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 capabilities of MAC bridges defined by the IEEE 802.1D-1998 (TM) MAC Bridges and the IEEE 802.1Q-2003 (TM) 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 and P802.1t-2001 (TM). The other MIB module defines objects for managing VLANs, as specified in IEEE 802.1Q-2003, P802.1u (TM), and P802.1v (TM).

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 supplements RFC 4188 and obsoletes RFC 2674.
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1. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

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’.

The transparent method of bridging is defined by IEEE 802.1D-1998 [802.1D]. Managed objects for transparent bridging are defined in the BRIDGE-MIB [BRIDGE-MIB].

The original IEEE 802.1D is augmented by IEEE 802.1Q-2003 [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, and port-and-protocol-based Virtual LANs where membership is determined by the bridge port on which frames are received and the protocol identifier of the frame. This memo defines the objects needed for the management of port-based VLANs in bridge entities.

This memo supplements RFC 4188 [BRIDGE-MIB] and obsoletes RFC 2674 [RFC2674].

2.1. Scope

The MIB modules defined in this document include a comprehensive set of managed objects that 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 [RFC1493] 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 that objects be essential for either fault or configuration management.
3. Consider evidence of current use and/or utility.
4. Limit the total number of objects.
5. Exclude objects that 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 objects that supplement those in the BRIDGE-MIB module [BRIDGE-MIB]. Section 3.4.3 of the present document contains some recommendations regarding usage of objects in the BRIDGE-MIB by devices implementing the enhancements defined here.

An extended bridge MIB module P-BRIDGE-MIB defines managed objects for the traffic class and multicast filtering enhancements defined by IEEE 802.1D-1998 [802.1D], including the Restricted Group Registration control defined by IEEE P802.1t [802.1t].

A virtual bridge MIB module Q-BRIDGE-MIB defines managed objects for the Virtual LAN bridging enhancements defined by IEEE 802.1Q-2003 [802.1Q], including the Restricted VLAN Registration control, defined by IEEE P802.1u [802.1u], and the VLAN Classification by Protocol and Port enhancement, defined by IEEE P802.1v [802.1v].
3.1.  Structure of Extended Bridge MIB Module

Objects in this MIB are arranged into subtrees. Each subtree is organized as a set of related objects. The overall structure and assignment of objects to their subtrees 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-Filtering-Database (per-FDB)) and so are not defined here. Instead, devices that 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 that support Extended Filtering Services should support dot1qTpGroupTable, dot1qForwardAllTable, and dot1qForwardUnregisteredTable.

<table>
<thead>
<tr>
<th>Extended Bridge MIB Name</th>
<th>IEEE 802.1D-1998 Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>dot1dExtBase</td>
<td>Bridge</td>
</tr>
<tr>
<td>dot1dDeviceCapabilities</td>
<td>.ApplicantAdministrativeControl</td>
</tr>
<tr>
<td>dot1dExtendedFilteringServices</td>
<td></td>
</tr>
<tr>
<td>dot1dTrafficClasses</td>
<td></td>
</tr>
<tr>
<td>dot1dTrafficClassesEnabled</td>
<td></td>
</tr>
<tr>
<td>dot1dGmrpStatus</td>
<td>.UserPriorityRegenerationTable</td>
</tr>
<tr>
<td>dot1dPriority</td>
<td></td>
</tr>
<tr>
<td>dot1dPortPriorityTable</td>
<td></td>
</tr>
<tr>
<td>dot1dPortDefaultUserPriority</td>
<td>.UserPriority</td>
</tr>
<tr>
<td>dot1dPortNumTrafficClasses</td>
<td></td>
</tr>
<tr>
<td>dot1dUserPriorityRegenTable</td>
<td></td>
</tr>
<tr>
<td>dot1dRegenUserPriority</td>
<td></td>
</tr>
<tr>
<td>dot1dTrafficClassTable</td>
<td>.TrafficClassTable</td>
</tr>
<tr>
<td>dot1dTrafficClassPriority</td>
<td></td>
</tr>
<tr>
<td>dot1dTrafficClass</td>
<td></td>
</tr>
<tr>
<td>dot1dPortOutboundAccessPriorityTable</td>
<td>.OutboundAccessPriorityTable</td>
</tr>
<tr>
<td>dot1dPortOutboundAccessPriority</td>
<td></td>
</tr>
</tbody>
</table>
dot1dGarp
   dot1dPortGarpTable
      dot1dPortGarpJoinTime .JoinTime
      dot1dPortGarpLeaveTime .LeaveTime
      dot1dPortGarpLeaveAllTime .LeaveAllTime

dot1dGmrp
   dot1dPortGmrpTable
      dot1dPortGmrpStatus .ApplicantAdministrativeControl
      dot1dPortGmrpFailedRegistrations .FailedRegistrations
      dot1dPortGmrpLastPduOrigin .OriginatorOfLastPDU
      dot1dPortRestrictedGroupRegistration
         Restricted Group Registration
         (Ref. IEEE 802.1t 10.3.2.3)

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.

notify group registration failure      not considered useful
                                       (IEEE 802.1t 14.10.1.2)

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-2003 [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.
3.1.3. The dot1dExtBase Subtree

This subtree contains the objects that 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 Generic Attribute Registration Protocol (GARP) and GARP Multicast Registration Protocol (GMRP) protocols.

3.1.4. The dot1dPriority Subtree

This subtree 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 dot1dGarp Subtree

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

3.1.6. The dot1dGmrp Subtree

This subtree contains the objects for configuring and reporting on operation of the GARP Multicast Registration Protocol (GMRP).
3.1.7. The dot1dTpHCPortTable

This table extends the dot1dTp subtree from the BRIDGE-MIB [BRIDGE-MIB] and contains the objects for reporting port-bridging statistics for high-capacity network interfaces.

3.1.8. The dot1dTpPortOverflowTable

This table extends the dot1dTp subtree from the BRIDGE-MIB [BRIDGE-MIB] 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 subtrees. Each subtree is organized as a set of related objects. The overall structure and assignment of objects to their subtrees is shown below. Some manageable objects defined in the BRIDGE-MIB [BRIDGE-MIB] 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-2003 [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-2003 [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.

<table>
<thead>
<tr>
<th>Virtual Bridge MIB object</th>
<th>IEEE 802.1Q-2003 Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dot1qBase</td>
<td></td>
</tr>
<tr>
<td>dot1qVlanVersionNumber</td>
<td>12.10.1.1 read bridge vlan config</td>
</tr>
<tr>
<td>dot1qMaxVlanId</td>
<td>12.10.1.1 read bridge vlan config</td>
</tr>
<tr>
<td>dot1qMaxSupportedVlans</td>
<td>12.10.1.1 read bridge vlan config</td>
</tr>
<tr>
<td>dot1qNumVlans</td>
<td></td>
</tr>
<tr>
<td>dot1qGvrpStatus</td>
<td>12.9.2.1/2 read/set garp</td>
</tr>
<tr>
<td>applicant controls</td>
<td></td>
</tr>
<tr>
<td>dot1qTp</td>
<td></td>
</tr>
<tr>
<td>dot1qFdbTable</td>
<td></td>
</tr>
<tr>
<td>dot1qFdbId</td>
<td></td>
</tr>
</tbody>
</table>
dot1qFdbDynamicCount
  12.7.1.1.3 read filtering d/base

dot1qTpFdbTable
  dot1qTpFdbAddress
  dot1qTpFdbPort
  dot1qTpFdbStatus

dot1qTpGroupTable
  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

dot1qVlanStaticName
dot1qVlanStaticEgressPorts
dot1qVlanForbiddenEgressPorts
dot1qVlanStaticUntaggedPorts
dot1qVlanStaticRowStatus
dot1qNextFreeLocalVlanIndex

dot1qPortVlanTable  12.10.1.1 read bridge vlan configuration

dot1qPvid
dot1qPortAcceptableFrameTypes  12.10.1.2 configure PVID values
                      12.10.1.3 configure acceptable frame types parameter

dot1qPortIngressFiltering  12.10.1.4 configure ingress filtering parameters

dot1qPortGvrpStatus

dot1qPortGvrpFailedRegistrations
dot1qPortGvrpLastPduOrigin
dot1qPortRestrictedVlanRegistration

IEEE 802.1u 11.2.3.2.3 Restricted VLAN Registration

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

**IEEE 802.1Q-2003 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) | not considered useful
discard on error details | not considered useful
read permanent database (12.7.6.1) | not considered useful
permanent database size | count rows in
number of static filtering entries | dot1qStaticUnicastTable + dot1qStaticMulticastTable
number of static VLAN registration entries | dot1qVlanStaticTable
read filtering entry range (12.7.7.4) | use GetNext operation.
read filtering database (12.7.1.1) | not considered useful
filtering database size | count rows applicable to each FDB in dot1dTpGroupTable
number of dynamic group address entries (12.7.1.3) | not considered useful
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 Subtree

This subtree contains the objects that are applicable to all bridges implementing IEEE 802.1Q virtual LANs.

3.2.3. The dot1qTp Subtree

This subtree 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 subtree will be implemented by all bridges that perform destination-address filtering.

3.2.4. The dot1qStatic Subtree

This subtree 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 Subtree

This subtree 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., GARP VLAN Registration Protocol (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

Various Working Groups have defined standards-track MIB documents (for example, [RFC2613] and [RFC3318]), that contain objects and Textual Conventions to represent a Virtual Local Area Network Identifier (VLAN-ID) [802.1Q]. New definitions are showing up in various documents (for example, [RFC4323] and [RFC4149]). Unfortunately, the result is a set of different definitions for the same piece of management information. This may lead to confusion and unnecessary complexity. In order to address this situation, three new textual conventions are defined in the Q-BRIDGE-MIB, called VlanIdOrAny, VlanIdOrNone, and VlanIdOrAnyOrNone. These new textual conventions should be (re)used in MIB modules so that they all represent a VLAN-ID in the same way.
These textual conventions provide a means to specify MIB objects that refer to a specific VLAN, to any VLAN, or to no VLAN. For an example of how these textual conventions might be used, consider a MIB object, with SYNTAX of VlanIdOrAnyOrNone, that specifies the VLAN on which to accept incoming packets of a particular protocol. Such an object would allow the device to be configured to accept packets of this protocol received with a specific 802.1q tag value, with any 802.1q tag value, or with no 802.1q tag. Note that a MIB object that is defined using one of these textual conventions should clarify the meaning of ‘any VLAN’ and/or ‘no VLAN’ in its DESCRIPTION clause.

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 module.

3.4.1. Relationship to the SNMPv2-MIB

The SNMPv2-MIB [RFC3418] defines objects that are generally applicable to managed devices. These objects apply to the device as a whole, irrespective of whether bridging is the device’s sole functionality or only a subset of the device’s functionality.

Full support for the 802.1D management objects requires that the SNMPv2-MIB objects sysDescr and sysUpTime be implemented. Note that compliance to the current SNMPv2-MIB module requires additional objects and notifications to be implemented as specified in RFC 3418 [RFC3418].

3.4.2. Relationship to the IF-MIB

The IF-MIB, [RFC2863], requires that any MIB that is an adjunct of the IF-MIB clarify specific areas within the IF-MIB. These areas were intentionally left vague in the IF-MIB in order to avoid over-constraining the MIB, thereby precluding management of certain media-types.

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

The IF-MIB [RFC2863] defines managed objects for managing network interfaces. A network interface is considered 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.

Full support for the 802.1D management objects requires that the IF-MIB objects ifIndex, ifType, ifDescr, ifPhysAddress, and ifLastChange are implemented. Note that compliance to the current IF-MIB module requires additional objects and notifications to be implemented as specified in RFC 2863 [RFC2863].

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’ subtree (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 delineated according to a set of protocols, with some protocols being bridged, and other protocols not being bridged. For example, in an entity that exclusively performed bridging, all protocols would be considered bridged, whereas in an entity that performed IP routing on IP datagrams and only bridged other protocols, only the non-IP data would be considered 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 that 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 Subtree to be in accordance with the IF-MIB [RFC2863], 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 does not make any assumption that within an entity, VLANs that are instantiated as an entry in dot1qVlanCurrentTable by either management configuration through dot1qVlanStaticTable or by dynamic means (e.g., through GVRP) are 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 IF-MIB [RFC2863] 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 (for example) 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 that 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. Relationship to the BRIDGE-MIB

This section defines how objects in the BRIDGE-MIB module [BRIDGE-MIB] should be represented for devices that implement the extensions: some of the old objects are less useful in such devices but must still be implemented for reasons of backwards compatibility.

3.4.3.1. The dot1dBase Subtree

This subtree contains objects that are applicable to all types of bridges. Interpretation of this subtree is unchanged.

3.4.3.2. The dot1dStp Subtree

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

3.4.3.3. The dot1dTp Subtree

This subtree 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 subtree is unchanged.

In a device supporting multiple Filtering Databases, this subtree 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 learned in. If an address has been learned in multiple databases on a single port, report it only once. If an address has been learned 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 Subtree

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

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

In a device supporting multiple Filtering Databases, this subtree 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 BRIDGE-MIB

To supplement the BRIDGE-MIB [BRIDGE-MIB], this module 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-2003 [802.1Q].

(3) support for 64-bit versions of BRIDGE-MIB [BRIDGE-MIB] 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, Integer32, 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 "200601090000Z"
    ORGANIZATION "IETF Bridge MIB Working Group"
    CONTACT-INFO
        "Email:  bridge-mib@ietf.org
                 ietfmibs@ops.ietf.org

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                                         Portsmouth, NH 03801
                                             USA
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                     Postal: Hemel Hempstead, Herts. HP2 7YU
                             UK
                             Email: elbell@ntlworld.com

                     Vivian Ngai

                     [Page 18]
DESCRIPTION
"The Bridge MIB Extension module for managing Priority and Multicast Filtering, defined by IEEE 802.1D-1998, including Restricted Group Registration defined by IEEE 802.1t-2001.

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REVISION
"200601090000Z"

DESCRIPTION
"Added dot1dPortRestrictedGroupRegistration.
Deprecated pBridgePortGmrpGroup and pBridgeCompliance and added pBridgePortGmrpGroup2 and pBridgeCompliance2."
REVISION "199908250000Z"
DESCRIPTION
"The Bridge MIB Extension module for managing Priority
and Multicast Filtering, defined by IEEE 802.1D-1998.

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) }

-- -------------------------------------------------------------
-- subtrees 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 subtree
-- -------------------------------------------------------------
dot1dDeviceCapabilities OBJECT-TYPE
SYNTAX BITS {
  dot1dExtendedFilteringServices(0),
  dot1dTrafficClasses(1),
  dot1qStaticEntryIndividualPort(2),
  dot1qIVLCapable(3),
  dot1qSVLCapable(4),
  dot1qHybridCapable(5),
  dot1qConfigurablePvidTagging(6),
  dot1dLocalVlanCapable(7)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION

Levi & Harrington Standards Track [Page 20]
"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.

dot1dExtendedFilteringServices(0),
    -- can perform filtering of
    -- individual multicast addresses
    -- controlled by GMRP.
dot1dTrafficClasses(1),
    -- can map user priority to
    -- multiple traffic classes.
dot1qStaticEntryIndividualPort(2),
    -- dot1qStaticUnicastReceivePort &
    -- dot1qStaticMulticastReceivePort
    -- can represent non-zero entries.
dot1qIVLCapable(3),  -- Independent VLAN Learning (IVL).
dot1qSVLCapable(4),  -- Shared VLAN Learning (SVL).
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."

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.

The value of this object MUST be retained across reinitializations of the management system."
DEFVAL { true }
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 and 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.

The value of this object MUST be retained across reinitializations of the management system.

---

Port Capabilities Table

---

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

---

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

---

SEQUENCE {
dot1dPortCapabilities
BITS

dot1dPortCapabilities OBJECT-TYPE
SYNTAX      BITS {
    dot1qDot1qTagging(0),
    dot1qConfigurableAcceptableFrameTypes(1),
    dot1qIngressFiltering(2)
}
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 that are manageable through this MIB.

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."
REFERENCE
"ISO/IEC 15802-3 Section 5.2,
IEEE 802.1Q/D11 Section 5.2"
 ::= { dot1dPortCapabilitiesEntry 1 }

-- ---------------------------------------------------------------------
-- the dot1dPriority subtree
-- ---------------------------------------------------------------------

-- -------------------------------------------------------------
-- 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 {  
        dot1dPortDefaultUserPriority   
            Integer32,  
        dot1dPortNumTrafficClasses  
            Integer32  
    }

dot1dPortDefaultUserPriority OBJECT-TYPE
SYNTAX     Integer32 (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.  

The value of this object MUST be retained across
reinitializations of the management system."
::= { dot1dPortPriorityEntry 1 }

dot1dPortNumTrafficClasses OBJECT-TYPE
SYNTAX     Integer32 (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.  

The value of this object MUST be retained across
reinitializations of the management system."
::= { dot1dPortPriorityEntry 2 }

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

Levi & Harrington           Standards Track                    [Page 24]
dot1dUserPriorityRegenTable OBJECT-TYPE
SYNTAX SEQUENCE OF Dot1dUserPriorityRegenEntry
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"
::= { dot1dPriority 2 }

Dot1dUserPriorityRegenEntry OBJECT-TYPE
SYNTAX Dot1dUserPriorityRegenEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A mapping of incoming User Priority to a Regenerated
User Priority."
INDEX { dot1dBasePort, dot1dUserPriority }
::= { dot1dUserPriorityRegenTable 1 }

Dot1dUserPriorityRegenEntry ::= SEQUENCE {
    dot1dUserPriority
    Integer32,
    dot1dRegenUserPriority
    Integer32
}
dot1dUserPriority OBJECT-TYPE
SYNTAX Integer32 (0..7)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The User Priority for a frame received on this port."
::= { dot1dUserPriorityRegenEntry 1 }
dot1dRegenUserPriority OBJECT-TYPE
SYNTAX Integer32 (0..7)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The Regenerated User Priority that the incoming User
Priority is mapped to for this port.

The value of this object MUST be retained across
reinitializations of the management system."
::= { dot1dUserPriorityRegenEntry 2 }

-- Traffic Class Table

-- -------------------------------------------------------------

dot1dTrafficClassTable OBJECT-TYPE
SYNTAX       SEQUENCE OF Dot1dTrafficClassEntry
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..(dot1dPortNumTrafficClasses-1))."
REFERENCE
"ISO/IEC 15802-3 Table 7-2"
::= { dot1dPriority 3 }

Dot1dTrafficClassEntry ::=
SEQUENCE {
   dot1dTrafficClassPriority
      Integer32,
   dot1dTrafficClass
      Integer32
}

dot1dTrafficClassPriority OBJECT-TYPE
SYNTAX       Integer32 (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 Integer32 (0..7)
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The Traffic Class the received frame is mapped to.

The value of this object MUST be retained across reinitializations of the management system."
::= { dot1dTrafficClassEntry 2 }

-- Outbound Access Priority Table

-- -------------------------------------------------------------
dot1dPortOutboundAccessPriorityTable OBJECT-TYPE
SYNTAX SEQUENCE OF Dot1dPortOutboundAccessPriorityEntry
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"
::= { dot1dPriority 4 }

dot1dPortOutboundAccessPriorityEntry OBJECT-TYPE
SYNTAX Dot1dPortOutboundAccessPriorityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Regenerated User Priority to Outbound Access Priority mapping."
INDEX { dot1dBasePort, dot1dRegenUserPriority }
::= { dot1dPortOutboundAccessPriorityTable 1 }

Dot1dPortOutboundAccessPriorityEntry ::= SEQUENCE {
dot1dPortOutboundAccessPriority
  Integer32
}

dot1dPortOutboundAccessPriority OBJECT-TYPE
  SYNTAX      Integer32 (0..7)
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The Outbound Access Priority the received frame is mapped to."
  ::= { dot1dPortOutboundAccessPriorityEntry 1 }

-- -------------------------------------------------------------
-- the dot1dGarp subtree
-- -------------------------------------------------------------

-- -------------------------------------------------------------
-- The GARP Port Table
-- -------------------------------------------------------------

dot1dPortGarpTable OBJECT-TYPE
  SYNTAX      SEQUENCE OF Dot1dPortGarpEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "A table of GARP control information about every bridge port. This is indexed by dot1dBasePort."
  ::= { dot1dGarp 1 }

dot1dPortGarpEntry OBJECT-TYPE
  SYNTAX      Dot1dPortGarpEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "GARP control information for a bridge port."
  AUGMENTS { dot1dBasePortEntry }
  ::= { dot1dPortGarpTable 1 }

Dot1dPortGarpEntry ::=
  SEQUENCE {
    dot1dPortGarpJoinTime
      TimeInterval,
    dot1dPortGarpLeaveTime
      TimeInterval,
    dot1dPortGarpLeaveAllTime
      TimeInterval
  }
dot1dPortGarpJoinTime OBJECT-TYPE
SYNTAX TimeInterval
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The GARP Join time, in centiseconds.

The value of this object MUST be retained across
reinitializations of the management system."
DEFVAL { 20 }
 ::= { dot1dPortGarpEntry 1 }

dot1dPortGarpLeaveTime OBJECT-TYPE
SYNTAX TimeInterval
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The GARP Leave time, in centiseconds.

The value of this object MUST be retained across
reinitializations of the management system."
DEFVAL { 60 }
 ::= { dot1dPortGarpEntry 2 }

dot1dPortGarpLeaveAllTime OBJECT-TYPE
SYNTAX TimeInterval
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The GARP LeaveAll time, in centiseconds.

The value of this object MUST be retained across
reinitializations of the management system."
DEFVAL { 1000 }
 ::= { dot1dPortGarpEntry 3 }

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

dot1dPortGmrpTable OBJECT-TYPE
SYNTAX SEQUENCE OF Dot1dPortGmrpEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table of GMRP control and status information about
every bridge port. Augments the dot1dBasePortTable."
 ::= { dot1dGmrp 1 }
dot1dPortGmrpEntry OBJECT-TYPE
SYNTAX Dot1dPortGmrpEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "GMRP control and status information for a bridge port."
AUGMENTS { dot1dBasePortEntry }
::= { dot1dPortGmrpTable 1 }

Dot1dPortGmrpEntry ::= 
SEQUENCE {
  dot1dPortGmrpStatus
    EnabledStatus,
  dot1dPortGmrpFailedRegistrations
    Counter32,
  dot1dPortGmrpLastPduOrigin
    MacAddress,
  dot1dPortRestrictedGroupRegistration
    TruthValue
}

dot1dPortGmrpStatus 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 dot1dGmrpStatus 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 dot1dGmrpStatus 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.

The value of this object MUST be retained across reinitializations of the management system."
DEFVAL { enabled }
::= { dot1dPortGmrpEntry 1 }
dot1dPortGmrpFailedRegistrations 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."
 ::= { dot1dPortGmrpEntry 2 }

dot1dPortGmrpLastPduOrigin OBJECT-TYPE
SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The Source MAC Address of the last GMRP message received on this port."
 ::= { dot1dPortGmrpEntry 3 }

dot1dPortRestrictedGroupRegistration OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The state of Restricted Group Registration on this port. If the value of this control is true(1), then creation of a new dynamic entry is permitted only if there is a Static Filtering Entry for the VLAN concerned, in which the Registrar Administrative Control value is Normal Registration. The value of this object MUST be retained across reinitializations of the management system."
REFERENCE "IEEE 802.1t clause 10.3.2.3, 14.10.1.3."
DEFVAL { false }
 ::= { dot1dPortGmrpEntry 4 }

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

dot1dTpHCPortTable OBJECT-TYPE
SYNTAX SEQUENCE OF Dot1dTpHCPortEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table that contains information about every high-capacity port that is associated with this transparent bridge."
 ::= { dot1dTp 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 that 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 that 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 that 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 that 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 that 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 deprecated

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 }

pBridgePortGmrpGroup2 OBJECT-GROUP

OBJECTS {
    dot1dPortGmrpStatus,
    dot1dPortGmrpFailedRegistrations,
    dot1dPortGmrpLastPduOrigin,
    dot1dPortRestrictedGroupRegistration
}

STATUS current

DESCRIPTION
"A collection of objects providing port level control
and status information for GMRP operation."

::= { pBridgeGroups 12 }
pBridgeCompliance MODULE-COMPLIANCE
STATUS deprecated
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 that 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 that 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 that 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 that map to network interfaces that have the value of the corresponding instance of ifSpeed greater than 650,000,000 bits/second."

OBJECT  dot1dPortNumTrafficClasses
MIN-ACCESS  read-only
DESCRIPTION
  "Write access is not required."

OBJECT  dot1dTrafficClass
MIN-ACCESS  read-only
DESCRIPTION
  "Write access is not required."

OBJECT  dot1dRegenUserPriority
MIN-ACCESS  read-only
DESCRIPTION
  "Write access is not required."

::= { pBridgeCompliances 1 }
pBridgeCompliance2 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 that 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 that 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 pBridgePortGmrpGroup2
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 that 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 that map to network interfaces that have the value of the corresponding instance of ifSpeed greater than 650,000,000 bits/second."

OBJECT dot1dPortNumTrafficClasses
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT dot1dTrafficClass
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT dot1dRegenUserPriority
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

::= { pBridgeCompliances 2 }

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, Integer32
FROM SNMPv2-SMI
RowStatus, TruthValue, TEXTUAL-CONVENTION, MacAddress
FROM SNMPv2-TC
SnmpAdminString
FROM SNMP-FRAMEWORK-MIB
MODULE-COMPLIANCE, OBJECT-GROUP
FROM SNMPv2-CONF
dot1dBridge, dot1dBasePortEntry, dot1dBasePort
FROM BRIDGE-MIB
EnabledStatus
FROM P-BRIDGE-MIB
TimeFilter
FROM RMON2-MIB;

qBridgeMIB MODULE-IDENTITY
LAST-UPDATED "200601090000Z"
ORGANIZATION "IETF Bridge MIB Working Group"
CONTACT-INFO
"Email:  Bridge-mib@ietf.org
ietf-mibs@ops.ietf.org
David Levi
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Levi & Harrington Standards Track [Page 42]
DESCRIPTION
"The VLAN Bridge MIB module for managing Virtual Bridged
Local Area Networks, as defined by IEEE 802.1Q-2003,
including Restricted Vlan Registration defined by
IEEE 802.1u-2001 and Vlan Classification defined by

Copyright (C) The Internet Society (2006). This version of
this MIB module is part of RFC 4363; See the RFC itself for
full legal notices."
REVISION "200601090000Z"
DESCRIPTION
"Added Vlan TEXTUAL-CONVENTIONS,
dot1qPortRestrictedVlanRegistration, dot1vProtocol subtree,
qBridgeClassificationDeviceGroup, qBridgePortGroup2,
qBridgeClassificationPortGroup, and qBridgeCompliance2.
Clarified dot1qForwardAllStaticPorts,
qPortAcceptableFrameTypes, and qBridgeCompliance.
Deprecated qBridgePortGroup and qBridgeCompliance."

REVISION "199908250000Z"

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

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
DISPLAY-HINT "d"
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
DISPLAY-HINT "d"
STATUS       current

DESCRIPTION
"The VLAN-ID that uniquely identifies a VLAN. This
is the 12-bit VLAN-ID used in the VLAN Tag header.
The range is defined by the REFERENCED specification."

REFERENCE
"IEEE Std 802.1Q 2003 Edition, Virtual Bridged
Local Area Networks."

SYNTAX      Integer32 (1..4094)

VlanIdOrAny ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS       current

DESCRIPTION
"The VLAN-ID that uniquely identifies a specific VLAN,
or any VLAN. The special value of 4095 is used to
indicate a wildcard, i.e., any VLAN. This can be used
in any situation where an object or table entry must
refer either to a specific VLAN or to any VLAN.

Note that a MIB object that is defined using this
TEXTUAL-CONVENTION should clarify the meaning of
‘any VLAN’ (i.e., the special value 4095)."

SYNTAX      Integer32 (1..4094 | 4095)

VlanIdOrNone ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS       current

DESCRIPTION
"The VLAN-ID that uniquely identifies a specific VLAN,
or no VLAN. The special value of zero is used to
indicate that no VLAN-ID is present or used. This can
be used in any situation where an object or a table entry
must refer either to a specific VLAN, or to no VLAN.

Note that a MIB object that is defined using this
TEXTUAL-CONVENTION should clarify the meaning of
‘no VLAN’ (i.e., the special value 0)."

SYNTAX      Integer32 (0 | 1..4094)
VlanIdOrAnyOrNone ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "d"
   STATUS    current
   DESCRIPTION "The VLAN-ID that uniquely identifies a specific VLAN,
any VLAN, or no VLAN. The special values 0 and 4095
have the same meaning as described in the VlanIdOrAny
and VlanIdOrNone TEXTUAL-CONVENTIONS.

Note that a MIB object that is defined using this
TEXTUAL-CONVENTION should clarify the meaning of
'any VLAN' and 'no VLAN' (i.e., the special values
0 and 4095)."
   SYNTAX       Integer32 (0 | 1..4094 | 4095)
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.

The value of this object MUST be retained across
reinitializations of the management system."
DEFVAL      { enabled }
::= { dot1qBase 5 }

-- -------------------------------------------------------------
-- the dot1qTp subtree
-- ----------------------------------------------------------------------

-- 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 that 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
    Integer32,
  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      Integer32 (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 learned 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 learned 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 learned 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 that
    were learned by GMRP or some other dynamic mechanism, in
    this Filtering database."
 ::= { dot1qTpGroupEntry 3 }

-- -------------------------------------------------------------
-- Service Requirements subtree
-- -------------------------------------------------------------

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 the standard behaviour of using basic filtering services, i.e., forward all multicasts to all ports.

The value of this object MUST be retained across reinitializations of the management system."

::= { 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.

The value of this object MUST be retained across reinitializations of the management system."

::= { 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 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."

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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.

The value of this object MUST be retained across reinitializations of the management system.

::= { 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.

The value of this object MUST be retained across reinitializations of the management system."
::= { 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 Integer32,
  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 Integer32 (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 on which a specific unicast address may be dynamically learned. The dot1qTpFdbTable will have an equivalent entry with a dot1qTpFdbPort value of ‘0’ until this address has been learned, at which point 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.

The value of this object MUST be retained across reinitializations of the management system.
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.

The value of this object MUST be retained across reinitializations of the management system."
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        
            Integer32,  
            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      Integer32 (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.

The value of this object MUST be retained across reinitializations of the management system."

::= { 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.

The value of this object MUST be retained across reinitializations of the management system."

::= { 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.

The value of this object MUST be retained across reinitializations of the management system.

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 referring 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 that 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 that 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 learned 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,

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dot1qVlanStaticRowStatus
  RowStatus
}

dot1qVlanStaticName OBJECT-TYPE
SYNTAX      SnmpAdminString {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 that 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 that 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."
dot1qVlanStaticUntaggedPorts OBJECT-TYPE
SYNTAX         PortList
MAX-ACCESS     read-create
STATUS         current
DESCRIPTION     "The set of ports that 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. For example, a
manager might attempt 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         Integer32 (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,
    dot1qPortGvtpStatus
         EnabledStatus,
    dot1qPortGvtpFailedRegistrations
         Counter32,
    dot1qPortGvtpLastPduOrigin
         MacAddress,
    dot1qPortRestrictedVlanRegistration
         TruthValue
}

dot1qPvid OBJECT-TYPE
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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.

The value of this object MUST be retained across
reinitializations of the management system."
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 a VID based on the
PVID and VID Set for this port.

This control does not affect VLAN-independent Bridge
Protocol Data Unit (BPDU) frames, such as GVRP and
Spanning Tree Protocol (STP). It does affect VLAN-
dependent BPDU frames, such as GMRP.

The value of this object MUST be retained across
reinitializations of the management system."
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 that 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.

The value of this object MUST be retained across reinitializations of the management system.

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.

The value of this object MUST be retained across reinitializations of the management system."

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

::= { dot1qPortVlanEntry 6 }

dot1qPortRestrictedVlanRegistration OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"The state of Restricted VLAN Registration on this port. If the value of this control
is true(1), then creation of a new dynamic VLAN entry is permitted only if there is a Static VLAN Registration Entry for the VLAN concerned, in which the Registrar Administrative Control value for this port is Normal Registration.

The value of this object MUST be retained across reinitializations of the management system."
REFERENCE
"IEEE 802.1u clause 11.2.3.2.3, 12.10.1.7."
DEFVAL      { false }
 ::= { dot1qPortVlanEntry 7 }

-- Per port VLAN Statistics Table

-- 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 that 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 that 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

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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 that 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 that were classified as belonging to this VLAN and that 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 that 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 that 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 that were classified as belonging to this VLAN and that 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 }
```
"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
    Integer32,
  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 Integer32 (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 a filtering database independent 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      Integer32 (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.

   The value of this object MUST be retained across
   reinitializations of the management system."
::= { 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.

   The value of this object MUST be retained across
reinitializations of the management system.

::= { dot1qVlan 10 }

-- -------------------------------------------------------------
dot1vProtocol subtree
-- -------------------------------------------------------------

dot1vProtocolGroupTable OBJECT-TYPE
SYNTAX      SEQUENCE OF Dot1vProtocolGroupEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A table that contains mappings from Protocol Templates to Protocol Group Identifiers used for Port-and-Protocol-based VLAN Classification."
REFERENCE    "IEEE 802.1v clause 8.6.4"
::= { dot1vProtocol 1 }

dot1vProtocolGroupEntry OBJECT-TYPE
SYNTAX      Dot1vProtocolGroupEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A mapping from a Protocol Template to a Protocol Group Identifier."
INDEX       { dot1vProtocolTemplateFrameType,
               dot1vProtocolTemplateProtocolValue }
::= { dot1vProtocolGroupTable 1 }

Dot1vProtocolGroupEntry ::= 
  SEQUENCE {
    dot1vProtocolTemplateFrameType
      INTEGER,
    dot1vProtocolTemplateProtocolValue
      OCTET STRING,
    dot1vProtocolGroupId
      Integer32,
    dot1vProtocolGroupRowStatus
      RowStatus
  }

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

dot1vProtocolTemplateProtocolValue OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (2 | 5))
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The identification of the protocol above the data-link layer in a Protocol Template. Depending on the frame type, the octet string will have one of the following values:

For 'ethernet', 'rfc1042' and 'snap8021H',
 this is the 16-bit (2-octet) IEEE 802.3 Type Field.
For 'snapOther',
 this is the 40-bit (5-octet) PID.
For 'llcOther',
 this is the 2-octet IEEE 802.2 Link Service Access Point (LSAP) pair: first octet for Destination Service Access Point (DSAP) and second octet for Source Service Access Point (SSAP)."
REFERENCE
"IEEE 802.1v clause 8.6.2"
 ::= { dot1vProtocolGroupEntry 2 }

dot1vProtocolGroupId OBJECT-TYPE
SYNTAX Integer32 (0..2147483647)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"Represents a group of protocols that are associated together when assigning a VID to a frame."
REFERENCE
"IEEE 802.1v clause 8.6.3, 12.10.2.1"
 ::= { dot1vProtocolGroupEntry 3 }

dot1vProtocolGroupRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
dot1vProtocolPortTable OBJECT-TYPE
SYNTAX SEQUENCE OF Dot1vProtocolPortEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table that contains VID sets used for Port-and-Protocol-based VLAN Classification."
REFERENCE "IEEE 802.1v clause 8.4.4"
::= { dot1vProtocol 2 }

Dot1vProtocolPortEntry ::=
SEQUENCE {
  dot1vProtocolPortGroupId
   Integer32,
  dot1vProtocolPortGroupVid
   Integer32,
  dot1vProtocolPortRowStatus
   RowStatus
}

dot1vProtocolPortGroupId OBJECT-TYPE
SYNTAX Integer32 (1..2147483647)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Designates a group of protocols in the Protocol Group Database."
REFERENCE "IEEE 802.1v clause 8.6.3, 12.10.1.2"
::= { dot1vProtocolPortEntry 1 }

dot1vProtocolPortGroupVid OBJECT-TYPE
SYNTAX Integer32 (1..4094)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The VID associated with a group of protocols for each port."
REFERENCE
"IEEE 802.1v clause 8.4.4, 12.10.1.2"
 ::= { dot1vProtocolPortEntry 2 }

dot1vProtocolPortRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object indicates the status of this entry."
 ::= { dot1vProtocolPortEntry 3 }

-- -------------------------------------------------------------
-- 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, learned 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, learned 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, learned 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     deprecated
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 that have no specific constraints defined."
::= { qBridgeGroups 13 }

qBridgeClassificationDeviceGroup OBJECT-GROUP
OBJECTS {
    dot1vProtocolGroupId,
    dot1vProtocolGroupRowStatus
}
STATUS current
DESCRIPTION "VLAN classification information for the bridge."
::= { qBridgeGroups 14 }

qBridgeClassificationPortGroup OBJECT-GROUP
OBJECTS {
    dot1vProtocolPortGroupVid,
    dot1vProtocolPortRowStatus
}
STATUS current
DESCRIPTION "VLAN classification information for individual ports."
::= { qBridgeGroups 15 }

qBridgePortGroup2 OBJECT-GROUP
OBJECTS {
    dot1qPvid,
    dot1qPortAcceptableFrameTypes,
    dot1qPortIngressFiltering,
    dot1qPortGvrpStatus,
dot1qPortGvrpFailedRegistrations,
dot1qPortGvrpLastPduOrigin,
dot1qPortRestrictedVlanRegistration
}
STATUS  current
DESCRIPTION
"A collection of objects providing port-level VLAN
control and status information for all ports."
::= { qBridgeGroups 16 }

-- compliance statements
-- -------------------------------------------------------------
qBridgeCompliance MODULE-COMPLIANCE
STATUS  deprecated
DESCRIPTION
"The compliance statement for device support of Virtual
LAN Bridge services.

RFC2674 was silent about the expected persistence of the
read-write objects in this MIB module. Applications MUST
NOT assume that the values of the read-write objects are
persistent across reinitializations of the management
system and MUST NOT assume that the values are not
persistent across reinitializations of the management
system."

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 }

qBridgeCompliance2 MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
"The compliance statement for device support of Virtual LAN Bridge services.

This document clarifies the persistence requirements for the read-write objects in this MIB module. All implementations claiming compliance to qBridgeCompliance2 MUST retain the values of those read-write objects that specify this requirement."

MODULE
MANDATORY-GROUPS {
  qBridgeBaseGroup,
  qBridgeVlanGroup,
  qBridgeVlanStaticGroup,
  qBridgePortGroup2
}

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."

GROUP qBridgeClassificationDeviceGroup
DESCRIPTION "This group is mandatory ONLY for devices implementing VLAN Classification as specified in IEEE 802.1v."
GROUP qBridgeClassificationPortGroup
DESCRIPTION
"This group is mandatory ONLY for devices implementing VLAN Classification as specified in IEEE 802.1v."

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."

OBJECT dot1vProtocolGroupId
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required as this is an optional capability in IEEE 802.1v."

OBJECT dot1vProtocolGroupRowStatus
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required as this is an optional capability in IEEE 802.1v."

::= { qBridgeCompliances 2 }

END
6. Acknowledgements

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, Anders SW Christensen, Andrew Smith, Paul Langille, Anil Rijhsinghani, and Keith McCloghrie in particular for their comments and suggestions, which improved this effort.

Editing for the final version was done by David Levi.

The new textual conventions related to VLAN-IDs were produced as a result of a review of the use of VLAN-ID in several MIB modules. Further investigation found that VLAN-ID objects were defined in a few other MIB modules. The editor would like to thank all who contributed to the discussion that resulted in these new textual conventions. Specifically, Bert Wijnen, Les Bell, Andrew Smith, Mike Heard, Randy Presuhn, Dan Romascu, Eduardo Cardona, Tom Petch, Juergen Schoenwaelder, Richard Woundy, Tony Jeffree, and William Murwin. We also received input and feedback from IEEE confirming that the values 0 and 4095 are not used for identifying a specific VLAN-ID and so can be used to represent none or a wildcard (see Appendix A).

7. Security Considerations

There are a number of management objects defined in this MIB module with 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. These tables and objects and their sensitivity/vulnerability are described below.

The following tables and objects in the P-BRIDGE-MIB can be manipulated to interfere with the operation of priority classes. This could, for example, be used to force a reinitialization of state machines, thus causing network instability. Another possibility would be for an attacker to override established policy on port priorities, thus giving a user (or an attacker) unauthorized preferential treatment.

\begin{verbatim}
dot1dTrafficClassesEnabled
dot1dGmrpStatus
dot1dPortPriorityTable
dot1dUserPriorityRegenTable
\end{verbatim}
The following tables and objects in the Q-BRIDGE-MIB could be manipulated to interfere with the operation of virtual LANs. This could, for example, be used to force a reinitialization of state machines to cause network instability, or changing the forwarding and filtering policies.

- dot1dTrafficClassTable
- dot1dPortGarpTable
- dot1dPortGmrpTable
- dot1qGvrpStatus
- dot1qForwardAllTable
- dot1qStaticUnicastTable
- dot1qStaticMulticastTable
- dot1qVlanStaticTable
- dot1qPortVlanTable
- dot1qLearningConstraintsTable
- dot1vProtocolGroupTable
- dot1vProtocolPortTable

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability.

The objects dot1dDeviceCapabilities and dot1dPortCapabilitiesTable in the P-BRIDGE-MIB could be used by an attacker to determine which attacks might be useful to attempt against a given device.

The following read-only tables and objects in the Q-BRIDGE-MIB could be used by an attacker to determine which attacks might be useful to attempt against a given device, could be used by an attacker to detect whether their attacks are being blocked or filtered, or could be used to understand the logical topology of the network.

- dot1qMaxVlanID
- dot1qMaxSupportedVlans
- dot1qNumVlans
- dot1qFdbTable
- dot1qTpFdbTable
- dot1qTpGroupTable
- dot1qVlanCurrentTable
- dot1qPortVlanStatisticsTable
SNMP versions prior to SNMPv3 did not include adequate security. 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 module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module 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.

8. Normative References


9. Informative References


Appendix A. Email from Tony Jeffrey from IEEE

-----Original Message-----
From: Tony Jeffree [mailto:tony@jeffree.co.uk]
Sent: Friday, 6th of June 2003 17:16
To: Wijnen, Bert (Bert) [mailto:bwijnen@lucent.com]
Subject: RE: VlAn ID

Bert et al -

We have concluded that the use of 4095 as a wildcard is acceptable to 802.1, and we will make any necessary changes to 802.1Q in due course to relax the current stated restriction. However, we need to know whether that is all that needs to be done to 802.1Q – i.e., is there any need to change our definitions of the managed objects in the document (Clause 12) to reflect the interpretation of 4095 as a wildcard, or is this simply an issue for the SNMP machinery to handle?

Regards,
Tony
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