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

Status of this Memo

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Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols in TCP/IP based internets.
   In particular, it defines two MIB modules for managing the new
   capabilities of MAC bridges defined by the IEEE 802.1D-1998 MAC
   Bridges and the IEEE 802.1Q-1998 Virtual LAN (VLAN) standards for
   bridging between Local Area Network (LAN) segments. One MIB module
   defines objects for managing the 'Traffic Classes' and 'Enhanced
   Multicast Filtering' components of IEEE 802.1D-1998. The other MIB
   module defines objects for managing IEEE 802.1Q VLANs.

   Provisions are made for support of transparent bridging. Provisions
   are also made so that these objects apply to bridges connected by
   subnetworks other than LAN segments. This memo also includes several
   MIB modules in a manner that is compliant to the SMIv2 [V2SMI].

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

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1. The SNMP Management Framework

    The SNMP Management Framework presently consists of five major
    components:

    o An overall architecture, described in an Architecture for
       Describing SNMP Management Frameworks [ARCH].

    o Mechanisms for describing and naming objects and events for the
       purpose of management. The first version of this Structure of
       Management Information (SMI) is called SMIv1 and described in STD
       16, RFC 1155 [V1SMI], STD 16, RFC 1212 [V1CONCISE] and RFC 1215
       [V1TRAPS]. The second version, called SMIv2, is described in STD
       58, RFC 2578 [V2SMI], STD 58, RFC 2579 [V2TC] and STD 58, RFC
       2580 [V2CONFORM].

    o Message protocols for transferring management information. The
       first version of the SNMP message protocol is called SNMPv1 and
       described in STD 15, RFC 1157 [V1PROTO]. A second version of the
       SNMP message protocol, which is not an Internet standards track
       protocol, is called SNMPv2c and described in RFC 1901
       [V2COMMUNITY] and RFC 1906 [V2TRANS]. The third version of the
       message protocol is called SNMPv3 and described in RFC 1906
       [V2TRANS], Message Processing and Dispatching [V3MPC] and User-
       based Security Model [V3USM].

    o Protocol operations for accessing management information. The
       first set of protocol operations and associated PDU formats is
       described in STD 15, RFC 1157 [V1PROTO]. A second set of
       protocol operations and associated PDU formats is described in
       RFC 1905 [V2PROTO].

    o A set of fundamental applications described in SNMPv3
       Applications [V3APPS] and the view-based access control mechanism
       described in View-based Access Control Model [V3VACM].

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

    This memo specifies a MIB module that is compliant to the SMIv2. A
    MIB conforming to the SMIv1 can be produced through the appropriate
    translations. The resulting translated MIB must be semantically
    equivalent, except where objects or events are omitted because no
    translation is possible (use of Counter64). Some machine readable
    information in SMIv2 will be converted into textual descriptions in

SMIv1 during the translation process. However, this loss of machine
readable information is not considered to change the semantics of the
MIB.

2. Overview

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

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

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

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

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

2.1. Scope

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

Historical note:

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

(1)   Start with a small set of essential objects and add only as
        further objects are needed.

(2)   Require objects be essential for either fault or configuration
        management.

(3)   Consider evidence of current use and/or utility.

(4)   Limit the total of objects.

(5)   Exclude objects which are simply derivable from others in
        this or other MIBs.

(6)   Avoid causing critical sections to be heavily instrumented.
        The guideline that was followed is one counter per critical
        section per layer.

3. Structure of MIBs

   This document defines additional objects, on top of those existing in
   the original BRIDGE-MIB module defined in [BRIDGEMIB]: that MIB
   module is to be maintained unchanged for backwards compatibility.
   Section 3.4.3 of the present document contains some recommendations
   regarding usage of objects in the original bridge MIB by devices
   implementing the enhancements defined here.

   Two MIB modules are defined here:

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

   (2)   Managed objects for a virtual bridge MIB module Q-BRIDGE-MIB
           for the Virtual LAN bridging enhancements defined by IEEE
           802.1Q-1998 [802.1Q].

3.1. Structure of Extended Bridge MIB module

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

3.1.1. Relationship to IEEE 802.1D-1998 Manageable Objects

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

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

```
   Extended Bridge MIB Name          IEEE 802.1D-1998 Name

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

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

   IEEE 802.1D-1998 Object   Disposition

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

3.1.2. Relationship to IEEE 802.1Q Manageable Objects

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

   Extended Bridge MIB Name   IEEE 802.1Q-1998 Section and Name

   dot1dExtBase   Bridge
     dot1dDeviceCapabilities
       dot1qStaticEntryIndividualPort   5.2 implementation options
       dot1qIVLCapable
       dot1qSVLCapable
       dot1qHybridCapable
       dot1qConfigurablePvidTagging   12.10.1.1 read bridge vlan
                                                  config
       dot1dLocalVlanCapable
     dot1dPortCapabilitiesTable
       dot1dPortCapabilities
         dot1qDot1qTagging   5.2 implementation options
         dot1qConfigurableAcceptableFrameTypes
                                        5.2 implementation options
         dot1qIngressFiltering   5.2 implementation options

3.1.3. The dot1dExtBase Group

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

3.1.4.   The dot1dPriority Group

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

3.1.5.   The dot1dGarp Group

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

3.1.6.   The dot1dGmrp Group

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

3.1.8.   The dot1dTpPortOverflowTable

   This table extends the dot1dTp group from the original bridge MIB
   [BRIDGEMIB] and contains the objects for reporting the upper bits of
   port bridging statistics for high capacity network interfaces for
   when 32-bit counters are inadequate.

3.2.   Structure of Virtual Bridge MIB module

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

3.2.1.   Relationship to IEEE 802.1Q Manageable Objects

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

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

```
Virtual Bridge MIB object           IEEE 802.1Q-1998 Reference

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

```
        dot1qStaticMulticastForbiddenEgressPorts
        dot1qStaticMulticastStatus
      dot1qVlan
        dot1qVlanNumDeletes
        dot1qVlanCurrentTable              12.10.2.1 read vlan configuration
                                           12.10.3.5 read VID to FID
                                                     allocations
                                           12.10.3.6 read FID allocated to
                                                     VID
                                           12.10.3.7 read VIDs allocated to
                                                     FID
          dot1qVlanTimeMark
          dot1qVlanIndex
          dot1qVlanFdbId
          dot1qVlanCurrentEgressPorts
          dot1qVlanCurrentUntaggedPorts
          dot1qVlanStatus
          dot1qVlanCreationTime
        dot1qVlanStaticTable              12.7.7.1/2/3 create/delete/read
                                                       filtering entry
                                          12.7.6.1 read permanent database
                                          12.10.2.2 create vlan config
                                          12.10.2.3 delete vlan config
          dot1qVlanStaticName             12.4.1.3 set bridge name
          dot1qVlanStaticEgressPorts
          dot1qVlanForbiddenEgressPorts
          dot1qVlanStaticUntaggedPorts
          dot1qVlanStaticRowStatus
        dot1qNextFreeLocalVlanIndex
        dot1qPortVlanTable                12.10.1.1 read bridge vlan
                                                    configuration
          dot1qPvid                       12.10.1.2 configure PVID values
          dot1qPortAcceptableFrameTypes   12.10.1.3 configure acceptable
                                                    frame types parameter
          dot1qPortIngressFiltering       12.10.1.4 configure ingress
                                                    filtering parameters
          dot1qPortGvrpStatus             12.9.2.2 read/set garp applicant
                                                   controls
          dot1qPortGvrpFailedRegistrations
          dot1qPortGvrpLastPduOrigin
        dot1qPortVlanStatisticsTable      12.6.1.1 read forwarding port
                                                   counters
          dot1qTpVlanPortInFrames
          dot1qTpVlanPortOutFrames
          dot1qTpVlanPortInDiscards
          dot1qTpVlanPortInOverflowFrames
          dot1qTpVlanPortOutOverflowFrames
          dot1qTpVlanPortInOverflowDiscards
```

```
      dot1qPortVlanHCStatisticsTable   12.6.1.1 read forwarding port
                                                counters
        dot1qTpVlanPortHCInFrames
        dot1qTpVlanPortHCOutFrames
        dot1qTpVlanPortHCInDiscards
      dot1qLearningConstraintsTable    12.10.3.1/3/4 read/set/delete
                                                vlan learning constraints
                                       12.10.3.2 read vlan learning
                                                constraints for VID

        dot1qConstraintVlan
        dot1qConstraintSet
        dot1qConstraintType
        dot1qConstraintStatus
      dot1qConstraintSetDefault
      dot1qConstraintTypeDefault
```

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

```
      IEEE 802.1Q-1998 Operation        Disposition

      reset bridge (12.4.1.4)           not considered useful

      reset vlan bridge (12.10.1.5)     not considered useful

      read forwarding port counters (12.6.1.1)
         discard on error details       not considered useful

      read permanent database (12.7.6.1)
         permanent database size        not considered useful
         number of static filtering     count rows in
            entries                        dot1qStaticUnicastTable +
                                           dot1qStaticMulticastTable
         number of static VLAN          count rows in
           registration entries            dot1qVlanStaticTable

      read filtering entry range        use GetNext operation.
         (12.7.7.4)

      read filtering database (12.7.1.1)
         filtering database size        not considered useful
         number of dynamic group address  count rows applicable to each
            entries (12.7.1.3)          FDB in dot1dTpGroupTable
```

         read garp state (12.9.3.1)   not considered useful

         notify vlan registration failure   not considered useful
            (12.10.1.6)

         notify learning constraint violation
            (12.10.3.10)   not considered useful

3.2.2. The dot1qBase Group

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

3.2.3. The dot1qTp Group

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

3.2.4. The dot1qStatic Group

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

3.2.5. The dot1qVlan Group

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

3.3. Textual Conventions

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

3.4. Relationship to Other MIBs

   As described above, some IEEE 802.1D management objects have not been
   included in this MIB because they overlap with objects in other MIBs
   applicable to a bridge implementing this MIB. In particular, it is
   assumed that a bridge implementing this MIB will also implement (at
   least) the 'system' group defined in MIB-II [MIB2], the 'interfaces'
   group defined in [INTERFACEMIB] and the original bridge MIB
   [BRIDGEMIB].

3.4.1. Relationship to the 'system' group

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

3.4.2. Relation to Interfaces MIB

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

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

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

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

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

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

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

3.4.2.1. Layering Model

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

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

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

3.4.2.2. ifStackTable

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

3.4.2.3. ifRcvAddressTable

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

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

3.4.3. Relation to Original Bridge MIB

   This section defines how objects in the original bridge MIB module
   [BRIDGEMIB] should be represented for devices which implement the
   extensions: some of the old objects are less useful in such devices
   but must still be implemented for reasons of backwards compatibility.
   Note that formal conformance statements for that MIB module do not
   exist since it is defined in SMIv1.

3.4.3.1. The dot1dBase Group

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

3.4.3.2. The dot1dStp Group

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

3.4.3.3. The dot1dTp Group

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

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

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

   dot1dTpLearnedEntryDiscards
        The number of times that *any* of the FDBs became full.

   dot1dTpAgingTime
        This applies to all Filtering Databases.

   dot1dTpFdbTable
        Report MAC addresses learned on each port, regardless of which
        Filtering Database they have been learnt in. If an address has
        been learnt in multiple databases on a single port, report it
        only once. If an address has been learnt in multiple
        databases on more than one port, report the entry on any one of
        the valid ports.

   dot1dTpPortTable
        This table is port-based and is not affected by multiple
        Filtering Databases or multiple VLANs. The counters should
        include frames received or transmitted for all VLANs. Note that
        equivalent 64-bit port statistics counters, as well as other
        objects to represent the upper 32 bits of these counters, are
        defined in this document for high capacity network interfaces.
        These have confromance statements to indicate for which speeds of
        interface they are required.

3.4.3.4. The dot1dStatic Group

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

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

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

     dot1dStaticTable
          Entries read from this table include all static entries from all
          of the Filtering Databases. Entries for the same MAC address
          and receive port in more than one Filtering Database must appear
          only once since these are the indices of this table. This table
          should be implemented as read-only in devices that support
          multiple Forwarding Databases - instead, write access should be
          provided through dot1qStaticUnicastTable and
          dot1qStaticMulticastTable, as defined in this document.

3.4.3.5. Additions to the Original Bridge MIB

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

     (1)   support for multiple traffic classes and dynamic multicast
            filtering as per IEEE 802.1D-1998 [802.1D].

     (2)   support for bridged Virtual LANs as per IEEE 802.1Q-1998
            [802.1Q].

     (3)   support for 64-bit versions of original bridge MIB [BRIDGEMIB]
            port counters.

4. Definitions for Extended Bridge MIB

P-BRIDGE-MIB DEFINITIONS ::= BEGIN

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

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

```
pBridgeMIB MODULE-IDENTITY
    LAST-UPDATED "9908250000Z"
    ORGANIZATION "IETF Bridge MIB Working Group"
    CONTACT-INFO
        "       Les Bell
        Postal: 3Com Europe Ltd.
                3Com Centre, Boundary Way
                Hemel Hempstead, Herts. HP2 7YU
                UK
         Phone: +44 1442 438025
         Email: Les_Bell@3Com.com


                Andrew Smith
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                3585 Monroe St.
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                USA
         Phone: +1 408 579 2821
         Email: andrew@extremenetworks.com


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                5 Corporate Drive
                Andover, MA 01810
                USA
         Phone: +1 978 691 4665
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                Anil Rijhsinghani
        Postal: Cabletron Systems
                50 Minuteman Road
                Andover, MA 01810
                USA
         Phone: +1 978 684 1295
         Email: anil@cabletron.com


                Keith McCloghrie
        Postal: cisco Systems, Inc.
                170 West Tasman Drive
                San Jose, CA 95134-1706
                USA
         Phone: +1 408 526 5260
         Email: kzm@cisco.com"

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

```
-- revision history

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

    ::= { dot1dBridge 6 }

pBridgeMIBObjects OBJECT IDENTIFIER ::= { pBridgeMIB 1 }

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

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

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

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

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

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

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

dot1dDeviceCapabilities OBJECT-TYPE
    SYNTAX       BITS {
        dot1dExtendedFilteringServices(0),
                            -- can perform filtering of
                            -- individual multicast addresses
                            -- controlled by GMRP.
        dot1dTrafficClasses(1),
                            -- can map user priority to
                            -- multiple traffic classes.
```

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

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

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

```
        "The administrative status requested by management for
        GMRP.  The value enabled(1) indicates that GMRP should
        be enabled on this device, in all VLANs, on all ports
        for which it has not been specifically disabled.  When
        disabled(2), GMRP is disabled, in all VLANs, on all
        ports and all GMRP packets will be forwarded
        transparently.  This object affects both Applicant and
        Registrar state machines.  A transition from disabled(2)
        to enabled(1) will cause a reset of all GMRP state
        machines on all ports."
    DEFVAL      { enabled }
    ::= { dot1dExtBase 3 }


-- ---------------------------------------------------------------
-- Port Capabilities Table
-- ---------------------------------------------------------------

dot1dPortCapabilitiesTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1dPortCapabilitiesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains capabilities information about
        every port that is associated with this bridge."
    ::= { dot1dExtBase 4 }

dot1dPortCapabilitiesEntry OBJECT-TYPE
    SYNTAX      Dot1dPortCapabilitiesEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A set of capabilities information about this port
        indexed by dot1dBasePort."
    AUGMENTS { dot1dBasePortEntry }
    ::= { dot1dPortCapabilitiesTable 1 }

Dot1dPortCapabilitiesEntry ::=
    SEQUENCE {
        dot1dPortCapabilities
            BITS
    }

dot1dPortCapabilities OBJECT-TYPE
    SYNTAX      BITS {
        dot1qDot1qTagging(0), -- supports 802.1Q VLAN tagging of
                           -- frames and GVRP.
        dot1qConfigurableAcceptableFrameTypes(1),
                           -- allows modified values of
```

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

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


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

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

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

Dot1dPortPriorityEntry ::=
     SEQUENCE {
```

```
        dot1dPortDefaultUserPriority
            INTEGER,
        dot1dPortNumTrafficClasses
            INTEGER
    }

dot1dPortDefaultUserPriority OBJECT-TYPE
    SYNTAX       INTEGER (0..7)
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The default ingress User Priority for this port.  This
        only has effect on media, such as Ethernet, that do not
        support native User Priority."
    ::= { dot1dPortPriorityEntry 1 }

dot1dPortNumTrafficClasses OBJECT-TYPE
    SYNTAX       INTEGER (1..8)
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The number of egress traffic classes supported on this
        port.  This object may optionally be read-only."
    ::= { dot1dPortPriorityEntry 2 }


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

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
            INTEGER,
        dot1dRegenUserPriority
            INTEGER
    }

dot1dUserPriority OBJECT-TYPE
    SYNTAX       INTEGER (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       INTEGER (0..7)
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The Regenerated User Priority the incoming User
        Priority is mapped to for this port."
    ::= { 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 OBJECT-TYPE
     SYNTAX       Dot1dTrafficClassEntry
     MAX-ACCESS   not-accessible
     STATUS       current
     DESCRIPTION
         "User Priority to Traffic Class mapping."
     INDEX   { dot1dBasePort, dot1dTrafficClassPriority }
     ::= { dot1dTrafficClassTable 1 }

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

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

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

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

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

-- --------------------------------------------------------------
```

-- Outbound Access Priority Table
-- --

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
            INTEGER
    }

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

-- --
-- the dot1dGarp group
-- --

-- --
-- 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."
    DEFVAL       { 20 }
    ::= { dot1dPortGarpEntry 1 }

dot1dPortGarpLeaveTime OBJECT-TYPE
    SYNTAX       TimeInterval
    MAX-ACCESS  read-write
    STATUS       current
    DESCRIPTION
        "The GARP Leave time, in centiseconds."
    DEFVAL       { 60 }
    ::= { dot1dPortGarpEntry 2 }
```

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

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."
        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 }

    -- --
    -- 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 which were discarded (i.e.,
        filtered) by the Forwarding Process."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1dTpHCPortEntry 3 }


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

dot1dTpPortOverflowTable OBJECT-TYPE
    SYNTAX       SEQUENCE OF Dot1dTpPortOverflowEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "A table that contains the most-significant bits of
        statistics counters for ports that are associated with this
        transparent bridge that are on high capacity interfaces, as
        defined in the conformance clauses for this table. This table
        is provided as a way to read 64-bit counters for agents which
        support only SNMPv1.

        Note that the reporting of most-significant and
        least-significant counter bits separately runs the risk of
        missing an overflow of the lower bits in the interval between
        sampling. The manager must be aware of this possibility, even
        within the same varbindlist, when interpreting the results of
        a request or asynchronous notification."
    ::= { dot1dTp 6 }

dot1dTpPortOverflowEntry OBJECT-TYPE
    SYNTAX       Dot1dTpPortOverflowEntry
    MAX-ACCESS   not-accessible
```

```
    STATUS      current
    DESCRIPTION
        "The most significant bits of statistics counters for a high
        capacity interface of a transparent bridge. Each object is
        associated with a corresponding object in dot1dTpPortTable
        which indicates the least significant bits of the counter."
    INDEX   { dot1dTpPort }
    ::= { dot1dTpPortOverflowTable 1 }

Dot1dTpPortOverflowEntry ::=
    SEQUENCE {
        dot1dTpPortInOverflowFrames
            Counter32,
        dot1dTpPortOutOverflowFrames
            Counter32,
        dot1dTpPortInOverflowDiscards
            Counter32
    }

dot1dTpPortInOverflowFrames OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated dot1dTpPortInFrames
        counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1dTpPortOverflowEntry 1 }

dot1dTpPortOutOverflowFrames OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated dot1dTpPortOutFrames
        counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1dTpPortOverflowEntry 2 }

dot1dTpPortInOverflowDiscards OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        "The number of times the associated
        dot1dTpPortInDiscards counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1dTpPortOverflowEntry 3 }

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

pBridgeConformance OBJECT IDENTIFIER ::= { pBridgeMIB 2 }

pBridgeGroups OBJECT IDENTIFIER ::= { pBridgeConformance 1 }

pBridgeCompliances OBJECT IDENTIFIER
    ::= { pBridgeConformance 2 }


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

pBridgeExtCapGroup OBJECT-GROUP
    OBJECTS {
        dot1dDeviceCapabilities,
        dot1dPortCapabilities
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects indicating the optional
        capabilites of the device."
    ::= { pBridgeGroups 1 }

pBridgeDeviceGmrpGroup OBJECT-GROUP
    OBJECTS {
        dot1dGmrpStatus
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing device-level control
        for the Multicast Filtering extended bridge services."
    ::= { pBridgeGroups 2 }
```

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

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

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

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

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

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

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

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

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

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

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

    MODULE
        MANDATORY-GROUPS { pBridgeExtCapGroup }

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

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

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

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

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

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

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

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

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

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

```
        OBJECT      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 }

END


5.  Definitions for Virtual Bridge MIB

Q-BRIDGE-MIB DEFINITIONS ::= BEGIN

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

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
    Counter32, Counter64, Unsigned32, TimeTicks
        FROM SNMPv2-SMI
    RowStatus, TruthValue, TEXTUAL-CONVENTION, MacAddress
        FROM SNMPv2-TC
    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF
    dot1dBridge, dot1dBasePortEntry, dot1dBasePort
        FROM BRIDGE-MIB
    EnabledStatus
        FROM P-BRIDGE-MIB
    TimeFilter
        FROM RMON2-MIB;

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

        CONTACT-INFO
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                    170 West Tasman Drive
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                    USA
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             Email: kzm@cisco.com"
        DESCRIPTION
            "The VLAN Bridge MIB module for managing Virtual Bridged
            Local Area Networks, as defined by IEEE 802.1Q-1998."

-- revision history

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

     ::= { dot1dBridge 7 }

qBridgeMIBObjects OBJECT IDENTIFIER ::= { qBridgeMIB 1 }

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

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

VlanIndex ::= TEXTUAL-CONVENTION
     STATUS   current
     DESCRIPTION
          "A value used to index per-VLAN tables: values of 0 and
          4095 are not permitted; if the value is between 1 and
          4094 inclusive, it represents an IEEE 802.1Q VLAN-ID with
          global scope within a given bridged domain (see VlanId
          textual convention). If the value is greater than 4095
          then it represents a VLAN with scope local to the
          particular agent, i.e. one without a global VLAN-ID
          assigned to it. Such VLANs are outside the scope of
          IEEE 802.1Q but it is convenient to be able to manage them
          in the same way using this MIB."
     SYNTAX   Unsigned32

```
VlanId ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
        "A 12-bit VLAN ID used in the VLAN Tag header."
    SYNTAX       INTEGER (1..4094)


-- -----------------------------------------------------------------
-- groups in the Q-BRIDGE MIB
-- -----------------------------------------------------------------

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


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

-- -----------------------------------------------------------------
-- dot1qBase group
-- -----------------------------------------------------------------

dot1qVlanVersionNumber OBJECT-TYPE
    SYNTAX       INTEGER {
                    version1(1)
                }
    MAX-ACCESS  read-only
    STATUS       current
    DESCRIPTION
        "The version number of IEEE 802.1Q that this device
        supports."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.1.1"
    ::= { dot1qBase 1 }

dot1qMaxVlanId OBJECT-TYPE
    SYNTAX       VlanId
    MAX-ACCESS  read-only
    STATUS       current
    DESCRIPTION
        "The maximum IEEE 802.1Q VLAN ID that this device
        supports."
    REFERENCE
        "IEEE 802.1Q/D11 Section 9.3.2.3"
    ::= { dot1qBase 2 }
```

```
dot1qMaxSupportedVlans OBJECT-TYPE
    SYNTAX       Unsigned32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The maximum number of IEEE 802.1Q VLANs that this
        device supports."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.1.1"
    ::= { dot1qBase 3 }

dot1qNumVlans OBJECT-TYPE
    SYNTAX       Unsigned32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The current number of IEEE 802.1Q VLANs that are
        configured in this device."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.7.1.1"
    ::= { dot1qBase 4 }

dot1qGvrpStatus OBJECT-TYPE
    SYNTAX       EnabledStatus
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The administrative status requested by management for
        GVRP.  The value enabled(1) indicates that GVRP should
        be enabled on this device, on all ports for which it has
        not been specifically disabled.  When disabled(2), GVRP
        is disabled on all ports and all GVRP packets will be
        forwarded transparently.  This object affects all GVRP
        Applicant and Registrar state machines.  A transition
        from disabled(2) to enabled(1) will cause a reset of all
        GVRP state machines on all ports."
    DEFVAL       { enabled }
    ::= { dot1qBase 5 }

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


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

```
dot1qFdbTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF Dot1qFdbEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "A table that contains configuration and control
        information for each Filtering Database currently
        operating on this device.  Entries in this table appear
        automatically when VLANs are assigned FDB IDs in the
        dot1qVlanCurrentTable."
    ::= { dot1qTp 1 }

dot1qFdbEntry OBJECT-TYPE
    SYNTAX        Dot1qFdbEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "Information about a specific Filtering Database."
    INDEX   { dot1qFdbId }
    ::= { dot1qFdbTable 1 }

Dot1qFdbEntry ::=
    SEQUENCE {
        dot1qFdbId
            Unsigned32,
        dot1qFdbDynamicCount
            Counter32
    }

dot1qFdbId OBJECT-TYPE
    SYNTAX        Unsigned32
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "The identity of this Filtering Database."
    ::= { dot1qFdbEntry 1 }

dot1qFdbDynamicCount OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The current number of dynamic entries in this
        Filtering Database."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.7.1.1.3"
    ::= { dot1qFdbEntry 2 }
```

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

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

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

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

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

        DESCRIPTION
            "A unicast MAC address for which the device has
            forwarding and/or filtering information."
        ::= { dot1qTpFdbEntry 1 }

dot1qTpFdbPort OBJECT-TYPE
    SYNTAX   INTEGER (0..65535)
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "Either the value '0', or the port number of the port on
        which a frame having a source address equal to the value
        of the corresponding instance of dot1qTpFdbAddress has
        been seen. A value of '0' indicates that the port
        number has not been learned but that the device does
        have some forwarding/filtering information about this
        address (e.g. in the dot1qStaticUnicastTable).
        Implementors are encouraged to assign the port value to
        this object whenever it is learned even for addresses
        for which the corresponding value of dot1qTpFdbStatus is
        not learned(3)."
    ::= { dot1qTpFdbEntry 2 }

dot1qTpFdbStatus OBJECT-TYPE
    SYNTAX   INTEGER {
                    other(1),
                    invalid(2),
                    learned(3),
                    self(4),
                    mgmt(5)
                }
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The status of this entry. The meanings of the values
        are:
            other(1) - none of the following. This may include
                the case where some other MIB object (not the
                corresponding instance of dot1qTpFdbPort, nor an
                entry in the dot1qStaticUnicastTable) is being
                used to determine if and how frames addressed to
                the value of the corresponding instance of
                dot1qTpFdbAddress are being forwarded.
            invalid(2) - this entry is no longer valid (e.g., it
                was learned but has since aged out), but has not
                yet been flushed from the table.
            learned(3) - the value of the corresponding instance
                of dot1qTpFdbPort was learned and is being used.

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


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

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

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

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

             PortList
     }

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

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

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

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

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

```
            instantiated."
        REFERENCE
            "IEEE 802.1Q/D11 Section 12.7.2, 12.7.7"
        ::= { dot1qTp 4 }

dot1qForwardAllEntry OBJECT-TYPE
        SYNTAX       Dot1qForwardAllEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "Forwarding information for a VLAN, specifying the set
            of ports to which all multicasts should be forwarded,
            configured statically by management or dynamically by
            GMRP."
        INDEX   { dot1qVlanIndex }
        ::= { dot1qForwardAllTable 1 }

Dot1qForwardAllEntry ::=
        SEQUENCE {
            dot1qForwardAllPorts
                PortList,
            dot1qForwardAllStaticPorts
                PortList,
            dot1qForwardAllForbiddenPorts
                PortList
        }

dot1qForwardAllPorts OBJECT-TYPE
        SYNTAX       PortList
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The complete set of ports in this VLAN to which all
            multicast group-addressed frames are to be forwarded.
            This includes ports for which this need has been
            determined dynamically by GMRP, or configured statically
            by management."
        ::= { dot1qForwardAllEntry 1 }

dot1qForwardAllStaticPorts OBJECT-TYPE
        SYNTAX       PortList
        MAX-ACCESS   read-write
        STATUS       current
```

        DESCRIPTION
            "The set of ports configured by management in this VLAN
            to which all multicast group-addressed frames are to be
            forwarded. Ports entered in this list will also appear
            in the complete set shown by dot1qForwardAllPorts. This
            value will be restored after the device is reset. This
            only applies to ports that are members of the VLAN,
            defined by dot1qVlanCurrentEgressPorts. A port may not
            be added in this set if it is already a member of the
            set of ports in dot1qForwardAllForbiddenPorts. The
            default value is a string of ones of appropriate length,
            to indicate standard non-EFS behaviour, i.e. forward
            all multicasts to all ports."
        ::= { dot1qForwardAllEntry 2 }

dot1qForwardAllForbiddenPorts OBJECT-TYPE
        SYNTAX   PortList
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "The set of ports configured by management in this VLAN
            for which the Service Requirement attribute Forward All
            Multicast Groups may not be dynamically registered by
            GMRP. This value will be restored after the device is
            reset. A port may not be added in this set if it is
            already a member of the set of ports in
            dot1qForwardAllStaticPorts. The default value is a
            string of zeros of appropriate length."
        ::= { dot1qForwardAllEntry 3 }

dot1qForwardUnregisteredTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF Dot1qForwardUnregisteredEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
            "A table containing forwarding information for each
            VLAN, specifying the set of ports to which forwarding of
            multicast group-addressed frames for which there is no
            more specific forwarding information applies. This is
            configured statically by management and determined
            dynamically by GMRP. An entry appears in this table for
            all VLANs that are currently instantiated."
        REFERENCE
            "IEEE 802.1Q/D11 Section 12.7.2, 12.7.7"
        ::= { dot1qTp 5 }

dot1qForwardUnregisteredEntry OBJECT-TYPE
        SYNTAX   Dot1qForwardUnregisteredEntry

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Forwarding information for a VLAN, specifying the set
        of ports to which all multicasts for which there is no
        more specific forwarding information shall be forwarded.
        This is configured statically by management or
        dynamically by GMRP."
    INDEX    { dot1qVlanIndex }
    ::= { dot1qForwardUnregisteredTable 1 }

Dot1qForwardUnregisteredEntry ::=
    SEQUENCE {
        dot1qForwardUnregisteredPorts
            PortList,
        dot1qForwardUnregisteredStaticPorts
            PortList,
        dot1qForwardUnregisteredForbiddenPorts
            PortList
    }

dot1qForwardUnregisteredPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The complete set of ports in this VLAN to which
        multicast group-addressed frames for which there is no
        more specific forwarding information will be forwarded.
        This includes ports for which this need has been
        determined dynamically by GMRP, or configured statically
        by management."
    ::= { dot1qForwardUnregisteredEntry 1 }

dot1qForwardUnregisteredStaticPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The set of ports configured by management, in this
        VLAN, to which multicast group-addressed frames for
        which there is no more specific forwarding information
        are to be forwarded.  Ports entered in this list will
        also appear in the complete set shown by
        dot1qForwardUnregisteredPorts.  This value will be
        restored after the device is reset.  A port may not be
        added in this set if it is already a member of the set
        of ports in dot1qForwardUnregisteredForbiddenPorts.  The
```

         default value is a string of zeros of appropriate
         length, although this has no effect with the default
         value of dot1qForwardAllStaticPorts."
    ::= { dot1qForwardUnregisteredEntry 2 }

dot1qForwardUnregisteredForbiddenPorts OBJECT-TYPE
    SYNTAX   PortList
    MAX-ACCESS   read-write
    STATUS   current
    DESCRIPTION
        "The set of ports configured by management in this VLAN
        for which the Service Requirement attribute Forward
        Unregistered Multicast Groups may not be dynamically
        registered by GMRP. This value will be restored after
        the device is reset. A port may not be added in this
        set if it is already a member of the set of ports in
        dot1qForwardUnregisteredStaticPorts. The default value
        is a string of zeros of appropriate length."
    ::= { dot1qForwardUnregisteredEntry 3 }

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

dot1qStaticUnicastTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF Dot1qStaticUnicastEntry
    MAX-ACCESS   not-accessible
    STATUS   current
    DESCRIPTION
        "A table containing filtering information for Unicast
        MAC addresses for each Filtering Database, configured
        into the device by (local or network) management
        specifying the set of ports to which frames received
        from specific ports and containing specific unicast
        destination addresses are allowed to be forwarded. A
        value of zero in this table as the port number from
        which frames with a specific destination address are
        received, is used to specify all ports for which there
        is no specific entry in this table for that particular
        destination address. Entries are valid for unicast
        addresses only."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.7.7,
        ISO/IEC 15802-3 Section 7.9.1"
    ::= { dot1qStatic 1 }

```
dot1qStaticUnicastEntry OBJECT-TYPE
    SYNTAX      Dot1qStaticUnicastEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Filtering information configured into the device by
        (local or network) management specifying the set of
        ports to which frames received from a specific port and
        containing a specific unicast destination address are
        allowed to be forwarded."
    INDEX   {
        dot1qFdbId,
        dot1qStaticUnicastAddress,
        dot1qStaticUnicastReceivePort
    }
    ::= { dot1qStaticUnicastTable 1 }

Dot1qStaticUnicastEntry ::=
    SEQUENCE {
        dot1qStaticUnicastAddress
            MacAddress,
        dot1qStaticUnicastReceivePort
            INTEGER,
        dot1qStaticUnicastAllowedToGoTo
            PortList,
        dot1qStaticUnicastStatus
            INTEGER
    }

dot1qStaticUnicastAddress OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The destination MAC address in a frame to which this
        entry's filtering information applies.  This object must
        take the value of a unicast address."
    ::= { dot1qStaticUnicastEntry 1 }

dot1qStaticUnicastReceivePort OBJECT-TYPE
    SYNTAX      INTEGER (0..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Either the value '0', or the port number of the port
        from which a frame must be received in order for this
        entry's filtering information to apply.  A value of zero
        indicates that this entry applies on all ports of the
```

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

    dot1qStaticUnicastAllowedToGoTo OBJECT-TYPE
            SYNTAX   PortList
            MAX-ACCESS   read-write
            STATUS   current
            DESCRIPTION
                "The set of ports for which a frame with a specific
                unicast address will be flooded in the event that it
                has not been learned. It also specifies the set of
                ports a specific unicast address may be dynamically
                learnt on. The dot1qTpFdbTable will have an equivalent
                entry with a dot1qTpFdbPort value of '0' until this
                address has been learnt, when it will be updated with
                the port the address has been seen on. This only
                applies to ports that are members of the VLAN, defined
                by dot1qVlanCurrentEgressPorts. The default value of
                this object is a string of ones of appropriate length."
            REFERENCE
                "IEEE 802.1Q/D11 Table 8-5, ISO/IEC 15802-3 Table 7-5"
            ::= { dot1qStaticUnicastEntry 3 }

    dot1qStaticUnicastStatus OBJECT-TYPE
            SYNTAX   INTEGER {
                            other(1),
                            invalid(2),
                            permanent(3),
                            deleteOnReset(4),
                            deleteOnTimeout(5)
                          }
            MAX-ACCESS   read-write
            STATUS   current
            DESCRIPTION
                "This object indicates the status of this entry.
                    other(1) - this entry is currently in use but
                        the conditions under which it will remain
                        so differ from the following values.
                    invalid(2) - writing this value to the object
                        removes the corresponding entry.
                    permanent(3) - this entry is currently in use
                        and will remain so after the next reset of
                        the bridge.
                    deleteOnReset(4) - this entry is currently in
                        use and will remain so until the next
                        reset of the bridge.

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


    dot1qStaticMulticastTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF Dot1qStaticMulticastEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "A table containing filtering information for Multicast
            and Broadcast MAC addresses for each VLAN, configured
            into the device by (local or network) management
            specifying the set of ports to which frames received
            from specific ports and containing specific Multicast
            and Broadcast destination addresses are allowed to be
            forwarded.  A value of zero in this table as the port
            number from which frames with a specific destination
            address are received, is used to specify all ports for
            which there is no specific entry in this table for that
            particular destination address.  Entries are valid for
            Multicast and Broadcast addresses only."
        REFERENCE
            "IEEE 802.1Q/D11 Section 12.7.7,
            ISO/IEC 15802-3 Section 7.9.1"
        ::= { dot1qStatic 2 }


    dot1qStaticMulticastEntry OBJECT-TYPE
        SYNTAX       Dot1qStaticMulticastEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "Filtering information configured into the device by
            (local or network) management specifying the set of
            ports to which frames received from this specific port
            for this VLAN and containing this Multicast or Broadcast
            destination address are allowed to be forwarded."
        INDEX    {
            dot1qVlanIndex,
            dot1qStaticMulticastAddress,
            dot1qStaticMulticastReceivePort
        }
        ::= { dot1qStaticMulticastTable 1 }
```

```
Dot1qStaticMulticastEntry ::=
    SEQUENCE {
        dot1qStaticMulticastAddress
            MacAddress,
        dot1qStaticMulticastReceivePort
            INTEGER,
        dot1qStaticMulticastStaticEgressPorts
            PortList,
        dot1qStaticMulticastForbiddenEgressPorts
            PortList,
        dot1qStaticMulticastStatus
            INTEGER
    }

dot1qStaticMulticastAddress OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The destination MAC address in a frame to which this
        entry's filtering information applies.  This object must
        take the value of a Multicast or Broadcast address."
    ::= { dot1qStaticMulticastEntry 1 }

dot1qStaticMulticastReceivePort OBJECT-TYPE
    SYNTAX      INTEGER (0..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Either the value '0', or the port number of the port
        from which a frame must be received in order for this
        entry's filtering information to apply.  A value of zero
        indicates that this entry applies on all ports of the
        device for which there is no other applicable entry."
    ::= { dot1qStaticMulticastEntry 2 }

dot1qStaticMulticastStaticEgressPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-write
    STATUS      current
```

        DESCRIPTION
            "The set of ports to which frames received from a
            specific port and destined for a specific Multicast or
            Broadcast MAC address must be forwarded, regardless of
            any dynamic information e.g. from GMRP. A port may not
            be added in this set if it is already a member of the
            set of ports in dot1qStaticMulticastForbiddenEgressPorts.
            The default value of this object is a string of ones of
            appropriate length."
        ::= { dot1qStaticMulticastEntry 3 }

    dot1qStaticMulticastForbiddenEgressPorts OBJECT-TYPE
        SYNTAX   PortList
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "The set of ports to which frames received from a
            specific port and destined for a specific Multicast or
            Broadcast MAC address must not be forwarded, regardless
            of any dynamic information e.g. from GMRP. A port may
            not be added in this set if it is already a member of the
            set of ports in dot1qStaticMulticastStaticEgressPorts.
            The default value of this object is a string of zeros of
            appropriate length."
        ::= { dot1qStaticMulticastEntry 4 }

    dot1qStaticMulticastStatus OBJECT-TYPE
        SYNTAX   INTEGER {
                    other(1),
                    invalid(2),
                    permanent(3),
                    deleteOnReset(4),
                    deleteOnTimeout(5)
                }
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "This object indicates the status of this entry.
                other(1) - this entry is currently in use but
                    the conditions under which it will remain
                    so differ from the following values.
                invalid(2) - writing this value to the object
                    removes the corresponding entry.
                permanent(3) - this entry is currently in use
                    and will remain so after the next reset of
                    the bridge.

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


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


dot1qVlanNumDeletes OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS read-only
        STATUS      current
        DESCRIPTION
            "The number of times a VLAN entry has been deleted from
            the dot1qVlanCurrentTable (for any reason).  If an entry
            is deleted, then inserted, and then deleted, this
            counter will be incremented by 2."
        ::= { dot1qVlan 1 }


dot1qVlanCurrentTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF Dot1qVlanCurrentEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "A table containing current configuration information
            for each VLAN currently configured into the device by
            (local or network) management, or dynamically created
            as a result of GVRP requests received."
        ::= { dot1qVlan 2 }


dot1qVlanCurrentEntry OBJECT-TYPE
        SYNTAX       Dot1qVlanCurrentEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "Information for a VLAN configured into the device by
            (local or network) management, or dynamically created
            as a result of GVRP requests received."
        INDEX   { dot1qVlanTimeMark, dot1qVlanIndex }
        ::= { dot1qVlanCurrentTable 1 }
```

```
Dot1qVlanCurrentEntry ::=
    SEQUENCE {
        dot1qVlanTimeMark
            TimeFilter,
        dot1qVlanIndex
            VlanIndex,
        dot1qVlanFdbId
            Unsigned32,
        dot1qVlanCurrentEgressPorts
            PortList,
        dot1qVlanCurrentUntaggedPorts
            PortList,
        dot1qVlanStatus
            INTEGER,
        dot1qVlanCreationTime
            TimeTicks
    }

dot1qVlanTimeMark OBJECT-TYPE
    SYNTAX      TimeFilter
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A TimeFilter for this entry.  See the TimeFilter
        textual convention to see how this works."
    ::= { dot1qVlanCurrentEntry 1 }

dot1qVlanIndex OBJECT-TYPE
    SYNTAX      VlanIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The VLAN-ID or other identifier refering to this VLAN."
    ::= { dot1qVlanCurrentEntry 2 }

dot1qVlanFdbId OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Filtering Database used by this VLAN.  This is one
        of the dot1qFdbId values in the dot1qFdbTable.  This
        value is allocated automatically by the device whenever
        the VLAN is created: either dynamically by GVRP, or by
```

        management, in dot1qVlanStaticTable. Allocation of this
        value follows the learning constraints defined for this
        VLAN in dot1qLearningConstraintsTable."
    ::= { dot1qVlanCurrentEntry 3 }

dot1qVlanCurrentEgressPorts OBJECT-TYPE
    SYNTAX   PortList
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
        "The set of ports which are transmitting traffic for
        this VLAN as either tagged or untagged frames."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.2.1"
    ::= { dot1qVlanCurrentEntry 4 }

dot1qVlanCurrentUntaggedPorts OBJECT-TYPE
    SYNTAX   PortList
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
        "The set of ports which are transmitting traffic for
        this VLAN as untagged frames."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.2.1"
    ::= { dot1qVlanCurrentEntry 5 }

dot1qVlanStatus OBJECT-TYPE
    SYNTAX   INTEGER {
                    other(1),
                    permanent(2),
                    dynamicGvrp(3)
                 }
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
        "This object indicates the status of this entry.
             other(1) - this entry is currently in use but the
                 conditions under which it will remain so differ
                 from the following values.
             permanent(2) - this entry, corresponding to an entry
                 in dot1qVlanStaticTable, is currently in use and
                 will remain so after the next reset of the
                 device. The port lists for this entry include
                 ports from the equivalent dot1qVlanStaticTable
                 entry and ports learnt dynamically.
             dynamicGvrp(3) - this entry is currently in use

```
                  and will remain so until removed by GVRP.  There
                  is no static entry for this VLAN and it will be
                  removed when the last port leaves the VLAN."
       ::= { dot1qVlanCurrentEntry 6 }


dot1qVlanCreationTime OBJECT-TYPE
    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime when this VLAN was created."
    ::= { dot1qVlanCurrentEntry 7 }


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

dot1qVlanStaticTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1qVlanStaticEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing static configuration information for
        each VLAN configured into the device by (local or
        network) management.  All entries are permanent and will
        be restored after the device is reset."
    ::= { dot1qVlan 3 }


dot1qVlanStaticEntry OBJECT-TYPE
    SYNTAX      Dot1qVlanStaticEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Static information for a VLAN configured into the
        device by (local or network) management."
    INDEX   { dot1qVlanIndex }
    ::= { dot1qVlanStaticTable 1 }

Dot1qVlanStaticEntry ::=
    SEQUENCE {
        dot1qVlanStaticName
            SnmpAdminString,
        dot1qVlanStaticEgressPorts
            PortList,
        dot1qVlanForbiddenEgressPorts
            PortList,
```

```
        dot1qVlanStaticUntaggedPorts
            PortList,
        dot1qVlanStaticRowStatus
            RowStatus
    }


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

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

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

              control for Registration Forbidden for the relevant GVRP
              state machine on each port. A port may not be added in
              this set if it is already a member of the set of ports
              in dot1qVlanStaticEgressPorts. The default value of
              this object is a string of zeros of appropriate length,
              excluding all ports from the forbidden set."
        REFERENCE
              "IEEE 802.1Q/D11 Section 12.7.7.3, 11.2.3.2.3"
        ::= { dot1qVlanStaticEntry 3 }

dot1qVlanStaticUntaggedPorts OBJECT-TYPE
        SYNTAX   PortList
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
              "The set of ports which should transmit egress packets
              for this VLAN as untagged. The default value of this
              object for the default VLAN (dot1qVlanIndex = 1) is a string
              of appropriate length including all ports. There is no
              specified default for other VLANs. If a device agent cannot
              support the set of ports being set then it will reject the
              set operation with an error. An example might be if a
              manager attempts to set more than one VLAN to be untagged
              on egress where the device does not support this IEEE 802.1Q
              option."
        REFERENCE
              "IEEE 802.1Q/D11 Section 12.10.2.1"
        ::= { dot1qVlanStaticEntry 4 }

dot1qVlanStaticRowStatus OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
              "This object indicates the status of this entry."
        ::= { dot1qVlanStaticEntry 5 }

dot1qNextFreeLocalVlanIndex OBJECT-TYPE
        SYNTAX   INTEGER (0|4096..2147483647)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
              "The next available value for dot1qVlanIndex of a local
              VLAN entry in dot1qVlanStaticTable. This will report
              values >=4096 if a new Local VLAN may be created or else
              the value 0 if this is not possible.

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

        This value will automatically change when the current value is
        used to create a new row."
    ::= { dot1qVlan 4 }

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

dot1qPortVlanTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF Dot1qPortVlanEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "A table containing per port control and status
        information for VLAN configuration in the device."
    ::= { dot1qVlan 5 }

dot1qPortVlanEntry OBJECT-TYPE
    SYNTAX   Dot1qPortVlanEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "Information controlling VLAN configuration for a port
        on the device. This is indexed by dot1dBasePort."
    AUGMENTS { dot1dBasePortEntry }
    ::= { dot1qPortVlanTable 1 }

Dot1qPortVlanEntry ::=
    SEQUENCE {
        dot1qPvid
            VlanIndex,
        dot1qPortAcceptableFrameTypes
            INTEGER,
        dot1qPortIngressFiltering
            TruthValue,
        dot1qPortGvrpStatus
            EnabledStatus,

```
        dot1qPortGvrpFailedRegistrations
            Counter32,
        dot1qPortGvrpLastPduOrigin
            MacAddress
    }

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

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

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

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

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

            This control does not affect VLAN independent BPDU
            frames, such as GVRP and STP. It does affect VLAN
            dependent BPDU frames, such as GMRP."
        REFERENCE
            "IEEE 802.1Q/D11 Section 12.10.1.4"
        DEFVAL   { false }
        ::= { dot1qPortVlanEntry 3 }

    dot1qPortGvrpStatus OBJECT-TYPE
        SYNTAX   EnabledStatus
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "The state of GVRP operation on this port. The value
            enabled(1) indicates that GVRP is enabled on this port,
            as long as dot1qGvrpStatus is also enabled for this
            device. When disabled(2) but dot1qGvrpStatus is still
            enabled for the device, GVRP is disabled on this port:
            any GVRP packets received will be silently discarded and
            no GVRP registrations will be propagated from other
            ports. This object affects all GVRP Applicant and
            Registrar state machines on this port. A transition
            from disabled(2) to enabled(1) will cause a reset of all
            GVRP state machines on this port."
        DEFVAL   { enabled }
        ::= { dot1qPortVlanEntry 4 }

    dot1qPortGvrpFailedRegistrations OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The total number of failed GVRP registrations, for any
            reason, on this port."
        ::= { dot1qPortVlanEntry 5 }

    dot1qPortGvrpLastPduOrigin OBJECT-TYPE
        SYNTAX   MacAddress
        MAX-ACCESS read-only
        STATUS   current

        DESCRIPTION
            "The Source MAC Address of the last GVRP message
            received on this port."
        ::= { dot1qPortVlanEntry 6 }

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

dot1qPortVlanStatisticsTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF Dot1qPortVlanStatisticsEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
            "A table containing per-port, per-VLAN statistics for
            traffic received. Separate objects are provided for both the
            most-significant and least-significant bits of statistics
            counters for ports that are associated with this transparent
            bridge. The most-significant bit objects are only required on
            high capacity interfaces, as defined in the conformance clauses
            for these objects. This mechanism is provided as a way to read
            64-bit counters for agents which support only SNMPv1.

            Note that the reporting of most-significant and least-
            significant counter bits separately runs the risk of missing
            an overflow of the lower bits in the interval between sampling.
            The manager must be aware of this possibility, even within the
            same varbindlist, when interpreting the results of a request or
            asynchronous notification."
        ::= { dot1qVlan 6 }

dot1qPortVlanStatisticsEntry OBJECT-TYPE
        SYNTAX   Dot1qPortVlanStatisticsEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
            "Traffic statistics for a VLAN on an interface."
        INDEX   { dot1dBasePort, dot1qVlanIndex }
        ::= { dot1qPortVlanStatisticsTable 1 }

Dot1qPortVlanStatisticsEntry ::=
        SEQUENCE {

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

dot1qTpVlanPortInFrames OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of valid frames received by this port from
        its segment which were classified as belonging to this
        VLAN.  Note that a frame received on this port is
        counted by this object if and only if it is for a
        protocol being processed by the local forwarding process
        for this VLAN.  This object includes received bridge
        management frames classified as belonging to this VLAN
        (e.g. GMRP, but not GVRP or STP)."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3(a)"
    ::= { dot1qPortVlanStatisticsEntry 1 }

dot1qTpVlanPortOutFrames OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of valid frames transmitted by this port to
        its segment from the local forwarding process for this
        VLAN.  This includes bridge management frames originated
        by this device which are classified as belonging to this
        VLAN (e.g. GMRP, but not GVRP or STP)."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3(d)"
    ::= { dot1qPortVlanStatisticsEntry 2 }
```

```
dot1qTpVlanPortInDiscards OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of valid frames received by this port from
        its segment which were classified as belonging to this
        VLAN which were discarded due to VLAN related reasons.
        Specifically, the IEEE 802.1Q counters for Discard
        Inbound and Discard on Ingress Filtering."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3"
    ::= { dot1qPortVlanStatisticsEntry 3 }

dot1qTpVlanPortInOverflowFrames OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of times the associated
        dot1qTpVlanPortInFrames counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1qPortVlanStatisticsEntry 4 }

dot1qTpVlanPortOutOverflowFrames OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of times the associated
        dot1qTpVlanPortOutFrames counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1qPortVlanStatisticsEntry 5 }

dot1qTpVlanPortInOverflowDiscards OBJECT-TYPE
    SYNTAX       Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of times the associated
        dot1qTpVlanPortInDiscards counter has overflowed."
    REFERENCE
        "ISO/IEC 15802-3 Section 14.6.1.1.3"
    ::= { dot1qPortVlanStatisticsEntry 6 }
```

```
dot1qPortVlanHCStatisticsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Dot1qPortVlanHCStatisticsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing per port, per VLAN statistics for
        traffic on high capacity interfaces."
    ::= { dot1qVlan 7 }

dot1qPortVlanHCStatisticsEntry OBJECT-TYPE
    SYNTAX      Dot1qPortVlanHCStatisticsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Traffic statistics for a VLAN on a high capacity
        interface."
    INDEX   { dot1dBasePort, dot1qVlanIndex }
    ::= { dot1qPortVlanHCStatisticsTable 1 }

Dot1qPortVlanHCStatisticsEntry ::=
    SEQUENCE {
        dot1qTpVlanPortHCInFrames
            Counter64,
        dot1qTpVlanPortHCOutFrames
            Counter64,
        dot1qTpVlanPortHCInDiscards
            Counter64
    }

dot1qTpVlanPortHCInFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of valid frames received by this port from
        its segment which were classified as belonging to this
        VLAN.  Note that a frame received on this port is
        counted by this object if and only if it is for a
        protocol being processed by the local forwarding process
        for this VLAN.  This object includes received bridge
        management frames classified as belonging to this VLAN
        (e.g. GMRP, but not GVRP or STP)."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3(a)"
    ::= { dot1qPortVlanHCStatisticsEntry 1 }
```

```
dot1qTpVlanPortHCOutFrames OBJECT-TYPE
    SYNTAX        Counter64
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of valid frames transmitted by this port to
        its segment from the local forwarding process for this
        VLAN.  This includes bridge management frames originated
        by this device which are classified as belonging to this
        VLAN (e.g. GMRP, but not GVRP or STP)."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3(d)"
    ::= { dot1qPortVlanHCStatisticsEntry 2 }

dot1qTpVlanPortHCInDiscards OBJECT-TYPE
    SYNTAX        Counter64
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of valid frames received by this port from
        its segment which were classified as belonging to this
        VLAN which were discarded due to VLAN related reasons.
        Specifically, the IEEE 802.1Q counters for Discard
        Inbound and Discard on Ingress Filtering."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.6.1.1.3"
    ::= { dot1qPortVlanHCStatisticsEntry 3 }

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

dot1qLearningConstraintsTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF Dot1qLearningConstraintsEntry
    MAX-ACCESS  not-accessible
    STATUS        current
    DESCRIPTION
        "A table containing learning constraints for sets of
        Shared and Independendent VLANs."
    REFERENCE
        "IEEE 802.1Q/D11 Section 12.10.3.1"
    ::= { dot1qVlan 8 }

dot1qLearningConstraintsEntry OBJECT-TYPE
    SYNTAX        Dot1qLearningConstraintsEntry
    MAX-ACCESS  not-accessible
    STATUS        current
```

```
    DESCRIPTION
        "A learning constraint defined for a VLAN."
    INDEX   { dot1qConstraintVlan, dot1qConstraintSet }
    ::= { dot1qLearningConstraintsTable 1 }

Dot1qLearningConstraintsEntry ::=
    SEQUENCE {
        dot1qConstraintVlan
            VlanIndex,
        dot1qConstraintSet
            INTEGER,
        dot1qConstraintType
            INTEGER,
        dot1qConstraintStatus
            RowStatus
    }

dot1qConstraintVlan OBJECT-TYPE
    SYNTAX      VlanIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index of the row in dot1qVlanCurrentTable for the
        VLAN constrained by this entry."
    ::= { dot1qLearningConstraintsEntry 1 }

dot1qConstraintSet OBJECT-TYPE
    SYNTAX      INTEGER (0..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The identity of the constraint set to which
        dot1qConstraintVlan belongs.  These values may be chosen
        by the management station."
    ::= { dot1qLearningConstraintsEntry 2 }

dot1qConstraintType OBJECT-TYPE
    SYNTAX      INTEGER {
                    independent(1),
                    shared(2)
                }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The type of constraint this entry defines.
            independent(1) - the VLAN, dot1qConstraintVlan,
                uses an independent filtering database from all
```

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


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


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


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

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

qBridgeConformance OBJECT IDENTIFIER ::= { qBridgeMIB 2 }

qBridgeGroups OBJECT IDENTIFIER ::= { qBridgeConformance 1 }

qBridgeCompliances OBJECT IDENTIFIER
    ::= { qBridgeConformance 2 }


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

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

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

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

```
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about all
        multicast addresses, learnt dynamically or statically
        configured by management, in each Filtering Database."
    ::= { qBridgeGroups 3 }

qBridgeServiceRequirementsGroup OBJECT-GROUP
    OBJECTS {
        dot1qForwardAllPorts,
        dot1qForwardAllStaticPorts,
        dot1qForwardAllForbiddenPorts,
        dot1qForwardUnregisteredPorts,
        dot1qForwardUnregisteredStaticPorts,
        dot1qForwardUnregisteredForbiddenPorts
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about
        service requirements, learnt dynamically or statically
        configured by management, in each Filtering Database."
    ::= { qBridgeGroups 4 }

qBridgeFdbStaticGroup OBJECT-GROUP
    OBJECTS {
        dot1qStaticUnicastAllowedToGoTo,
        dot1qStaticUnicastStatus,
        dot1qStaticMulticastStaticEgressPorts,
        dot1qStaticMulticastForbiddenEgressPorts,
        dot1qStaticMulticastStatus
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about
        unicast and multicast addresses statically configured by
        management, in each Filtering Database or VLAN."
    ::= { qBridgeGroups 5 }

qBridgeVlanGroup OBJECT-GROUP
    OBJECTS {
        dot1qVlanNumDeletes,
        dot1qVlanFdbId,
        dot1qVlanCurrentEgressPorts,
        dot1qVlanCurrentUntaggedPorts,
        dot1qVlanStatus,
        dot1qVlanCreationTime
    }
```

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


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


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


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

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

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

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

qBridgeLearningConstraintDefaultGroup OBJECT-GROUP
    OBJECTS {
        dot1qConstraintSetDefault,
        dot1qConstraintTypeDefault
    }

```
    STATUS      current
    DESCRIPTION
        "A collection of objects defining the default Filtering
        Database constraints for VLANs which have no specific
        constraints defined."
    ::= { qBridgeGroups 13 }

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

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

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

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

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

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

        GROUP       qBridgeFdbStaticGroup
        DESCRIPTION
            "This group is optional."
```

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

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

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

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

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

          OBJECT   dot1qPortAcceptableFrameTypes
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required as this is an optional
              capability in IEEE 802.1Q."

          OBJECT   dot1qPortIngressFiltering
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required as this is an optional
              capability in IEEE 802.1Q."

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

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

    ::= { qBridgeCompliances 1 }

END
```

6. Acknowledgments

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

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

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    David Harrington in particular for their many comments and
    suggestions which improved this effort.

7. Security Considerations

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

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

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

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

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