cisco.com"

DESCRIPTION

"The Bridge MIB Extension module for managing Priority
and Multicast Filtering, defined by IEEE 802.1D-1998."

```
-- revision history

REVISION      "9908250000Z"
DESCRIPTION
    "Initial version, published as RFC 2674."

 ::= { dot1dBridge 6 }

pBridgeMIBObjects OBJECT IDENTIFIER ::= { pBridgeMIB 1 }

-- -----
-- Textual Conventions
-- -----

EnabledStatus ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "A simple status value for the object."
    SYNTAX      INTEGER { enabled(1), disabled(2) }

-- -----
-- -----
-- groups in the P-BRIDGE MIB
-- -----

dot1dExtBase    OBJECT IDENTIFIER ::= { pBridgeMIBObjects 1 }
dot1dPriority    OBJECT IDENTIFIER ::= { pBridgeMIBObjects 2 }
dot1dGarp        OBJECT IDENTIFIER ::= { pBridgeMIBObjects 3 }
dot1dGmrp        OBJECT IDENTIFIER ::= { pBridgeMIBObjects 4 }

-- -----
-- -----
-- the dot1dExtBase group
-- -----

dot1dDeviceCapabilities OBJECT-TYPE
    SYNTAX      BITS {
        dot1dExtendedFilteringServices(0),
            -- can perform filtering of
            -- individual multicast addresses
            -- controlled by GMRP.
        dot1dTraficClasses(1),
            -- can map user priority to
            -- multiple traffic classes.
```

```

dot1qStaticEntryIndividualPort(2),
    -- dot1qStaticUnicastReceivePort &
    -- dot1qStaticMulticastReceivePort
    -- can represent non-zero entries.
dot1qIVLCapable(3),    -- Independent VLAN Learning.
dot1qSVLCapable(4),    -- Shared VLAN Learning.
dot1qHybridCapable(5),
    -- both IVL & SVL simultaneously.
dot1qConfigurablePvidTagging(6),
    -- whether the implementation
    -- supports the ability to
    -- override the default PVID
    -- setting and its egress status
    -- (VLAN-Tagged or Untagged) on
    -- each port.
dot1dLocalVlanCapable(7)
    -- can support multiple local
    -- bridges, outside of the scope
    -- of 802.1Q defined VLANs.
}
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "Indicates the optional parts of IEEE 802.1D and 802.1Q
    that are implemented by this device and are manageable
    through this MIB.  Capabilities that are allowed on a
    per-port basis are indicated in dot1dPortCapabilities."
REFERENCE
    "ISO/IEC 15802-3 Section 5.2,
    IEEE 802.1Q/D11 Section 5.2, 12.10.1.1.3/b/2"
::= { dot1dExtBase 1 }

dot1dTrafficClassesEnabled OBJECT-TYPE
SYNTAX        TruthValue
MAX-ACCESS    read-write
STATUS        current
DESCRIPTION
    "The value true(1) indicates that Traffic Classes are
    enabled on this bridge.  When false(2), the bridge
    operates with a single priority level for all traffic."
DEFVAL        { true }
::= { dot1dExtBase 2 }

dot1dGmrpStatus OBJECT-TYPE
SYNTAX        EnabledStatus
MAX-ACCESS    read-write
STATUS        current
DESCRIPTION

```

"The administrative status requested by management for GMRP. The value enabled(1) indicates that GMRP should be enabled on this device, in all VLANs, on all ports for which it has not been specifically disabled. When disabled(2), GMRP is disabled, in all VLANs, on all ports and all GMRP packets will be forwarded transparently. This object affects both Applicant and Registrar state machines. A transition from disabled(2) to enabled(1) will cause a reset of all GMRP state machines on all ports."

```
DEFVAL      { enabled }
 ::= { dot1dExtBase 3 }
```

 -- Port Capabilities Table

dot1dPortCapabilitiesTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1dPortCapabilitiesEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains capabilities information about every port that is associated with this bridge."

```
::= { dot1dExtBase 4 }
```

dot1dPortCapabilitiesEntry OBJECT-TYPE

SYNTAX Dot1dPortCapabilitiesEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A set of capabilities information about this port indexed by dot1dBasePort."

AUGMENTS { dot1dBasePortEntry }

```
::= { dot1dPortCapabilitiesTable 1 }
```

Dot1dPortCapabilitiesEntry ::=

```
SEQUENCE {
    dot1dPortCapabilities
        BITS
}
```

dot1dPortCapabilities OBJECT-TYPE

SYNTAX BITS {

dot1qDot1qTagging(0), -- supports 802.1Q VLAN tagging of
 -- frames and GVRP.

dot1qConfigurableAcceptableFrameTypes(1),
 -- allows modified values of

```

-- dot1qPortAcceptableFrameTypes.
dot1qIngressFiltering(2)
-- supports the discarding of any
-- frame received on a Port whose
-- VLAN classification does not
-- include that Port in its Member
-- set.
}
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "Indicates the parts of IEEE 802.1D and 802.1Q that are
    optional on a per-port basis that are implemented by
    this device and are manageable through this MIB."
REFERENCE
    "ISO/IEC 15802-3 Section 5.2,
    IEEE 802.1Q/D11 Section 5.2"
::= { dot1dPortCapabilitiesEntry 1 }

-- -----
-- the dot1dPriority group
-- -----

-- -----
-- Port Priority Table
-- -----

dot1dPortPriorityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1dPortPriorityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains information about every port that
        is associated with this transparent bridge."
    ::= { dot1dPriority 1 }

dot1dPortPriorityEntry OBJECT-TYPE
    SYNTAX      Dot1dPortPriorityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of Default User Priorities for each port of a
        transparent bridge. This is indexed by dot1dBasePort."
    AUGMENTS { dot1dBasePortEntry }
    ::= { dot1dPortPriorityTable 1 }

Dot1dPortPriorityEntry ::=
    SEQUENCE {

```

```

        dotldPortDefaultUserPriority
            INTEGER,
        dotldPortNumTrafficClasses
            INTEGER
    }

dotldPortDefaultUserPriority OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The default ingress User Priority for this port.  This
        only has effect on media, such as Ethernet, that do not
        support native User Priority."
    ::= { dotldPortPriorityEntry 1 }

dotldPortNumTrafficClasses OBJECT-TYPE
    SYNTAX      INTEGER (1..8)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The number of egress traffic classes supported on this
        port.  This object may optionally be read-only."
    ::= { dotldPortPriorityEntry 2 }

-- -----
-- User Priority Regeneration Table
-- -----

dotldUserPriorityRegenTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DotldUserPriorityRegenEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of Regenerated User Priorities for each received
        User Priority on each port of a bridge.  The Regenerated
        User Priority value may be used to index the Traffic
        Class Table for each input port.  This only has effect
        on media that support native User Priority.  The default
        values for Regenerated User Priorities are the same as
        the User Priorities."
    REFERENCE
        "ISO/IEC 15802-3 Section 6.4"
    ::= { dotldPriority 2 }

```



```

dotldUserPriorityRegenEntry OBJECT-TYPE
    SYNTAX      DotldUserPriorityRegenEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A mapping of incoming User Priority to a Regenerated
        User Priority."
    INDEX       { dotldBasePort, dotldUserPriority }
    ::= { dotldUserPriorityRegenTable 1 }

DotldUserPriorityRegenEntry ::=
    SEQUENCE {
        dotldUserPriority
            INTEGER,
        dotldRegenUserPriority
            INTEGER
    }

dotldUserPriority OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The User Priority for a frame received on this port."
    ::= { dotldUserPriorityRegenEntry 1 }

dotldRegenUserPriority OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The Regenerated User Priority the incoming User
        Priority is mapped to for this port."
    ::= { dotldUserPriorityRegenEntry 2 }

-- -----
-- Traffic Class Table
-- -----

dotldTrafficClassTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DotldTrafficClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table mapping evaluated User Priority to Traffic
        Class, for forwarding by the bridge.  Traffic class is a
        number in the range (0..(dotldPortNumTrafficClasses-1))."
    REFERENCE

```

```

    "ISO/IEC 15802-3 Table 7-2"
    ::= { dot1dPriority 3 }

```

```

dot1dTrafficClassEntry OBJECT-TYPE
    SYNTAX      Dot1dTrafficClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "User Priority to Traffic Class mapping."
    INDEX       { dot1dBasePort, dot1dTrafficClassPriority }
    ::= { dot1dTrafficClassTable 1 }

```

```

Dot1dTrafficClassEntry ::=
    SEQUENCE {
        dot1dTrafficClassPriority
            INTEGER,
        dot1dTrafficClass
            INTEGER
    }

```

```

dot1dTrafficClassPriority OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Priority value determined for the received frame.
        This value is equivalent to the priority indicated in
        the tagged frame received, or one of the evaluated
        priorities, determined according to the media-type.

        For untagged frames received from Ethernet media, this
        value is equal to the dot1dPortDefaultUserPriority value
        for the ingress port.

        For untagged frames received from non-Ethernet media,
        this value is equal to the dot1dRegenUserPriority value
        for the ingress port and media-specific user priority."
    ::= { dot1dTrafficClassEntry 1 }

```

```

dot1dTrafficClass OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The Traffic Class the received frame is mapped to."
    ::= { dot1dTrafficClassEntry 2 }

```

-- Outbound Access Priority Table

-- -----

dotldPortOutboundAccessPriorityTable OBJECT-TYPE

SYNTAX SEQUENCE OF DotldPortOutboundAccessPriorityEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table mapping Regenerated User Priority to Outbound Access Priority. This is a fixed mapping for all port types, with two options for 802.5 Token Ring."

REFERENCE

"ISO/IEC 15802-3 Table 7-3"

::= { dotldPriority 4 }

dotldPortOutboundAccessPriorityEntry OBJECT-TYPE

SYNTAX DotldPortOutboundAccessPriorityEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Regenerated User Priority to Outbound Access Priority mapping."

INDEX { dotldBasePort, dotldRegenUserPriority }

::= { dotldPortOutboundAccessPriorityTable 1 }

DotldPortOutboundAccessPriorityEntry ::=

```
SEQUENCE {
    dotldPortOutboundAccessPriority
        INTEGER
}
```

dotldPortOutboundAccessPriority OBJECT-TYPE

SYNTAX INTEGER (0..7)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Outbound Access Priority the received frame is mapped to."

::= { dotldPortOutboundAccessPriorityEntry 1 }

-- -----

-- the dotldGarp group

-- -----

-- -----

-- The GARP Port Table

-- -----

```
dotldPortGarpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DotldPortGarpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table of GARP control information about every bridge
        port. This is indexed by dotldBasePort."
    ::= { dotldGarp 1 }

dotldPortGarpEntry OBJECT-TYPE
    SYNTAX      DotldPortGarpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "GARP control information for a bridge port."
    AUGMENTS { dotldBasePortEntry }
    ::= { dotldPortGarpTable 1 }

DotldPortGarpEntry ::=
    SEQUENCE {
        dotldPortGarpJoinTime
            TimeInterval,
        dotldPortGarpLeaveTime
            TimeInterval,
        dotldPortGarpLeaveAllTime
            TimeInterval
    }

dotldPortGarpJoinTime OBJECT-TYPE
    SYNTAX      TimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The GARP Join time, in centiseconds."
    DEFVAL      { 20 }
    ::= { dotldPortGarpEntry 1 }

dotldPortGarpLeaveTime OBJECT-TYPE
    SYNTAX      TimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The GARP Leave time, in centiseconds."
    DEFVAL      { 60 }
    ::= { dotldPortGarpEntry 2 }
```

dotldPortGarpLeaveAllTime OBJECT-TYPE

SYNTAX TimeInterval

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The GARP LeaveAll time, in centiseconds."

DEFVAL { 1000 }

::= { dotldPortGarpEntry 3 }

```

-- -----
-- The GMRP Port Configuration and Status Table
-- -----

```

dotldPortGmrpTable OBJECT-TYPE

SYNTAX SEQUENCE OF DotldPortGmrpEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of GMRP control and status information about every bridge port. Augments the dotldBasePortTable."

::= { dotldGmrp 1 }

dotldPortGmrpEntry OBJECT-TYPE

SYNTAX DotldPortGmrpEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"GMRP control and status information for a bridge port."

AUGMENTS { dotldBasePortEntry }

::= { dotldPortGmrpTable 1 }

DotldPortGmrpEntry ::=

```

SEQUENCE {
    dotldPortGmrpStatus
        EnabledStatus,
    dotldPortGmrpFailedRegistrations
        Counter32,
    dotldPortGmrpLastPduOrigin
        MacAddress
}

```

dotldPortGmrpStatus OBJECT-TYPE

SYNTAX EnabledStatus

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The administrative state of GMRP operation on this port. The value enabled(1) indicates that GMRP is enabled on this port in all VLANs as long as dotldGmrpStatus is also enabled(1). A value of disabled(2) indicates that GMRP is disabled on this port in all VLANs: any GMRP packets received will be silently discarded and no GMRP registrations will be propagated from other ports. Setting this to a value of enabled(1) will be stored by the agent but will only take effect on the GMRP protocol operation if dotldGmrpStatus also indicates the value enabled(1). This object affects all GMRP Applicant and Registrar state machines on this port. A transition from disabled(2) to enabled(1) will cause a reset of all GMRP state machines on this port."

DEFVAL { enabled }
 ::= { dotldPortGmrpEntry 1 }

dotldPortGmrpFailedRegistrations OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of failed GMRP registrations, for any reason, in all VLANs, on this port."

::= { dotldPortGmrpEntry 2 }

dotldPortGmrpLastPduOrigin OBJECT-TYPE

SYNTAX MacAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Source MAC Address of the last GMRP message received on this port."

::= { dotldPortGmrpEntry 3 }

-- -----
 -- High Capacity Port Table for Transparent Bridges
 -- -----

dotldTpHCPortTable OBJECT-TYPE

SYNTAX SEQUENCE OF DotldTpHCPortEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains information about every high capacity port that is associated with this transparent bridge."

::= { dotldTp 5 }

```
dot1dTpHCPortEntry OBJECT-TYPE
    SYNTAX      Dot1dTpHCPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Statistics information for each high capacity port of a
         transparent bridge."
    INDEX       { dot1dTpPort }
    ::= { dot1dTpHCPortTable 1 }
```

```
Dot1dTpHCPortEntry ::=
    SEQUENCE {
        dot1dTpHCPortInFrames
            Counter64,
        dot1dTpHCPortOutFrames
            Counter64,
        dot1dTpHCPortInDiscards
            Counter64
    }
```

```
dot1dTpHCPortInFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of frames that have been received by this
         port from its segment. Note that a frame received on
         the interface corresponding to this port is only counted
         by this object if and only if it is for a protocol being
         processed by the local bridging function, including
         bridge management frames."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1dTpHCPortEntry 1 }
```

```
dot1dTpHCPortOutFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of frames that have been transmitted by this
         port to its segment. Note that a frame transmitted on
         the interface corresponding to this port is only counted
         by this object if and only if it is for a protocol being
         processed by the local bridging function, including
         bridge management frames."
```

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1dTpHCPortEntry 2 }

dot1dTpHCPortInDiscards OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Count of valid frames that have been received by this port from its segment which were discarded (i.e., filtered) by the Forwarding Process."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1dTpHCPortEntry 3 }

```
-- -----
-- Upper part of High Capacity Port Table for Transparent Bridges
-- -----
```

dot1dTpPortOverflowTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1dTpPortOverflowEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains the most-significant bits of statistics counters for ports that are associated with this transparent bridge that are on high capacity interfaces, as defined in the conformance clauses for this table. This table is provided as a way to read 64-bit counters for agents which support only SNMPv1.

Note that the reporting of most-significant and least-significant counter bits separately runs the risk of missing an overflow of the lower bits in the interval between sampling. The manager must be aware of this possibility, even within the same varbindlist, when interpreting the results of a request or asynchronous notification."

::= { dot1dTp 6 }

dot1dTpPortOverflowEntry OBJECT-TYPE

SYNTAX Dot1dTpPortOverflowEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The most significant bits of statistics counters for a high capacity interface of a transparent bridge. Each object is associated with a corresponding object in dot1dTpPortTable which indicates the least significant bits of the counter."

INDEX { dot1dTpPort }

::= { dot1dTpPortOverflowTable 1 }

Dot1dTpPortOverflowEntry ::=

SEQUENCE {

dot1dTpPortInOverflowFrames

Counter32,

dot1dTpPortOutOverflowFrames

Counter32,

dot1dTpPortInOverflowDiscards

Counter32

}

dot1dTpPortInOverflowFrames OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated dot1dTpPortInFrames counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1dTpPortOverflowEntry 1 }

dot1dTpPortOutOverflowFrames OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated dot1dTpPortOutFrames counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1dTpPortOverflowEntry 2 }

dot1dTpPortInOverflowDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated
dot1dTpPortInDiscards counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1dTpPortOverflowEntry 3 }

```
-- -----
-- IEEE 802.1p MIB - Conformance Information
-- -----
```

pBridgeConformance OBJECT IDENTIFIER ::= { pBridgeMIB 2 }

pBridgeGroups OBJECT IDENTIFIER ::= { pBridgeConformance 1 }

pBridgeCompliances OBJECT IDENTIFIER
::= { pBridgeConformance 2 }

```
-- -----
-- units of conformance
-- -----
```

pBridgeExtCapGroup OBJECT-GROUP

OBJECTS {
 dot1dDeviceCapabilities,
 dot1dPortCapabilities
}

STATUS current

DESCRIPTION

"A collection of objects indicating the optional
capabilities of the device."

::= { pBridgeGroups 1 }

pBridgeDeviceGmrpGroup OBJECT-GROUP

OBJECTS {
 dot1dGmrpStatus
}

STATUS current

DESCRIPTION

"A collection of objects providing device-level control
for the Multicast Filtering extended bridge services."

::= { pBridgeGroups 2 }

```
pBridgeDevicePriorityGroup OBJECT-GROUP
  OBJECTS {
    dot1dTrafficClassesEnabled
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing device-level control
    for the Priority services."
  ::= { pBridgeGroups 3 }

pBridgeDefaultPriorityGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortDefaultUserPriority
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects defining the User Priority
    applicable to each port for media which do not support
    native User Priority."
  ::= { pBridgeGroups 4 }

pBridgeRegenPriorityGroup OBJECT-GROUP
  OBJECTS {
    dot1dRegenUserPriority
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects defining the User Priorities
    applicable to each port for media which support native
    User Priority."
  ::= { pBridgeGroups 5 }

pBridgePriorityGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortNumTrafficClasses,
    dot1dTrafficClass
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects defining the traffic classes
    within a bridge for each evaluated User Priority."
  ::= { pBridgeGroups 6 }
```

```
pBridgeAccessPriorityGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortOutboundAccessPriority
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects defining the media dependent
    outbound access level for each priority."
  ::= { pBridgeGroups 7 }

pBridgePortGarpGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortGarpJoinTime,
    dot1dPortGarpLeaveTime,
    dot1dPortGarpLeaveAllTime
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing port level control
    and status information for GARP operation."
  ::= { pBridgeGroups 8 }

pBridgePortGmrpGroup OBJECT-GROUP
  OBJECTS {
    dot1dPortGmrpStatus,
    dot1dPortGmrpFailedRegistrations,
    dot1dPortGmrpLastPduOrigin
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing port level control
    and status information for GMRP operation."
  ::= { pBridgeGroups 9 }

pBridgeHCPortGroup OBJECT-GROUP
  OBJECTS {
    dot1dTpHCPortInFrames,
    dot1dTpHCPortOutFrames,
    dot1dTpHCPortInDiscards
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing 64-bit statistics
    counters for high capacity bridge ports."
  ::= { pBridgeGroups 10 }
```

```

pBridgePortOverflowGroup OBJECT-GROUP
    OBJECTS {
        dot1dTpPortInOverflowFrames,
        dot1dTpPortOutOverflowFrames,
        dot1dTpPortInOverflowDiscards
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing overflow statistics
        counters for high capacity bridge ports."
    ::= { pBridgeGroups 11 }

-- -----
-- compliance statements
-- -----

pBridgeCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for device support of Priority
        and Multicast Filtering extended bridging services."

    MODULE
        MANDATORY-GROUPS { pBridgeExtCapGroup }

        GROUP      pBridgeDeviceGmrpGroup
        DESCRIPTION
            "This group is mandatory for devices supporting the GMRP
            application, defined by IEEE 802.1D Extended Filtering
            Services."

        GROUP      pBridgeDevicePriorityGroup
        DESCRIPTION
            "This group is mandatory only for devices supporting
            the priority forwarding operations defined by IEEE
            802.1D."

        GROUP      pBridgeDefaultPriorityGroup
        DESCRIPTION
            "This group is mandatory only for devices supporting
            the priority forwarding operations defined by the
            extended bridge services with media types, such as
            Ethernet, that do not support native User Priority."

```

GROUP pBridgeRegenPriorityGroup
DESCRIPTION
 "This group is mandatory only for devices supporting the priority forwarding operations defined by IEEE 802.1D and which have interface media types that support native User Priority e.g. IEEE 802.5."

GROUP pBridgePriorityGroup
DESCRIPTION
 "This group is mandatory only for devices supporting the priority forwarding operations defined by IEEE 802.1D."

GROUP pBridgeAccessPriorityGroup
DESCRIPTION
 "This group is optional and is relevant only for devices supporting the priority forwarding operations defined by IEEE 802.1D and which have interface media types that support native Access Priority e.g. IEEE 802.5."

GROUP pBridgePortGarpGroup
DESCRIPTION
 "This group is mandatory for devices supporting any of the GARP applications: e.g. GMRP, defined by the extended filtering services of 802.1D; or GVRP, defined by 802.1Q (refer to the Q-BRIDGE-MIB for conformance statements for GVRP)."

GROUP pBridgePortGmrpGroup
DESCRIPTION
 "This group is mandatory for devices supporting the GMRP application, as defined by IEEE 802.1D Extended Filtering Services."

GROUP pBridgeHCPortGroup
DESCRIPTION
 "Support for this group in a device is mandatory for those bridge ports which map to network interfaces that have the value of the corresponding instance of ifSpeed greater than 650,000,000 bits/second."

GROUP pBridgePortOverflowGroup
DESCRIPTION
 "Support for this group in a device is mandatory for those bridge ports which map to network interfaces that have the value of the corresponding instance of ifSpeed greater than 650,000,000 bits/second."

```

OBJECT      dotldPortNumTrafficClasses
MIN-ACCESS  read-only
DESCRIPTION
    "Write access is not required."

```

```

OBJECT      dotldTrafficClass
MIN-ACCESS  read-only
DESCRIPTION
    "Write access is not required."

```

```

OBJECT      dotldRegenUserPriority
MIN-ACCESS  read-only
DESCRIPTION
    "Write access is not required."

```

```

::= { pBridgeCompliances 1 }

```

```

END

```

5. Definitions for Virtual Bridge MIB

```

Q-BRIDGE-MIB DEFINITIONS ::= BEGIN

```

```

-- -----
-- MIB for IEEE 802.1Q Devices
-- -----

```

IMPORTS

```

    MODULE-IDENTITY, OBJECT-TYPE,
    Counter32, Counter64, Unsigned32, TimeTicks
    FROM SNMPv2-SMI
    RowStatus, TruthValue, TEXTUAL-CONVENTION, MacAddress
    FROM SNMPv2-TC
    SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB
    MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
    dotldBridge, dotldBasePortEntry, dotldBasePort
    FROM BRIDGE-MIB
    EnabledStatus
    FROM P-BRIDGE-MIB
    TimeFilter
    FROM RMON2-MIB;

```

```

qBridgeMIB MODULE-IDENTITY
    LAST-UPDATED "9908250000Z"
    ORGANIZATION "IETF Bridge MIB Working Group"

```

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DESCRIPTION

"The VLAN Bridge MIB module for managing Virtual Bridged
Local Area Networks, as defined by IEEE 802.1Q-1998."

-- revision history

```
REVISION      "9908250000Z"
DESCRIPTION
    "Initial version, published as RFC 2674."
```

```
::= { dot1dBridge 7 }
```

```
qBridgeMIBObjects OBJECT IDENTIFIER ::= { qBridgeMIB 1 }
```

```
-- -----
-- Textual Conventions
-- -----
```

PortList ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Each octet within this value specifies a set of eight ports, with the first octet specifying ports 1 through 8, the second octet specifying ports 9 through 16, etc. Within each octet, the most significant bit represents the lowest numbered port, and the least significant bit represents the highest numbered port. Thus, each port of the bridge is represented by a single bit within the value of this object. If that bit has a value of '1' then that port is included in the set of ports; the port is not included if its bit has a value of '0'."

SYNTAX OCTET STRING

VlanIndex ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"A value used to index per-VLAN tables: values of 0 and 4095 are not permitted; if the value is between 1 and 4094 inclusive, it represents an IEEE 802.1Q VLAN-ID with global scope within a given bridged domain (see VlanId textual convention). If the value is greater than 4095 then it represents a VLAN with scope local to the particular agent, i.e. one without a global VLAN-ID assigned to it. Such VLANs are outside the scope of IEEE 802.1Q but it is convenient to be able to manage them in the same way using this MIB."

SYNTAX Unsigned32

VlanId ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"A 12-bit VLAN ID used in the VLAN Tag header."

SYNTAX INTEGER (1..4094)

-- groups in the Q-BRIDGE MIB

```

dot1qBase      OBJECT IDENTIFIER ::= { qBridgeMIBObjects 1 }
dot1qTp        OBJECT IDENTIFIER ::= { qBridgeMIBObjects 2 }
dot1qStatic    OBJECT IDENTIFIER ::= { qBridgeMIBObjects 3 }
dot1qVlan      OBJECT IDENTIFIER ::= { qBridgeMIBObjects 4 }

```

-- dot1qBase group

dot1qVlanVersionNumber OBJECT-TYPE

SYNTAX INTEGER {
version1(1)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The version number of IEEE 802.1Q that this device supports."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.1.1"

::= { dot1qBase 1 }

dot1qMaxVlanId OBJECT-TYPE

SYNTAX VlanId

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum IEEE 802.1Q VLAN ID that this device supports."

REFERENCE

"IEEE 802.1Q/D11 Section 9.3.2.3"

::= { dot1qBase 2 }

`dot1qMaxSupportedVlans OBJECT-TYPE``SYNTAX Unsigned32``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The maximum number of IEEE 802.1Q VLANs that this device supports."

`REFERENCE`

"IEEE 802.1Q/D11 Section 12.10.1.1"

`::= { dot1qBase 3 }``dot1qNumVlans OBJECT-TYPE``SYNTAX Unsigned32``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The current number of IEEE 802.1Q VLANs that are configured in this device."

`REFERENCE`

"IEEE 802.1Q/D11 Section 12.7.1.1"

`::= { dot1qBase 4 }``dot1qGvrpStatus OBJECT-TYPE``SYNTAX EnabledStatus``MAX-ACCESS read-write``STATUS current``DESCRIPTION`

"The administrative status requested by management for GVRP. The value enabled(1) indicates that GVRP should be enabled on this device, on all ports for which it has not been specifically disabled. When disabled(2), GVRP is disabled on all ports and all GVRP packets will be forwarded transparently. This object affects all GVRP Applicant and Registrar state machines. A transition from disabled(2) to enabled(1) will cause a reset of all GVRP state machines on all ports."

`DEFVAL { enabled }``::= { dot1qBase 5 }`

```
-- -----
-- the dot1qTp group
-- -----

-- -----
-- the current Filtering Database Table
-- -----
```

dot1qFdbTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qFdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table that contains configuration and control information for each Filtering Database currently operating on this device. Entries in this table appear automatically when VLANs are assigned FDB IDs in the dot1qVlanCurrentTable."

::= { dot1qTp 1 }

dot1qFdbEntry OBJECT-TYPE

SYNTAX Dot1qFdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a specific Filtering Database."

INDEX { dot1qFdbId }

::= { dot1qFdbTable 1 }

Dot1qFdbEntry ::=

SEQUENCE {

dot1qFdbId

Unsigned32,

dot1qFdbDynamicCount

Counter32

}

dot1qFdbId OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The identity of this Filtering Database."

::= { dot1qFdbEntry 1 }

dot1qFdbDynamicCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current number of dynamic entries in this Filtering Database."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.1.1.3"

::= { dot1qFdbEntry 2 }

```

-- -----
-- Multiple Forwarding Databases for 802.1Q Transparent devices
-- This table is an alternative to the dot1dTpFdbTable,
-- previously defined for 802.1D devices which only support a
-- single Forwarding Database.
-- -----

dot1qTpFdbTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1qTpFdbEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains information about unicast entries
        for which the device has forwarding and/or filtering
        information. This information is used by the
        transparent bridging function in determining how to
        propagate a received frame."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.7.7"
    ::= { dot1qTp 2 }

dot1qTpFdbEntry OBJECT-TYPE
    SYNTAX      Dot1qTpFdbEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Information about a specific unicast MAC address for
        which the device has some forwarding and/or filtering
        information."
    INDEX       { dot1qFdbId, dot1qTpFdbAddress }
    ::= { dot1qTpFdbTable 1 }

Dot1qTpFdbEntry ::=
    SEQUENCE {
        dot1qTpFdbAddress
            MacAddress,
        dot1qTpFdbPort
            INTEGER,
        dot1qTpFdbStatus
            INTEGER
    }

dot1qTpFdbAddress OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  not-accessible
    STATUS      current

```

DESCRIPTION

"A unicast MAC address for which the device has forwarding and/or filtering information."

::= { dot1qTpFdbEntry 1 }

dot1qTpFdbPort OBJECT-TYPE

SYNTAX INTEGER (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Either the value '0', or the port number of the port on which a frame having a source address equal to the value of the corresponding instance of dot1qTpFdbAddress has been seen. A value of '0' indicates that the port number has not been learned but that the device does have some forwarding/filtering information about this address (e.g. in the dot1qStaticUnicastTable).

Implementors are encouraged to assign the port value to this object whenever it is learned even for addresses for which the corresponding value of dot1qTpFdbStatus is not learned(3)."

::= { dot1qTpFdbEntry 2 }

dot1qTpFdbStatus OBJECT-TYPE

SYNTAX INTEGER {
 other(1),
 invalid(2),
 learned(3),
 self(4),
 mgmt(5)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The status of this entry. The meanings of the values are:

other(1) - none of the following. This may include the case where some other MIB object (not the corresponding instance of dot1qTpFdbPort, nor an entry in the dot1qStaticUnicastTable) is being used to determine if and how frames addressed to the value of the corresponding instance of dot1qTpFdbAddress are being forwarded.

invalid(2) - this entry is no longer valid (e.g., it was learned but has since aged out), but has not yet been flushed from the table.

learned(3) - the value of the corresponding instance of dot1qTpFdbPort was learned and is being used.

```

        self(4) - the value of the corresponding instance of
                    dot1qTpFdbAddress represents one of the device's
                    addresses. The corresponding instance of
                    dot1qTpFdbPort indicates which of the device's
                    ports has this address.
        mgmt(5) - the value of the corresponding instance of
                    dot1qTpFdbAddress is also the value of an
                    existing instance of dot1qStaticAddress."
 ::= { dot1qTpFdbEntry 3 }

-- -----
-- Dynamic Group Registration Table
-- -----

dot1qTpGroupTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1qTpGroupEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing filtering information for VLANs
        configured into the bridge by (local or network)
        management, or learnt dynamically, specifying the set of
        ports to which frames received on a VLAN for this FDB
        and containing a specific Group destination address are
        allowed to be forwarded."
 ::= { dot1qTp 3 }

dot1qTpGroupEntry OBJECT-TYPE
    SYNTAX      Dot1qTpGroupEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Filtering information configured into the bridge by
        management, or learnt dynamically, specifying the set of
        ports to which frames received on a VLAN and containing
        a specific Group destination address, are allowed to be
        forwarded. The subset of these ports learnt dynamically
        is also provided."
    INDEX      { dot1qVlanIndex, dot1qTpGroupAddress }
 ::= { dot1qTpGroupTable 1 }

Dot1qTpGroupEntry ::=
    SEQUENCE {
        dot1qTpGroupAddress
        MacAddress,
        dot1qTpGroupEgressPorts
        PortList,
        dot1qTpGroupLearnt
    }

```

```

        PortList
    }

dot1qTpGroupAddress OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The destination Group MAC address in a frame to which
        this entry's filtering information applies."
    ::= { dot1qTpGroupEntry 1 }

dot1qTpGroupEgressPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The complete set of ports, in this VLAN, to which
        frames destined for this Group MAC address are currently
        being explicitly forwarded. This does not include ports
        for which this address is only implicitly forwarded, in
        the dot1qForwardAllPorts list."
    ::= { dot1qTpGroupEntry 2 }

dot1qTpGroupLearnt OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The subset of ports in dot1qTpGroupEgressPorts which
        were learnt by GMRP or some other dynamic mechanism, in
        this Filtering database."
    ::= { dot1qTpGroupEntry 3 }

-- -----
-- Service Requirements Group
-- -----

dot1qForwardAllTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1qForwardAllEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing forwarding information for each
        VLAN, specifying the set of ports to which forwarding of
        all multicasts applies, configured statically by
        management or dynamically by GMRP. An entry appears in
        this table for all VLANs that are currently

```


instantiated."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.2, 12.7.7"

::= { dot1qTp 4 }

dot1qForwardAllEntry OBJECT-TYPE

SYNTAX Dot1qForwardAllEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Forwarding information for a VLAN, specifying the set of ports to which all multicasts should be forwarded, configured statically by management or dynamically by GMRP."

INDEX { dot1qVlanIndex }

::= { dot1qForwardAllTable 1 }

Dot1qForwardAllEntry ::=

SEQUENCE {

dot1qForwardAllPorts

PortList,

dot1qForwardAllStaticPorts

PortList,

dot1qForwardAllForbiddenPorts

PortList

}

dot1qForwardAllPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The complete set of ports in this VLAN to which all multicast group-addressed frames are to be forwarded. This includes ports for which this need has been determined dynamically by GMRP, or configured statically by management."

::= { dot1qForwardAllEntry 1 }

dot1qForwardAllStaticPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The set of ports configured by management in this VLAN to which all multicast group-addressed frames are to be forwarded. Ports entered in this list will also appear in the complete set shown by dot1qForwardAllPorts. This value will be restored after the device is reset. This only applies to ports that are members of the VLAN, defined by dot1qVlanCurrentEgressPorts. A port may not be added in this set if it is already a member of the set of ports in dot1qForwardAllForbiddenPorts. The default value is a string of ones of appropriate length, to indicate standard non-EFS behaviour, i.e. forward all multicasts to all ports."

```
::= { dot1qForwardAllEntry 2 }
```

dot1qForwardAllForbiddenPorts OBJECT-TYPE

SYNTAX PortList
MAX-ACCESS read-write
STATUS current

DESCRIPTION

"The set of ports configured by management in this VLAN for which the Service Requirement attribute Forward All Multicast Groups may not be dynamically registered by GMRP. This value will be restored after the device is reset. A port may not be added in this set if it is already a member of the set of ports in dot1qForwardAllStaticPorts. The default value is a string of zeros of appropriate length."

```
::= { dot1qForwardAllEntry 3 }
```

dot1qForwardUnregisteredTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qForwardUnregisteredEntry
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"A table containing forwarding information for each VLAN, specifying the set of ports to which forwarding of multicast group-addressed frames for which there is no more specific forwarding information applies. This is configured statically by management and determined dynamically by GMRP. An entry appears in this table for all VLANs that are currently instantiated."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.2, 12.7.7"

```
::= { dot1qTp 5 }
```

dot1qForwardUnregisteredEntry OBJECT-TYPE

SYNTAX Dot1qForwardUnregisteredEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Forwarding information for a VLAN, specifying the set of ports to which all multicasts for which there is no more specific forwarding information shall be forwarded. This is configured statically by management or dynamically by GMRP."

INDEX { dot1qVlanIndex }

::= { dot1qForwardUnregisteredTable 1 }

Dot1qForwardUnregisteredEntry ::=

SEQUENCE {

dot1qForwardUnregisteredPorts

PortList,

dot1qForwardUnregisteredStaticPorts

PortList,

dot1qForwardUnregisteredForbiddenPorts

PortList

}

dot1qForwardUnregisteredPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The complete set of ports in this VLAN to which multicast group-addressed frames for which there is no more specific forwarding information will be forwarded. This includes ports for which this need has been determined dynamically by GMRP, or configured statically by management."

::= { dot1qForwardUnregisteredEntry 1 }

dot1qForwardUnregisteredStaticPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The set of ports configured by management, in this VLAN, to which multicast group-addressed frames for which there is no more specific forwarding information are to be forwarded. Ports entered in this list will also appear in the complete set shown by dot1qForwardUnregisteredPorts. This value will be restored after the device is reset. A port may not be added in this set if it is already a member of the set of ports in dot1qForwardUnregisteredForbiddenPorts. The

default value is a string of zeros of appropriate length, although this has no effect with the default value of dot1qForwardAllStaticPorts."

```
::= { dot1qForwardUnregisteredEntry 2 }
```

dot1qForwardUnregisteredForbiddenPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The set of ports configured by management in this VLAN for which the Service Requirement attribute Forward Unregistered Multicast Groups may not be dynamically registered by GMRP. This value will be restored after the device is reset. A port may not be added in this set if it is already a member of the set of ports in dot1qForwardUnregisteredStaticPorts. The default value is a string of zeros of appropriate length."

```
::= { dot1qForwardUnregisteredEntry 3 }
```

```
-- -----
-- The Static (Destination-Address Filtering) Database
-- -----
```

dot1qStaticUnicastTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qStaticUnicastEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing filtering information for Unicast MAC addresses for each Filtering Database, configured into the device by (local or network) management specifying the set of ports to which frames received from specific ports and containing specific unicast destination addresses are allowed to be forwarded. A value of zero in this table as the port number from which frames with a specific destination address are received, is used to specify all ports for which there is no specific entry in this table for that particular destination address. Entries are valid for unicast addresses only."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.7,
ISO/IEC 15802-3 Section 7.9.1"

```
::= { dot1qStatic 1 }
```

dot1qStaticUnicastEntry OBJECT-TYPE

SYNTAX Dot1qStaticUnicastEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Filtering information configured into the device by (local or network) management specifying the set of ports to which frames received from a specific port and containing a specific unicast destination address are allowed to be forwarded."

```
INDEX {
    dot1qFdbId,
    dot1qStaticUnicastAddress,
    dot1qStaticUnicastReceivePort
}
 ::= { dot1qStaticUnicastTable 1 }
```

Dot1qStaticUnicastEntry ::=

```
SEQUENCE {
    dot1qStaticUnicastAddress
        MacAddress,
    dot1qStaticUnicastReceivePort
        INTEGER,
    dot1qStaticUnicastAllowedToGoTo
        PortList,
    dot1qStaticUnicastStatus
        INTEGER
}
```

dot1qStaticUnicastAddress OBJECT-TYPE

SYNTAX MacAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The destination MAC address in a frame to which this entry's filtering information applies. This object must take the value of a unicast address."

```
::= { dot1qStaticUnicastEntry 1 }
```

dot1qStaticUnicastReceivePort OBJECT-TYPE

SYNTAX INTEGER (0..65535)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Either the value '0', or the port number of the port from which a frame must be received in order for this entry's filtering information to apply. A value of zero indicates that this entry applies on all ports of the

device for which there is no other applicable entry."
 ::= { dot1qStaticUnicastEntry 2 }

dot1qStaticUnicastAllowedToGoTo OBJECT-TYPE

SYNTAX PortList
 MAX-ACCESS read-write
 STATUS current

DESCRIPTION

"The set of ports for which a frame with a specific unicast address will be flooded in the event that it has not been learned. It also specifies the set of ports a specific unicast address may be dynamically learnt on. The dot1qTpFdbTable will have an equivalent entry with a dot1qTpFdbPort value of '0' until this address has been learnt, when it will be updated with the port the address has been seen on. This only applies to ports that are members of the VLAN, defined by dot1qVlanCurrentEgressPorts. The default value of this object is a string of ones of appropriate length."

REFERENCE

"IEEE 802.1Q/D11 Table 8-5, ISO/IEC 15802-3 Table 7-5"

::= { dot1qStaticUnicastEntry 3 }

dot1qStaticUnicastStatus OBJECT-TYPE

SYNTAX INTEGER {
 other(1),
 invalid(2),
 permanent(3),
 deleteOnReset(4),
 deleteOnTimeout(5)
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object indicates the status of this entry.
 other(1) - this entry is currently in use but the conditions under which it will remain so differ from the following values.
 invalid(2) - writing this value to the object removes the corresponding entry.
 permanent(3) - this entry is currently in use and will remain so after the next reset of the bridge.
 deleteOnReset(4) - this entry is currently in use and will remain so until the next reset of the bridge."

```

        deleteOnTimeout(5) - this entry is currently in
                           use and will remain so until it is aged out."
DEFVAL      { permanent }
 ::= { dot1qStaticUnicastEntry 4 }

```

dot1qStaticMulticastTable OBJECT-TYPE

```

SYNTAX      SEQUENCE OF Dot1qStaticMulticastEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

```

"A table containing filtering information for Multicast and Broadcast MAC addresses for each VLAN, configured into the device by (local or network) management specifying the set of ports to which frames received from specific ports and containing specific Multicast and Broadcast destination addresses are allowed to be forwarded. A value of zero in this table as the port number from which frames with a specific destination address are received, is used to specify all ports for which there is no specific entry in this table for that particular destination address. Entries are valid for Multicast and Broadcast addresses only."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.7,
ISO/IEC 15802-3 Section 7.9.1"

```
 ::= { dot1qStatic 2 }
```

dot1qStaticMulticastEntry OBJECT-TYPE

```

SYNTAX      Dot1qStaticMulticastEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

```

"Filtering information configured into the device by (local or network) management specifying the set of ports to which frames received from this specific port for this VLAN and containing this Multicast or Broadcast destination address are allowed to be forwarded."

```

INDEX      {
    dot1qVlanIndex,
    dot1qStaticMulticastAddress,
    dot1qStaticMulticastReceivePort
}
 ::= { dot1qStaticMulticastTable 1 }

```

Dot1qStaticMulticastEntry ::=

```
SEQUENCE {
    dot1qStaticMulticastAddress
        MacAddress,
    dot1qStaticMulticastReceivePort
        INTEGER,
    dot1qStaticMulticastStaticEgressPorts
        PortList,
    dot1qStaticMulticastForbiddenEgressPorts
        PortList,
    dot1qStaticMulticastStatus
        INTEGER
}
```

dot1qStaticMulticastAddress OBJECT-TYPE

SYNTAX MacAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The destination MAC address in a frame to which this entry's filtering information applies. This object must take the value of a Multicast or Broadcast address."

::= { dot1qStaticMulticastEntry 1 }

dot1qStaticMulticastReceivePort OBJECT-TYPE

SYNTAX INTEGER (0..65535)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Either the value '0', or the port number of the port from which a frame must be received in order for this entry's filtering information to apply. A value of zero indicates that this entry applies on all ports of the device for which there is no other applicable entry."

::= { dot1qStaticMulticastEntry 2 }

dot1qStaticMulticastStaticEgressPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The set of ports to which frames received from a specific port and destined for a specific Multicast or Broadcast MAC address must be forwarded, regardless of any dynamic information e.g. from GMRP. A port may not be added in this set if it is already a member of the set of ports in dot1qStaticMulticastForbiddenEgressPorts. The default value of this object is a string of ones of appropriate length."

```
::= { dot1qStaticMulticastEntry 3 }
```

dot1qStaticMulticastForbiddenEgressPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The set of ports to which frames received from a specific port and destined for a specific Multicast or Broadcast MAC address must not be forwarded, regardless of any dynamic information e.g. from GMRP. A port may not be added in this set if it is already a member of the set of ports in dot1qStaticMulticastStaticEgressPorts. The default value of this object is a string of zeros of appropriate length."

```
::= { dot1qStaticMulticastEntry 4 }
```

dot1qStaticMulticastStatus OBJECT-TYPE

SYNTAX INTEGER {
 other(1),
 invalid(2),
 permanent(3),
 deleteOnReset(4),
 deleteOnTimeout(5)
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object indicates the status of this entry.
 other(1) - this entry is currently in use but the conditions under which it will remain so differ from the following values.
 invalid(2) - writing this value to the object removes the corresponding entry.
 permanent(3) - this entry is currently in use and will remain so after the next reset of the bridge."

```

        deleteOnReset(4) - this entry is currently in
                           use and will remain so until the next
                           reset of the bridge.
        deleteOnTimeout(5) - this entry is currently in
                             use and will remain so until it is aged out."
DEFVAL      { permanent }
 ::= { dot1qStaticMulticastEntry 5 }

```

```

-- -----
-- The Current VLAN Database
-- -----

```

dot1qVlanNumDeletes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times a VLAN entry has been deleted from the dot1qVlanCurrentTable (for any reason). If an entry is deleted, then inserted, and then deleted, this counter will be incremented by 2."

::= { dot1qVlan 1 }

dot1qVlanCurrentTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qVlanCurrentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing current configuration information for each VLAN currently configured into the device by (local or network) management, or dynamically created as a result of GVRP requests received."

::= { dot1qVlan 2 }

dot1qVlanCurrentEntry OBJECT-TYPE

SYNTAX Dot1qVlanCurrentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information for a VLAN configured into the device by (local or network) management, or dynamically created as a result of GVRP requests received."

INDEX { dot1qVlanTimeMark, dot1qVlanIndex }

::= { dot1qVlanCurrentTable 1 }

Dot1qVlanCurrentEntry ::=

```
SEQUENCE {
    dot1qVlanTimeMark
        TimeFilter,
    dot1qVlanIndex
        VlanIndex,
    dot1qVlanFdbId
        Unsigned32,
    dot1qVlanCurrentEgressPorts
        PortList,
    dot1qVlanCurrentUntaggedPorts
        PortList,
    dot1qVlanStatus
        INTEGER,
    dot1qVlanCreationTime
        TimeTicks
}
```

dot1qVlanTimeMark OBJECT-TYPE

SYNTAX TimeFilter
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"A TimeFilter for this entry. See the TimeFilter textual convention to see how this works."

::= { dot1qVlanCurrentEntry 1 }

dot1qVlanIndex OBJECT-TYPE

SYNTAX VlanIndex
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"The VLAN-ID or other identifier refering to this VLAN."

::= { dot1qVlanCurrentEntry 2 }

dot1qVlanFdbId OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The Filtering Database used by this VLAN. This is one of the dot1qFdbId values in the dot1qFdbTable. This value is allocated automatically by the device whenever the VLAN is created: either dynamically by GVRP, or by

management, in dot1qVlanStaticTable. Allocation of this value follows the learning constraints defined for this VLAN in dot1qLearningConstraintsTable."

::= { dot1qVlanCurrentEntry 3 }

dot1qVlanCurrentEgressPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The set of ports which are transmitting traffic for this VLAN as either tagged or untagged frames."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.2.1"

::= { dot1qVlanCurrentEntry 4 }

dot1qVlanCurrentUntaggedPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The set of ports which are transmitting traffic for this VLAN as untagged frames."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.2.1"

::= { dot1qVlanCurrentEntry 5 }

dot1qVlanStatus OBJECT-TYPE

SYNTAX INTEGER {
 other(1),
 permanent(2),
 dynamicGvrp(3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the status of this entry.

 other(1) - this entry is currently in use but the conditions under which it will remain so differ from the following values.

 permanent(2) - this entry, corresponding to an entry in dot1qVlanStaticTable, is currently in use and will remain so after the next reset of the device. The port lists for this entry include ports from the equivalent dot1qVlanStaticTable entry and ports learnt dynamically.

 dynamicGvrp(3) - this entry is currently in use

and will remain so until removed by GVRP. There is no static entry for this VLAN and it will be removed when the last port leaves the VLAN."

::= { dot1qVlanCurrentEntry 6 }

dot1qVlanCreationTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime when this VLAN was created."

::= { dot1qVlanCurrentEntry 7 }

-- -----
-- The Static VLAN Database
-- -----

dot1qVlanStaticTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qVlanStaticEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing static configuration information for each VLAN configured into the device by (local or network) management. All entries are permanent and will be restored after the device is reset."

::= { dot1qVlan 3 }

dot1qVlanStaticEntry OBJECT-TYPE

SYNTAX Dot1qVlanStaticEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Static information for a VLAN configured into the device by (local or network) management."

INDEX { dot1qVlanIndex }

::= { dot1qVlanStaticTable 1 }

Dot1qVlanStaticEntry ::=

SEQUENCE {

dot1qVlanStaticName

SnmpAdminString,

dot1qVlanStaticEgressPorts

PortList,

dot1qVlanForbiddenEgressPorts

PortList,

```

        dot1qVlanStaticUntaggedPorts
            PortList,
        dot1qVlanStaticRowStatus
            RowStatus
    }

dot1qVlanStaticName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE (0..32))
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "An administratively assigned string, which may be used
        to identify the VLAN."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.2.1"
    ::= { dot1qVlanStaticEntry 1 }

dot1qVlanStaticEgressPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The set of ports which are permanently assigned to the
        egress list for this VLAN by management. Changes to a
        bit in this object affect the per-port per-VLAN
        Registrar control for Registration Fixed for the
        relevant GVRP state machine on each port. A port may
        not be added in this set if it is already a member of
        the set of ports in dot1qVlanForbiddenEgressPorts. The
        default value of this object is a string of zeros of
        appropriate length, indicating not fixed."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.7.7.3, 11.2.3.2.3"
    ::= { dot1qVlanStaticEntry 2 }

dot1qVlanForbiddenEgressPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The set of ports which are prohibited by management
        from being included in the egress list for this VLAN.
        Changes to this object that cause a port to be included
        or excluded affect the per-port per-VLAN Registrar

```

control for Registration Forbidden for the relevant GVRP state machine on each port. A port may not be added in this set if it is already a member of the set of ports in dot1qVlanStaticEgressPorts. The default value of this object is a string of zeros of appropriate length, excluding all ports from the forbidden set."

REFERENCE

"IEEE 802.1Q/D11 Section 12.7.7.3, 11.2.3.2.3"

::= { dot1qVlanStaticEntry 3 }

dot1qVlanStaticUntaggedPorts OBJECT-TYPE

SYNTAX PortList

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The set of ports which should transmit egress packets for this VLAN as untagged. The default value of this object for the default VLAN (dot1qVlanIndex = 1) is a string of appropriate length including all ports. There is no specified default for other VLANs. If a device agent cannot support the set of ports being set then it will reject the set operation with an error. An example might be if a manager attempts to set more than one VLAN to be untagged on egress where the device does not support this IEEE 802.1Q option."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.2.1"

::= { dot1qVlanStaticEntry 4 }

dot1qVlanStaticRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicates the status of this entry."

::= { dot1qVlanStaticEntry 5 }

dot1qNextFreeLocalVlanIndex OBJECT-TYPE

SYNTAX INTEGER (0|4096..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The next available value for dot1qVlanIndex of a local VLAN entry in dot1qVlanStaticTable. This will report values >=4096 if a new Local VLAN may be created or else the value 0 if this is not possible."

A row creation operation in this table for an entry with a local VlanIndex value may fail if the current value of this object is not used as the index. Even if the value read is used, there is no guarantee that it will still be the valid index when the create operation is attempted - another manager may have already got in during the intervening time interval. In this case, dot1qNextFreeLocalVlanIndex should be re-read and the creation re-tried with the new value.

This value will automatically change when the current value is used to create a new row."

```
::= { dot1qVlan 4 }
```

```
-- -----
-- The VLAN Port Configuration Table
-- -----
```

dot1qPortVlanTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qPortVlanEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing per port control and status information for VLAN configuration in the device."

```
::= { dot1qVlan 5 }
```

dot1qPortVlanEntry OBJECT-TYPE

SYNTAX Dot1qPortVlanEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

AUGMENTS { dot1dBasePortEntry }

```
::= { dot1qPortVlanTable 1 }
```

Dot1qPortVlanEntry ::=

SEQUENCE {

dot1qPvid

VlanIndex,

dot1qPortAcceptableFrameTypes

INTEGER,

dot1qPortIngressFiltering

TruthValue,

dot1qPortGvrpStatus

EnabledStatus,


```

        dot1qPortGvrpFailedRegistrations
            Counter32,
        dot1qPortGvrpLastPduOrigin
            MacAddress
    }

dot1qPvid OBJECT-TYPE
    SYNTAX      VlanIndex
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The PVID, the VLAN ID assigned to untagged frames or
        Priority-Tagged frames received on this port."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.1.1"
    DEFVAL      { 1 }
    ::= { dot1qPortVlanEntry 1 }

dot1qPortAcceptableFrameTypes OBJECT-TYPE
    SYNTAX      INTEGER {
                    admitAll(1),
                    admitOnlyVlanTagged(2)
                }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "When this is admitOnlyVlanTagged(2) the device will
        discard untagged frames or Priority-Tagged frames
        received on this port.  When admitAll(1), untagged
        frames or Priority-Tagged frames received on this port
        will be accepted and assigned to the PVID for this port.

        This control does not affect VLAN independent BPDU
        frames, such as GVRP and STP.  It does affect VLAN
        dependent BPDU frames, such as GMRP."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.1.3"
    DEFVAL      { admitAll }
    ::= { dot1qPortVlanEntry 2 }

dot1qPortIngressFiltering OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current

```

DESCRIPTION

"When this is true(1) the device will discard incoming frames for VLANs which do not include this Port in its Member set. When false(2), the port will accept all incoming frames.

This control does not affect VLAN independent BPDU frames, such as GVRP and STP. It does affect VLAN dependent BPDU frames, such as GMRP."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.1.4"

DEFVAL { false }
::= { dot1qPortVlanEntry 3 }

dot1qPortGvrpStatus OBJECT-TYPE

SYNTAX EnabledStatus
MAX-ACCESS read-write
STATUS current

DESCRIPTION

"The state of GVRP operation on this port. The value enabled(1) indicates that GVRP is enabled on this port, as long as dot1qGvrpStatus is also enabled for this device. When disabled(2) but dot1qGvrpStatus is still enabled for the device, GVRP is disabled on this port: any GVRP packets received will be silently discarded and no GVRP registrations will be propagated from other ports. This object affects all GVRP Applicant and Registrar state machines on this port. A transition from disabled(2) to enabled(1) will cause a reset of all GVRP state machines on this port."

DEFVAL { enabled }
::= { dot1qPortVlanEntry 4 }

dot1qPortGvrpFailedRegistrations OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The total number of failed GVRP registrations, for any reason, on this port."

::= { dot1qPortVlanEntry 5 }

dot1qPortGvrpLastPduOrigin OBJECT-TYPE

SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The Source MAC Address of the last GVRP message received on this port."

::= { dot1qPortVlanEntry 6 }

```
-- -----
-- Per port VLAN Statistics Table
-- -----
```

dot1qPortVlanStatisticsTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qPortVlanStatisticsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing per-port, per-VLAN statistics for traffic received. Separate objects are provided for both the most-significant and least-significant bits of statistics counters for ports that are associated with this transparent bridge. The most-significant bit objects are only required on high capacity interfaces, as defined in the conformance clauses for these objects. This mechanism is provided as a way to read 64-bit counters for agents which support only SNMPv1.

Note that the reporting of most-significant and least-significant counter bits separately runs the risk of missing an overflow of the lower bits in the interval between sampling. The manager must be aware of this possibility, even within the same varbindlist, when interpreting the results of a request or asynchronous notification."

::= { dot1qVlan 6 }

dot1qPortVlanStatisticsEntry OBJECT-TYPE

SYNTAX Dot1qPortVlanStatisticsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Traffic statistics for a VLAN on an interface."

INDEX { dot1dBasePort, dot1qVlanIndex }

::= { dot1qPortVlanStatisticsTable 1 }

Dot1qPortVlanStatisticsEntry ::=

SEQUENCE {

```

dot1qTpVlanPortInFrames
    Counter32,
dot1qTpVlanPortOutFrames
    Counter32,
dot1qTpVlanPortInDiscards
    Counter32,
dot1qTpVlanPortInOverflowFrames
    Counter32,
dot1qTpVlanPortOutOverflowFrames
    Counter32,
dot1qTpVlanPortInOverflowDiscards
    Counter32
}

```

dot1qTpVlanPortInFrames OBJECT-TYPE

```

SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current

```

DESCRIPTION

"The number of valid frames received by this port from its segment which were classified as belonging to this VLAN. Note that a frame received on this port is counted by this object if and only if it is for a protocol being processed by the local forwarding process for this VLAN. This object includes received bridge management frames classified as belonging to this VLAN (e.g. GMRP, but not GVRP or STP)."

REFERENCE

```

"IEEE 802.1Q/D11 Section 12.6.1.1.3(a)"
::= { dot1qPortVlanStatisticsEntry 1 }

```

dot1qTpVlanPortOutFrames OBJECT-TYPE

```

SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current

```

DESCRIPTION

"The number of valid frames transmitted by this port to its segment from the local forwarding process for this VLAN. This includes bridge management frames originated by this device which are classified as belonging to this VLAN (e.g. GMRP, but not GVRP or STP)."

REFERENCE

```

"IEEE 802.1Q/D11 Section 12.6.1.1.3(d)"
::= { dot1qPortVlanStatisticsEntry 2 }

```

dot1qTpVlanPortInDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of valid frames received by this port from its segment which were classified as belonging to this VLAN which were discarded due to VLAN related reasons. Specifically, the IEEE 802.1Q counters for Discard Inbound and Discard on Ingress Filtering."

REFERENCE

"IEEE 802.1Q/D11 Section 12.6.1.1.3"

::= { dot1qPortVlanStatisticsEntry 3 }

dot1qTpVlanPortInOverflowFrames OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated dot1qTpVlanPortInFrames counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1qPortVlanStatisticsEntry 4 }

dot1qTpVlanPortOutOverflowFrames OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated dot1qTpVlanPortOutFrames counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1qPortVlanStatisticsEntry 5 }

dot1qTpVlanPortInOverflowDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated dot1qTpVlanPortInDiscards counter has overflowed."

REFERENCE

"ISO/IEC 15802-3 Section 14.6.1.1.3"

::= { dot1qPortVlanStatisticsEntry 6 }

dot1qPortVlanHCStatisticsTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qPortVlanHCStatisticsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing per port, per VLAN statistics for traffic on high capacity interfaces."

::= { dot1qVlan 7 }

dot1qPortVlanHCStatisticsEntry OBJECT-TYPE

SYNTAX Dot1qPortVlanHCStatisticsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Traffic statistics for a VLAN on a high capacity interface."

INDEX { dot1dBasePort, dot1qVlanIndex }

::= { dot1qPortVlanHCStatisticsTable 1 }

Dot1qPortVlanHCStatisticsEntry ::=

SEQUENCE {

dot1qTpVlanPortHCInFrames

Counter64,

dot1qTpVlanPortHCOutFrames

Counter64,

dot1qTpVlanPortHCInDiscards

Counter64

}

dot1qTpVlanPortHCInFrames OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of valid frames received by this port from its segment which were classified as belonging to this VLAN. Note that a frame received on this port is counted by this object if and only if it is for a protocol being processed by the local forwarding process for this VLAN. This object includes received bridge management frames classified as belonging to this VLAN (e.g. GMRP, but not GVRP or STP)."

REFERENCE

"IEEE 802.1Q/D11 Section 12.6.1.1.3(a)"

::= { dot1qPortVlanHCStatisticsEntry 1 }

dot1qTpVlanPortHCOutFrames OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of valid frames transmitted by this port to its segment from the local forwarding process for this VLAN. This includes bridge management frames originated by this device which are classified as belonging to this VLAN (e.g. GMRP, but not GVRP or STP)."

REFERENCE

"IEEE 802.1Q/D11 Section 12.6.1.1.3(d)"

::= { dot1qPortVlanHCStatisticsEntry 2 }

dot1qTpVlanPortHCInDiscards OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of valid frames received by this port from its segment which were classified as belonging to this VLAN which were discarded due to VLAN related reasons. Specifically, the IEEE 802.1Q counters for Discard Inbound and Discard on Ingress Filtering."

REFERENCE

"IEEE 802.1Q/D11 Section 12.6.1.1.3"

::= { dot1qPortVlanHCStatisticsEntry 3 }

-- -----
 -- The VLAN Learning Constraints Table
 -- -----

dot1qLearningConstraintsTable OBJECT-TYPE

SYNTAX SEQUENCE OF Dot1qLearningConstraintsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing learning constraints for sets of Shared and Independent VLANs."

REFERENCE

"IEEE 802.1Q/D11 Section 12.10.3.1"

::= { dot1qVlan 8 }

dot1qLearningConstraintsEntry OBJECT-TYPE

SYNTAX Dot1qLearningConstraintsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A learning constraint defined for a VLAN."

INDEX { dot1qConstraintVlan, dot1qConstraintSet }
 ::= { dot1qLearningConstraintsTable 1 }

Dot1qLearningConstraintsEntry ::=

```
SEQUENCE {
    dot1qConstraintVlan
        VlanIndex,
    dot1qConstraintSet
        INTEGER,
    dot1qConstraintType
        INTEGER,
    dot1qConstraintStatus
        RowStatus
}
```

dot1qConstraintVlan OBJECT-TYPE

```
SYNTAX      VlanIndex
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The index of the row in dot1qVlanCurrentTable for the
    VLAN constrained by this entry."
::= { dot1qLearningConstraintsEntry 1 }
```

dot1qConstraintSet OBJECT-TYPE

```
SYNTAX      INTEGER (0..65535)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The identity of the constraint set to which
    dot1qConstraintVlan belongs. These values may be chosen
    by the management station."
::= { dot1qLearningConstraintsEntry 2 }
```

dot1qConstraintType OBJECT-TYPE

```
SYNTAX      INTEGER {
                    independent(1),
                    shared(2)
                }
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The type of constraint this entry defines.
    independent(1) - the VLAN, dot1qConstraintVlan,
    uses an independent filtering database from all
```



```
        other VLANs in the same set, defined by
        dot1qConstraintSet.
    shared(2) - the VLAN, dot1qConstraintVlan, shares
        the same filtering database as all other VLANs
        in the same set, defined by dot1qConstraintSet."
 ::= { dot1qLearningConstraintsEntry 3 }

dot1qConstraintStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The status of this entry."
    ::= { dot1qLearningConstraintsEntry 4 }

dot1qConstraintSetDefault OBJECT-TYPE
    SYNTAX      INTEGER (0..65535)
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The identity of the constraint set to which a VLAN
        belongs, if there is not an explicit entry for that VLAN
        in dot1qLearningConstraintsTable."
    ::= { dot1qVlan 9 }

dot1qConstraintTypeDefault OBJECT-TYPE
    SYNTAX      INTEGER {
                    independent(1),
                    shared(2)
                }
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The type of constraint set to which a VLAN belongs, if
        there is not an explicit entry for that VLAN in
        dot1qLearningConstraintsTable. The types are as defined
        for dot1qConstraintType."
    ::= { dot1qVlan 10 }
```

```
-- -----
-- IEEE 802.1Q MIB - Conformance Information
-- -----

qBridgeConformance OBJECT IDENTIFIER ::= { qBridgeMIB 2 }

qBridgeGroups OBJECT IDENTIFIER ::= { qBridgeConformance 1 }

qBridgeCompliances OBJECT IDENTIFIER
    ::= { qBridgeConformance 2 }

-- -----
-- units of conformance
-- -----

qBridgeBaseGroup OBJECT-GROUP
    OBJECTS {
        dot1qVlanVersionNumber,
        dot1qMaxVlanId,
        dot1qMaxSupportedVlans,
        dot1qNumVlans,
        dot1qGvrpStatus
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing device level control
        and status information for the Virtual LAN bridge
        services."
    ::= { qBridgeGroups 1 }

qBridgeFdbUnicastGroup OBJECT-GROUP
    OBJECTS {
        dot1qFdbDynamicCount,
        dot1qTpFdbPort,
        dot1qTpFdbStatus
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about all
        unicast addresses, learnt dynamically or statically
        configured by management, in each Filtering Database."
    ::= { qBridgeGroups 2 }

qBridgeFdbMulticastGroup OBJECT-GROUP
    OBJECTS {
        dot1qTpGroupEgressPorts,
        dot1qTpGroupLearnt
    }
```

STATUS current

DESCRIPTION

"A collection of objects providing information about all multicast addresses, learnt dynamically or statically configured by management, in each Filtering Database."

::= { qBridgeGroups 3 }

qBridgeServiceRequirementsGroup OBJECT-GROUP

OBJECTS {

dot1qForwardAllPorts,
dot1qForwardAllStaticPorts,
dot1qForwardAllForbiddenPorts,
dot1qForwardUnregisteredPorts,
dot1qForwardUnregisteredStaticPorts,
dot1qForwardUnregisteredForbiddenPorts

}

STATUS current

DESCRIPTION

"A collection of objects providing information about service requirements, learnt dynamically or statically configured by management, in each Filtering Database."

::= { qBridgeGroups 4 }

qBridgeFdbStaticGroup OBJECT-GROUP

OBJECTS {

dot1qStaticUnicastAllowedToGoTo,
dot1qStaticUnicastStatus,
dot1qStaticMulticastStaticEgressPorts,
dot1qStaticMulticastForbiddenEgressPorts,
dot1qStaticMulticastStatus

}

STATUS current

DESCRIPTION

"A collection of objects providing information about unicast and multicast addresses statically configured by management, in each Filtering Database or VLAN."

::= { qBridgeGroups 5 }

qBridgeVlanGroup OBJECT-GROUP

OBJECTS {

dot1qVlanNumDeletes,
dot1qVlanFdbId,
dot1qVlanCurrentEgressPorts,
dot1qVlanCurrentUntaggedPorts,
dot1qVlanStatus,
dot1qVlanCreationTime

}

```
STATUS          current
DESCRIPTION
    "A collection of objects providing information about
    all VLANs currently configured on this device."
 ::= { qBridgeGroups 6 }
```

qBridgeVlanStaticGroup OBJECT-GROUP

```
OBJECTS {
    dot1qVlanStaticName,
    dot1qVlanStaticEgressPorts,
    dot1qVlanForbiddenEgressPorts,
    dot1qVlanStaticUntaggedPorts,
    dot1qVlanStaticRowStatus,
    dot1qNextFreeLocalVlanIndex
}
STATUS          current
DESCRIPTION
    "A collection of objects providing information about
    VLANs statically configured by management."
 ::= { qBridgeGroups 7 }
```

qBridgePortGroup OBJECT-GROUP

```
OBJECTS {
    dot1qPvid,
    dot1qPortAcceptableFrameTypes,
    dot1qPortIngressFiltering,
    dot1qPortGvrpStatus,
    dot1qPortGvrpFailedRegistrations,
    dot1qPortGvrpLastPduOrigin
}
STATUS          current
DESCRIPTION
    "A collection of objects providing port level VLAN
    control and status information for all ports."
 ::= { qBridgeGroups 8 }
```

qBridgeVlanStatisticsGroup OBJECT-GROUP

```
OBJECTS {
    dot1qTpVlanPortInFrames,
    dot1qTpVlanPortOutFrames,
    dot1qTpVlanPortInDiscards
}
STATUS          current
DESCRIPTION
    "A collection of objects providing per-port packet
    statistics for all VLANs currently configured on this
    device."
 ::= { qBridgeGroups 9 }
```

qBridgeVlanStatisticsOverflowGroup OBJECT-GROUP

```
OBJECTS {
    dot1qTpVlanPortInOverflowFrames,
    dot1qTpVlanPortOutOverflowFrames,
    dot1qTpVlanPortInOverflowDiscards
}
STATUS          current
DESCRIPTION
    "A collection of objects providing overflow counters for
    per-port packet statistics for all VLANs currently configured
    on this device for high capacity interfaces, defined as those
    that have the value of the corresponding instance of
    ifSpeed greater than 650,000,000 bits/second."
::= { qBridgeGroups 10 }
```

qBridgeVlanHCStatisticsGroup OBJECT-GROUP

```
OBJECTS {
    dot1qTpVlanPortHCInFrames,
    dot1qTpVlanPortHCOutFrames,
    dot1qTpVlanPortHCInDiscards
}
STATUS          current
DESCRIPTION
    "A collection of objects providing per-port packet
    statistics for all VLANs currently configured on this
    device for high capacity interfaces, defined as those
    that have the value of the corresponding instance of
    ifSpeed greater than 650,000,000 bits/second."
::= { qBridgeGroups 11 }
```

qBridgeLearningConstraintsGroup OBJECT-GROUP

```
OBJECTS {
    dot1qConstraintType,
    dot1qConstraintStatus
}
STATUS          current
DESCRIPTION
    "A collection of objects defining the Filtering Database
    constraints all VLANs have with each other."
::= { qBridgeGroups 12 }
```

qBridgeLearningConstraintDefaultGroup OBJECT-GROUP

```
OBJECTS {
    dot1qConstraintSetDefault,
    dot1qConstraintTypeDefault
}
```

STATUS current

DESCRIPTION

"A collection of objects defining the default Filtering Database constraints for VLANs which have no specific constraints defined."

::= { qBridgeGroups 13 }

-- -----
-- compliance statements
-- -----

qBridgeCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for device support of Virtual LAN Bridge services."

MODULE

MANDATORY-GROUPS {
 qBridgeBaseGroup,
 qBridgeVlanGroup,
 qBridgeVlanStaticGroup,
 qBridgePortGroup
}

GROUP qBridgeFdbUnicastGroup

DESCRIPTION

"This group is mandatory for bridges that implement 802.1Q transparent bridging."

GROUP qBridgeFdbMulticastGroup

DESCRIPTION

"This group is mandatory for bridges that implement 802.1Q transparent bridging."

GROUP qBridgeServiceRequirementsGroup

DESCRIPTION

"This group is mandatory for bridges that implement extended filtering services. All objects must be read-write if extended-filtering services are enabled."

GROUP qBridgeFdbStaticGroup

DESCRIPTION

"This group is optional."

GROUP qBridgeVlanStatisticsGroup

DESCRIPTION

"This group is optional as there may be significant implementation cost associated with its support."

GROUP qBridgeVlanStatisticsOverflowGroup

DESCRIPTION

"This group is optional as there may be significant implementation cost associated with its support. It is most relevant for high capacity interfaces where the SNMP agent supports only SNMPv1."

GROUP qBridgeVlanHCStatisticsGroup

DESCRIPTION

"This group is optional as there may be significant implementation cost associated with its support. It is most relevant for high capacity interfaces."

GROUP qBridgeLearningConstraintsGroup

DESCRIPTION

"This group is mandatory for devices implementing both Independent VLAN Learning (IVL) and Shared VLAN Learning (SVL) modes of operation of the filtering database, as defined by IEEE 802.1Q."

GROUP qBridgeLearningConstraintDefaultGroup

DESCRIPTION

"This group is mandatory for devices implementing both Independent VLAN Learning (IVL) and Shared VLAN Learning (SVL) modes of operation of the filtering database, as defined by IEEE 802.1Q."

OBJECT dot1qPortAcceptableFrameTypes

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required as this is an optional capability in IEEE 802.1Q."

OBJECT dot1qPortIngressFiltering

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required as this is an optional capability in IEEE 802.1Q."

```
OBJECT      dot1qConstraintSetDefault
MIN-ACCESS  read-only
DESCRIPTION
    "Write access is not required as this is an optional
    capability in IEEE 802.1Q."

OBJECT      dot1qConstraintTypeDefault
MIN-ACCESS  read-only
DESCRIPTION
    "Write access is not required as this is an optional
    capability in IEEE 802.1Q."

 ::= { qBridgeCompliances 1 }
```

END

6. Acknowledgments

This document expands upon previous work which resulted in the original bridge MIB [BRIDGEMIB].

Much of the groundwork for this document was performed by the IEEE 802.1 working group during the definition of the IEEE 802.1D updates [802.1D] and IEEE 802.1Q [802.1Q].

The authors wish to thank the members of the Bridge Working Group and David Harrington in particular for their many comments and suggestions which improved this effort.

7. 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.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

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