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IEEE Std 802.1Qbu™-2016
(Amendment to
IEEE Std 802.1Q™-2014)

IEEE Standard for
Local and metropolitan area networks—

Bridges and Bridged Networks—Amendment 26: Frame Preemption

Sponsor

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Abstract: Enhancements to the forwarding process that support frame preemption are provided in this amendment to IEEE Std 802.1Q-2014.

Keywords: Bridged Local Area Networks, IEEE 802.1Q™, LANs, local area networks, MAC Bridges, metropolitan area networks, preemption, Virtual Bridged Local Area Networks, virtual LANs

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IEEE Std 802.1Qbu-2016
IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks—
Amendment 26: Frame Preemption

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Introduction

This introduction is not part of IEEE Std 802.1Qbu-2016, IEEE Standard for Local and metropolitan area networks—Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks—Amendment 26: Frame Preemption.

This amendment to IEEE Std 802.1Q-2014 provides enhancements to the forwarding process that support frame preemption.

This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution. Revisions are anticipated within the next few years to clarify existing material, to correct possible errors, and to incorporate new related material. Information on the current revision state of this and other IEEE 802 standards may be obtained from

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IEEE Standard for
Local and metropolitan area networks—

Bridges and Bridged Networks—Amendment 26: Frame Preemption

(This amendment is based on IEEE Std 802.1Q™-2014 as amended by IEEE Std 802.1Qbv-2015.)

NOTE—The editing instructions contained in this amendment define how to merge the material contained here into the base document and its other amendments to form the new comprehensive standard.

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[1]Notes in text, tables, and figures are given for information only, and do not contain requirements needed to implement the standard.

2. Normative references

Insert the following reference in the appropriate collating sequence:

IEEE Std 802.3br™, IEEE Approved Draft Standard for Ethernet—Amendment 5: Specification and Management Parameters for Interspersing Express Traffic.

3. Definitions

Insert the following definition in the appropriate collating sequence and renumber appropriately:

3.x preemption: The suspension of the transmission of a preemptable frame to allow one or more express frames to be transmitted before transmission of the preemptable frame is resumed.

4. Abbreviations

Insert the following definitions in the appropriate collating sequence and renumber appropriately:

eMAC express Media Access Control

pMAC preemptable Media Access Control

5. Conformance

5.4 VLAN Bridge component requirements

5.4.1 VLAN Bridge component options

Insert the following list item at the end of the list, relettering as necessary:

ae) Support frame preemption as specified in 6.7.1, 6.7.2, and 8.6.8.

5.13 MAC Bridge component requirements

5.13.1 MAC Bridge component options

Insert the following list item at the end of the list, relettering as necessary:

n) Support frame preemption as specified in 6.7.1, 6.7.2, and 8.6.8.

Insert the following new subclause at the end of Clause 5, renumbering as necessary:

5.26 End station requirements—enhancements for frame preemption

An end station implementation that conforms to the provisions of this standard for frame preemption shall

a) Support the provisions of 6.7.1, 6.7.2, and 8.6.8.

6. Support of the MAC Service

6.7 Support of the Internal Sublayer Service by specific MAC procedures

6.7.1 Support of the Internal Sublayer Service by IEEE Std 802.3 (Ethernet)

Change the first paragraph of 6.7.1 as follows:

In addition to the provisions of 12.1.1 of IEEE Std 802.1AC-2012, an M_CONTROL.request primitive is mapped to an IEEE 802.3 MA_CONTROL.request primitive having the same parameters. If the MAC supports IEEE 802.3br Interspersing Express Traffic, then PFC M_CONTROL.requests are mapped onto the MAC control interface associated with the express MAC (eMAC). An IEEE 802.3 MA_CONTROL.indication primitive is mapped to an M_CONTROL.indication primitive having the same parameters.

Insert new text at the end of 6.7.1 as follows:

If frame preemption (6.7.2) is supported on a Port, then the IEEE 802.3 MAC provides the following two MAC service interfaces (99.4 of IEEE Std 802.3br):

a) A preemptable MAC (pMAC) service interface, and
b) An express MAC (eMAC) service interface.

For priority values that are identified in the frame preemption status table (6.7.2) as *preemptable*, frames that are selected for transmission shall be transmitted using the pMAC service instance, and for priority values that are identified in the frame preemption status table as *express*, frames that are selected for transmission shall be transmitted using the eMAC service instance.

In all other respects, the Port behaves as if it is supported by a single MAC service interface. In particular, all frames received by the Port are treated as if they were received on a single MAC service interface regardless of whether they were received on the eMAC service interface or the pMAC service interface, except with respect to frame preemption.

If the value of the holdRequest managed object (12.30.1.5) transitions from FALSE to TRUE, a MM_CTL.request(hold_req) primitive is issued to the underlying IEEE 802.3 MAC, with a hold_req parameter value of HOLD, as described in Clause 99 of IEEE Std 802.3br. If the value of the holdRequest managed object (12.30.1.5) transitions from TRUE to FALSE, a MM_CTL.request(hold_req) primitive is issued to the underlying IEEE 802.3 MAC, with a hold_req parameter value of RELEASE.

NOTE—This additional material will be moved to IEEE Std 802.1AC in a future revision.

Insert new subclause 6.7.2 as follows:

6.7.2 Frame preemption

If the Port supports frame preemption, then a value of frame preemption status is assigned to each value of priority via a *frame preemption status table*. The possible values of frame preemption status are *express* or *preemptable*.

The frame preemption status table can be changed by management as described in 12.30.1.1. The default value of frame preemption status is *express* for all priority values.

8. Principles of bridge operation

8.6 The Forwarding Process

8.6.8 Transmission selection

Insert the following immediately after NOTE 2:

In a port of a Bridge or station that supports frame preemption, a frame of priority *n* is not available for transmission if that priority is identified in the frame preemption status table (6.7.2) as preemptable and either the holdRequest object (12.30.1.5) is set to the value *hold*, or the transmission of a prior preemptable frame has yet to complete because it has been interrupted to allow the transmission of an express frame.

8.6.8.2 Credit-based shaper algorithm

Change the text of list items e) and f), and insert new NOTEs, renumbering subsequent NOTEs, as follows:

e) ***transmit***. Takes the value TRUE for the duration of a frame transmission from the queue; FALSE when any frame transmission from the queue has completed. If the credit-based shaper algorithm is used in combination with frame preemption (6.7.2), transmit only takes the value TRUE while the frame is actually being transmitted by the MAC. If the frame transmission is delayed or interrupted (e.g., the frame is a preemptable frame and its transmission is interrupted to allow the transmission of an express frame from a different queue, or the frame is an express frame and there is a delay before transmission can start because a preemptable frame was being transmitted) transmit takes the value FALSE until transmission of the frame commences or is resumed. Transmit also takes the value FALSE during the transmission of any overhead that is a consequence of frame preemption; i.e., any additional frame overhead that is added to the preemptable frame when preemption occurs.

NOTE 1—The consequence of this is that any overhead associated with preemption does not come out of the reserved bandwidth for the credit-based shaper.

f) ***credit.*** The transmission credit, in bits, that is currently available to the queue. If, at any time, there are no frames in the queue, and the *transmit* parameter is FALSE, and the transmission gate for the queue is open (8.6.8.4), and *credit* is positive, and there is no preemptable frame from this queue for which transmission is in progress but has been interrupted, then *credit* is set to zero.

NOTE 2—The condition that the *transmit* parameter is FALSE and a preemptable frame or part-frame is waiting in the MAC for transmission can only occur if the credit-based shaper algorithm is used in combination with Preemption.

8.6.8.4 Enhancements for scheduled traffic

Change the second paragraph of 8.6.8.4 as follows:[2]

A *gate control list* associated with each Port contains an ordered list of gate operations. Each gate operation changes the transmission gate state for the gate associated with each of the Port's traffic class queues and allows associated control operations to be scheduled. In an implementation that does not support enhancements for scheduled traffic, all gates are assumed to be permanently in the *open* state. Table 8-6 identifies the gate operation types, their parameters, and the actions that result from their execution. The state machines that control the execution of the gate control list, along with their variables and procedures, are specified in 8.6.9.

[2]The base text of 8.6.8.4 is to be found in IEEE Std 802.1Qbv-2016.

Insert two new rows at the end of Table 8-6 as follows:

Table 8-6—Gate operations

Operation name	Parameter(s)	Action
Set-And-Hold-MAC	GateState, TimeInterval	Performs all of the actions defined for the SetGateStates operation;[1] in addition, the start of this operation marks the point in the sequence of gate operations at which the MAC associated with the port is to have stopped transmitting preemptable frames. This is achieved by setting the holdRequest managed object to the value *hold (1)*, at holdAdvance (Table 12-29) nanoseconds in advance of this point for the hold to have taken effect at this point. If frame preemption is not supported or not enabled (preemptionActive is FALSE), this operation behaves the same as SetGateStates.
Set-And-Release-MAC	GateState, TimeInterval	Performs all of the actions defined for the SetGateStates operation; in addition, the start of this operation marks the point in the sequence of gate operations at which the MAC associated with the port is permitted to resume transmitting preemptable frames; if an express frame is currently being transmitted by the MAC, the release takes effect at the end of that transmission. This is achieved by setting the holdRequest managed object to the value *release (2)*, at releaseAdvance (Table 12-29) nanoseconds in advance of this point for the release to have taken effect at this point.[2] If frame preemption is not supported or not enabled (preemptionActive is FALSE), this operation behaves the same as SetGateStates.

[1]The SetGateStates operation is defined in IEEE Std 802.1Qbv-2016.

[2]The releaseAdvance parameter allows the timing of when the release command is issued to vary depending upon the constraints of a particular implementation. Its value should be less than the minimum frame size so that release does not occur too early and interfere with transmission of the last express frame.

12. Bridge management

Insert new subclause 12.30 and its subclauses and tables, as follows, renumbering as necessary:

12.30 Managed objects for frame preemption

The Bridge enhancements for support of frame preemption are defined in 8.6.8, 8.6.8.4, and 6.7.2. The objects that comprise this managed resource are as follows:

a) Frame Preemption Parameter Table (12.30.1)

12.30.1 Frame Preemption Parameter table

There is one Frame Preemption Parameter table per Port of a Bridge component or end station. Each table row contains a set of parameters that supports the enhancements for frame preemption (6.7.2), as detailed in Table 12-29. Rows in the table can be created or removed dynamically in implementations that support dynamic configuration of ports and components.

Table 12-29—Frame Preemption Parameter table

Name	Data type	Operations supported[a]	Conformance[b]	References
framePreemp-tionStatusTable	sequence of framePreemptionAd-minStatus values	RW	BE	6.7.2, 12.30.1.1, 12.30.1.1.1.
holdAdvance	Integer, nanoseconds	R	BE	Table 8-6, 12.30.1.2
releaseAdvance	Integer, nanoseconds	R	BE	Table 8-6, 12.30.1.3
preemptionActive	Boolean	R	BE	12.30.1.4
holdRequest	Interger {hold (1), release (2)}	R	BE	Table 8-6, 12.30.1.5

[a]R = Read only access; RW = Read/Write access
[b]B = Required for Bridge or Bridge component support of enhancements for frame preemption.
E = Required for end station support of enhancements for frame preemption.

12.30.1.1 framePreemptionStatusTable structure and data types

The framePreemptionStatusTable (6.7.2) consists of 8 framePreemptionAdminStatus values (12.30.1.1.1), one per priority.

12.30.1.1.1 framePreemptionAdminStatus

This parameter is the administrative value of the preemption status for the priority. It takes value *express* if frames queued for the priority are to be transmitted using the express service for the Port, or *preemptable* if frames queued for the priority are to be transmitted using the preemptable service for the Port and preemption is enabled for the Port.

Priorities that all map to the same traffic class should be constrained to use the same value of preemption status.

12.30.1.2 holdAdvance object

The holdAdvance object contains an integer value representing the maximum number of nanoseconds that can elapse between issuing a HOLD (12.30.1.5) to the MAC and the MAC ceasing to transmit any preemptable frame that is in the process of transmission or any preemptable frames that are queued for transmission, including any MAC-specific delay before transmission of an express frame could start once preemptable frame transmission has ceased. This object exists per Port, and is a characteristic of the underlying MAC.

12.30.1.3 releaseAdvance object

The releaseAdvance object contains an integer value representing the maximum number of nanoseconds that can elapse between issuing a RELEASE (12.30.1.5) to the MAC and the MAC being ready to resume transmission of preemptable frames, in the absence of there being any express frames available for transmission. This object exists per Port, and is a characteristic of the underlying MAC.

12.30.1.4 preemptionActive object

TRUE if preemption is both supported by the MAC and currently active.

12.30.1.5 holdRequest object

The holdRequest object contains an enumerated integer value, with *hold (1)* indicating that a Set-And-Hold-MAC gate operation (8.6.8.4, Table 8-6) has been executed, and *release (2)* indicating that a Set-And-Release-MAC gate operation has been executed. This object exists per Port.

NOTE—In order to determine support of frame preemption by the Bridge, a network management application could attempt to read the preemptionActive object. If the read operation returns an error, frame preemption is not supported. Determining whether the MAC supports preemption could similarly be achieved by examining the objects in the MAC MIB.

17. Management Information Base (MIB)

17.2 Structure of the MIB

Insert the following new subclause 17.2.23 and Table 17-29 at the end of 17.2, renumbering as necessary:

17.2.23 Structure of the IEEE8021-Preemption-MIB

The IEEE8021-Preemption-MIB provides for configuration of frame preemption (6.7.2, 8.6.8) on ports. Table 17-29 indicates the relationship between the SMIv2 objects defined in the MIB module (17.7.23) and managed objects defined in 12.30.

Table 17-29—IEEE8021-Preemption-MIB Structure and relationship to this standard

MIB table	MIB object	Reference
ieee8021PreemptionParameterTable subtree		
ieee8021PreemptionParameterTable		Frame Preemption parameter table, 6.7.2, 12.30.1
	ieee8021PreemptionPriority	Priority (Table index)
	ieee8021FramePreemptionAdminStatus	framePreemptionAdminStatus, 6.7.2, 12.30.1
ieee8021PreemptionConfigTable		Frame Preemption configuration table, 6.7.2, 12.30.1
	ieee8021FramePreemptionHoldAdvance	framePreemptionHoldAdvance, 6.7.2, 12.30.1, 12.30.1.2
	ieee8021FramePreemptionReleaseAdvance	framePreemptionReleaseAdvance, 6.7.2, 12.30.1, 12.30.1.3
	ieee8021FramePreemptionActive	framePreemptionActive, 6.7.2, 12.30.1, 12.30.1.4
	ieee8021FramePreemptionHoldRequest	framePreemptionHoldRequest, 6.7.2, 12.30.1, 12.30.1.5

17.3 Relationship to other MIBs

Insert the following new subclause 17.3.23 at the end of 17.3, renumbering as necessary:

17.3.23 Relationship of the IEEE8021-Preemption-MIB to other MIBs

The IEEE8021-Preemption-MIB provides objects that extend the core management functionality of a Bridge, as defined by the IEEE8021-BRIDGE-MIB (17.7.2), in order to support the additional management functionality needed when the frame preemption extensions are supported by the Bridge. As support of the objects defined in the IEEE8021-Preemption-MIB also requires support of the IEEE8021-BRIDGE-MIB, the provisions of 17.3.2 apply to implementations claiming support of the IEEE8021-Preemption-MIB.

17.4 Security considerations

Insert the following new subclause 17.4.23 at the end of 17.4, renumbering as necessary:

17.4.23 Security considerations of the IEEE8021-ST-MIB

There is one management object defined in the IEEE8021-Preemption-MIB module that has a MAX-ACCESS clause of read-write. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a nonsecure environment without proper protection can have a negative effect on network operations.

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

The following tables and objects in the IEEE8021-Preemption-MIB can be manipulated to interfere with the operation of the forwarding and queuing mechanisms in a manner that would be detrimental to the transmission of frames:

ieee8021FramePreemptionAdminStatus

a) Misconfiguration of the ieee8021FramePreemptionAdminStatus object can lead to the degradation of the quality of service for the application on the port at the respective traffic class that is wrongly preempted, or to the saturation of the priority queues on the port because of preemptable traffic classes receiving express processing.

17.7 MIB modules

Replace subclause 17.7.22 with the following:

17.7.22 Definitions for the IEEE8021-ST-MIB module

```
IEEE8021-ST-MIB DEFINITIONS ::= BEGIN

-- ============================================================
-- MIB for support of the Scheduled Traffic Enhancements
-- for IEEE 802.1Q Bridges.
-- ============================================================


IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32,
    Counter64
        FROM SNMPv2-SMI
    TEXTUAL-CONVENTION,
    TruthValue
        FROM SNMPv2-TC
    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF
    ieee802dot1mibs
        FROM IEEE8021-TC-MIB
    ieee8021BridgeBaseComponentId,
    ieee8021BridgeBasePort
        FROM IEEE8021-BRIDGE-MIB
    ;

ieee8021STMib MODULE-IDENTITY
    LAST-UPDATED "201608150000Z" -- August 15, 2016
    ORGANIZATION "IEEE 802.1 Working Group"
    CONTACT-INFO
        "  WG-URL: www.ieee802.org/1
         WG-EMail: STDS-802-1-L@listserv.ieee.org

          Contact: IEEE 802.1 Working Group Chair
           Postal: C/O IEEE 802.1 Working Group
                   IEEE Standards Association
                   445 Hoes Lane
                   Piscataway
                   NJ 08854
                   USA
           E-mail: STDS-802-1-L@listserv.ieee.org"
    DESCRIPTION
        "The Bridge MIB module for managing devices that support
        the Scheduled Traffic Enhancements
        for 802.1Q Bridges.

        Unless otherwise indicated, the references in this MIB
        module are to IEEE Std 802.1Q-2014.

        Copyright (C) IEEE (2014).
        This version of this MIB module is part of IEEE802.1Q;
        see the draft itself for full legal notices."
```

```
    REVISION "201608150000Z" -- August 15, 2016
    DESCRIPTION
            "Revised to include Set-And-Hold-MAC and
            Set-And-Release-MAC in the description of
            ieee8021STAdminControlList and
            ieee8021STOperControlList.
            Published as part of IEEE Std 802.1Qbu."

    REVISION "201509250000Z" -- September 25, 2015
    DESCRIPTION
            "Initial version published as part of IEEE Std 802.1Qbv."


       ::= { ieee802dot1mibs 30 }

-- ================================================================
-- Textual Conventions
-- ================================================================

IEEE8021STTrafficClassValue ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "A traffic class value.
        This is the numerical value associated with a traffic
        class in a Bridge. Larger values are associated with
        higher priority traffic classes."
    REFERENCE   "12.29.1"
    SYNTAX      Unsigned32 (0..7)

IEEE8021STPTPtimeValue ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "A PTPtime value, represented as a 48-bit unsigned integer
        number of seconds and a 32-bit unsigned integer number of
        nanoseconds.
        The first 6 octets represent the number of seconds: the
        first octet is the most significant
        octet of the 48-bit seconds value and the sixth octet
        is the least significant octet of the seconds value.
        The remaining octets, 7 through 10,  represent the
        number of nanoseconds: the seventh octet
        is the most significant octet of the 32-bit nanoseconds
        value and the tenth octet is the
        least significant octet of the nanoseconds value."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    SYNTAX      OCTET STRING (SIZE(10))


-- ================================================================
-- subtrees in the ST MIB
-- ================================================================

ieee8021STNotifications
    OBJECT IDENTIFIER ::= { ieee8021STMib 0 }

ieee8021STObjects
    OBJECT IDENTIFIER ::= { ieee8021STMib 1 }
```

```
ieee8021STConformance
    OBJECT IDENTIFIER ::= { ieee8021STMib 2 }

ieee8021STMaxSDUSubtree
    OBJECT IDENTIFIER ::= { ieee8021STObjects 1 }

ieee8021STParameters
    OBJECT IDENTIFIER ::= { ieee8021STObjects 2 }

-- ================================================================
-- The ieee8021STMaxSDUSubtree subtree
-- This subtree defines the objects necessary for the management
-- of the max SDU size parameters for each traffic class on a Port.
-- ================================================================

-- ================================================================
-- the ieee8021STMaxSDUTable
-- ================================================================

ieee8021STMaxSDUTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021STMaxSDUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing a set of max SDU
        parameters, one for each traffic class.
        All writeable objects in this table must be
        persistent over power up restart/reboot."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STMaxSDUSubtree 1 }

ieee8021STMaxSDUEntry OBJECT-TYPE
    SYNTAX      Ieee8021STMaxSDUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of objects containing Max SDU size
        for each traffic class supported by the Port."
    INDEX  { ieee8021BridgeBaseComponentId,
             ieee8021BridgeBasePort,
             ieee8021STTrafficClass  }
    ::= { ieee8021STMaxSDUTable 1 }

Ieee8021STMaxSDUEntry ::=
    SEQUENCE {
        ieee8021STTrafficClass
            IEEE8021STTrafficClassValue,
        ieee8021STMaxSDU
            Unsigned32,
        iee8021TransmissionOverrun
            Counter64
        }

ieee8021STTrafficClass OBJECT-TYPE
    SYNTAX      IEEE8021STTrafficClassValue
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The traffic class number associated with the row of
```

```
        the table.

        A row in this table is created for each traffic class
        that is supported by the Port"
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STMaxSDUEntry 1 }


ieee8021STMaxSDU OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "octets"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value of the MaxSDU parameter for the traffic class.
        This value is represented as an unsigned integer. A value
        of 0 is interpreted as the max SDU size supported by
        the underlying MAC.

        The default value of the MaxSDU parameter is 0.

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    DEFVAL { 0 }
    ::= { ieee8021STMaxSDUEntry 2}


ieee8021TransmissionOverrun OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter of transmission overrun events, where
        a PDU is still being transmitted by a MAC at the
        time when the transmission gate for the queue closed."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1, 12.29.1.1.2"
    DEFVAL { 0 }
    ::= { ieee8021STMaxSDUEntry 2}


-- ================================================================
-- The ieee8021STParameters subtree
-- This subtree defines the objects necessary for the management
-- of the traffic scheduling mechanism for IEEE Std 802.1Q.
-- ================================================================

-- ================================================================
-- the ieee8021STParametersTable
-- ================================================================

ieee8021STParametersTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021STParametersEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains the per-port manageable parameters for
        traffic scheduling.
```

```
            For a given Port, a row in the table exists.

            All writable objects in this table must be
            persistent over power up restart/reboot."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParameters 1 }

    ieee8021STParametersEntry OBJECT-TYPE
        SYNTAX      Ieee8021STParametersEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "A list of objects that contains the manageable parameters for
            traffic scheduling for a port."
        INDEX  { ieee8021BridgeBaseComponentId,
                 ieee8021BridgeBasePort
               }
        ::= { ieee8021STParametersTable 1 }

    Ieee8021STParametersEntry ::=
        SEQUENCE {
            ieee8021STGateEnabled
                TruthValue,
            ieee8021STAdminGateStates
                OCTET STRING,
            ieee8021STOperGateStates
                OCTET STRING,
            ieee8021STAdminControlListLength
                Unsigned32,
            ieee8021STOperControlListLength
                Unsigned32,
            ieee8021STAdminControlList
                OCTET STRING,
            ieee8021STOperControlList
                OCTET STRING,
            ieee8021STAdminCycleTimeNumerator
                Unsigned32,
            ieee8021STAdminCycleTimeDenominator
                Unsigned32,
            ieee8021STOperCycleTimeNumerator
                Unsigned32,
            ieee8021STOperCycleTimeDenominator
                Unsigned32,
            ieee8021STAdminCycleTimeExtension
                Unsigned32,
            ieee8021STOperCycleTimeExtension
                Unsigned32,
            ieee8021STAdminBaseTime
                IEEE8021STPTPtimeValue,
            ieee8021STOperBaseTime
                IEEE8021STPTPtimeValue,
            ieee8021STConfigChange
                TruthValue,
            ieee8021STConfigChangeTime
                IEEE8021STPTPtimeValue,
            ieee8021STTickGranularity
                Unsigned32,
            ieee8021STCurrentTime
                IEEE8021STPTPtimeValue,
```

```
        ieee8021STConfigPending
            TruthValue,
        ieee8021STConfigChangeError
            Counter64,
        ieee8021STSupportedListMax
            Unsigned32
            }

ieee8021STGateEnabled OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The GateEnabled parameter determines whether traffic scheduling
        is active (true) or inactive (false).

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    DEFVAL { false }
    ::= { ieee8021STParametersEntry 1 }

ieee8021STAdminGateStates OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(1))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The administrative value of the GateStates parameter for the Port.
        The bits of the octet represent the gate states for the
        corresponding traffic classes; the MS bit corresponds to traffic class 7,
        the LS bit to traffic class 0. A bit value of 0 indicates closed; a
        bit value of 1 indicates open.

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 2 }

ieee8021STOperGateStates OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(1))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The operational value of the GateStates parameter for the Port.
        The bits of the octet represent the gate states for the
        corresponding traffic classes; the MS bit corresponds to traffic class 7,
        the LS bit to traffic class 0. A bit value of 0 indicates closed; a
        bit value of 1 indicates open."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 3 }

ieee8021STAdminControlListLength OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The administrative value of the ListMax parameter for the Port.
        The integer value indicates the number of entries (TLVs) in the
        AdminControlList.
```

```
            The value of this object MUST be retained across
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 4 }

    ieee8021STOperControlListLength OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The operational value of the ListMax parameter for the Port.
            The integer value indicates the number of entries (TLVs) in the
            OperControlList."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 5 }

    ieee8021STAdminControlList OBJECT-TYPE
        SYNTAX      OCTET STRING
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The administrative value of the ControlList parameter for the Port.
            The octet string value represents the contents of the control list as
            an ordered list of entries, each encoded as a TLV, as follows.
            The first octet  of each TLV is interpreted as an
            unsigned integer representing a gate operation name:
                0: SetGateStates
                1: Set-And-Hold-MAC
                2: Set-And-Release-MAC
                3-255: Reserved for future gate operations

            The second octet of the TLV is the length field,
            interpreted as an unsigned integer, indicating the number of
            octets of the value that follows the length. A length of
            zero indicates that there is no value
            (i.e., the gate operation has no parameters).

            The third through (3 + length -1)th octets encode the
            parameters of the gate operation, in the order that they
            appear in the definition of the operation
            in Table 8-6. Two parameter types are currently defined:

            - GateState:
                A GateState parameter is encoded in a single octet.
                The bits of the octet represent the gate states for the
                corresponding traffic classes; the MS bit corresponds
                to traffic class 7,
                the LS bit to traffic class 0. A bit value of 0 indicates
                closed; a bit value of 1 indicates open.

            - TimeInterval:
                A TimeInterval is encoded in 4 octets as a 32-bit
                unsigned integer, representing a number of nanoseconds.
                The first octet encodes the most significant 8 bits of the
                integer, and the fourth octet encodes the least
                significant 8 bits.

            The value of this object MUST be retained across
```

```
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 6 }

    ieee8021STOperControlList OBJECT-TYPE
        SYNTAX      OCTET STRING
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The operational value of the ListMax parameter for the Port.
            The octet string value represents the contents of the control list as
            an ordered list of TLVs, as follows.
            The first octet  of each TLV is interpreted as a gate operation name:
                0: SetGateStates
                1: Set-And-Hold-MAC
                2: Set-And-Release-MAC
                3-255: Reserved for future gate operations

            The second octet of the TLV is the length field,
            interpreted as an unsigned integer,
            indicating the number of octets of the value that follows
            the length. A length of zero indicates that there is no value
            (i.e., the gate operation has no parameters).

            The third through (3 + length -1)th octets encode the
            parameters of the gate operation, in the order that they
            appear in the definition of the operation
            in Table 8-6. Two parameter types are currently defined:

            - GateState:
                A GateState parameter is encoded in a single octet.
                The bits of the octet represent the gate states for the
                corresponding traffic classes; the MS bit corresponds to
                traffic class 7, the LS bit to traffic class 0.
                A bit value of 0 indicates closed; a
                bit value of 1 indicates open.

            - TimeInterval:
                A TimeInterval is encoded in 4 octets as a 32-bit
                unsigned integer, representing
                a number of nanoseconds. The first octet encodes the
                most significant 8 bits of the integer, and the fourth
                octet encodes the least significant 8 bits."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 7 }

    ieee8021STAdminCycleTimeNumerator OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The administrative value of the numerator of the CycleTime
            parameter for the Port.
            The numerator and denominator together represent the cycle time as
            a rational number of seconds.

            The value of this object MUST be retained across
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
```

```
    ::= { ieee8021STParametersEntry 8 }

ieee8021STAdminCycleTimeDenominator OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The administrative value of the denominator of the
        CycleTime parameter for the Port.
        The numerator and denominator together represent the cycle time as
        a rational number of seconds.

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 9 }

ieee8021STOperCycleTimeNumerator OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The operational value of the numerator of the
        CycleTime parameter for the Port.
        The numerator and denominator together represent the cycle
        time as a rational number of seconds."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 10 }

ieee8021STOperCycleTimeDenominator OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The operational value of the denominator of the
        CycleTime parameter for the Port.
        The numerator and denominator together represent the
        cycle time as a rational number of seconds."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 11 }

ieee8021STAdminCycleTimeExtension OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "nanoseconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The administrative value of the CycleTimeExtension
        parameter for the Port.
        The value is an unsigned integer number of nanoseconds.

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
    ::= { ieee8021STParametersEntry 12 }

ieee8021STOperCycleTimeExtension OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "nanoseconds"
```

```
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The operational value of the CycleTimeExtension parameter for the Port.
            The value is an unsigned integer number of nanoseconds."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 13 }

    ieee8021STAdminBaseTime OBJECT-TYPE
        SYNTAX      IEEE8021STPTPtimeValue
        UNITS       "PTP time"
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The administrative value of the BaseTime parameter for the Port.
            The value is a representation of a PTPtime value,
            consisting of a 48-bit integer
            number of seconds and a 32-bit integer number of nanoseconds.

            The value of this object MUST be retained across
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 14 }

    ieee8021STOperBaseTime OBJECT-TYPE
        SYNTAX      IEEE8021STPTPtimeValue
        UNITS       "PTP time"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The operationsl value of the BaseTime parameter for the Port.
            The value is a representation of a PTPtime value,
            consisting of a 48-bit integer
            number of seconds and a 32-bit integer number of nanoseconds."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 15 }

    ieee8021STConfigChange OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The ConfigChange parameter signals the start of a
            configuration change
            when it is set to TRUE. This should only be done
            when the various administrative parameters
            are all set to appropriate values."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 16 }

    ieee8021STConfigChangeTime OBJECT-TYPE
        SYNTAX      IEEE8021STPTPtimeValue
        UNITS       "PTP time"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The PTPtime at which the next config change is scheduled to occur.
            The value is a representation of a PTPtime value,
            consisting of a 48-bit integer
```

```
            number of seconds and a 32-bit integer number of nanoseconds.

            The value of this object MUST be retained across
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 17 }

        ieee8021STTickGranularity OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The granularity of the cycle time clock, represented as an
            unsigned number of tenths of nanoseconds.

            The value of this object MUST be retained across
            reinitializations of the management system."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 18 }

    ieee8021STCurrentTime OBJECT-TYPE
        SYNTAX      IEEE8021STPTPtimeValue
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The current time, in PTPtime, as maintained by the local system.
            The value is a representation of a PTPtime value,
            consisting of a 48-bit integer
            number of seconds and a 32-bit integer number of nanoseconds."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 19 }

    ieee8021STConfigPending OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The value of the ConfigPending state machine variable.
            The value is TRUE if a configuration change is in progress
            but has not yet completed."
        REFERENCE   "8.6.8.4, 8.6.9.4, 12.29.1"
        ::= { ieee8021STParametersEntry 20 }

    ieee8021STConfigChangeError OBJECT-TYPE
        SYNTAX      Counter64
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "A counter of the number of times that a re-configuration
            of the traffic schedule has been requested with the old
            schedule still running and the requested base time was
            in the past."
        REFERENCE   "8.6.8.4, 8.6.9.3, 8.6.9.1.1, 12.29.1"
        ::= { ieee8021STParametersEntry 21 }

    ieee8021STSupportedListMax OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
```

```
    DESCRIPTION
        "The maximum value supported by this Port of the
        AdminControlListLength and OperControlListLength
        parameters."
    REFERENCE   "12.29.1.5"
    ::= { ieee8021STParametersEntry 22 }


-- ================================================================
-- IEEE8021 FQTSS MIB - Conformance Information
-- ================================================================

ieee8021STCompliances
    OBJECT IDENTIFIER ::= { ieee8021STConformance 1 }
ieee8021STGroups
    OBJECT IDENTIFIER ::= { ieee8021STConformance 2 }

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

-- ================================================================
-- the ieee8021STObjectsGroup group
-- ================================================================

ieee8021STObjectsGroup OBJECT-GROUP
    OBJECTS {
        ieee8021STMaxSDU,
        ieee8021TransmissionOverrun,
        ieee8021STGateEnabled,
        ieee8021STAdminGateStates,
        ieee8021STOperGateStates,
        ieee8021STAdminControlListLength,
        ieee8021STOperControlListLength,
        ieee8021STAdminControlList,
        ieee8021STOperControlList,
        ieee8021STAdminCycleTimeNumerator,
        ieee8021STAdminCycleTimeDenominator,
        ieee8021STOperCycleTimeNumerator,
        ieee8021STOperCycleTimeDenominator,
        ieee8021STAdminCycleTimeExtension,
        ieee8021STOperCycleTimeExtension,
        ieee8021STAdminBaseTime,
        ieee8021STOperBaseTime,
        ieee8021STConfigChange,
        ieee8021STConfigChangeTime,
        ieee8021STTickGranularity,
        ieee8021STCurrentTime,
        ieee8021STConfigPending,
        ieee8021STConfigChangeError,
        ieee8021STSupportedListMax
    }
    STATUS      current
    DESCRIPTION
        "Objects that allow management of scheduled traffic."
    ::= { ieee8021STGroups 1 }


-- ================================================================
```

```
-- compliance statements
-- ============================================================

ieee8021STCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for devices supporting
        scheduled traffic.

        Support of the objects defined in this MIB module
        also requires support of the IEEE8021-BRIDGE-MIB; the
        provisions of 17.3.2 apply to implementations claiming
        support of this MIB."

    MODULE -- this module
        MANDATORY-GROUPS {
            ieee8021STObjectsGroup
        }

    ::= { ieee8021STCompliances 1 }

END
```

Insert the following new subclause 17.7.23 at the end of 17.7, renumbering as necessary:

17.7.23 Definitions for the IEEE8021-Preemption-MIB module

```
IEEE8021-Preemption-MIB DEFINITIONS ::= BEGIN

-- ============================================================
-- MIB for support of the frame preemption enhancements
-- for IEEE 802.1Q Bridges.
-- ============================================================

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32
        FROM SNMPv2-SMI
    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF
    ieee802dot1mibs,
    IEEE8021PriorityValue
        FROM IEEE8021-TC-MIB
    ieee8021BridgeBaseComponentId,
    ieee8021BridgeBasePort
        FROM IEEE8021-BRIDGE-MIB
    ;

ieee8021PreemptionMib MODULE-IDENTITY
    LAST-UPDATED "201608150000Z" -- August 15, 2016
    ORGANIZATION "IEEE 802.1 Working Group"
    CONTACT-INFO
        "  WG-URL: www.ieee802.org/1
         WG-EMail: STDS-802-1-L@listserv.ieee.org

           Contact: IEEE 802.1 Working Group Chair
            Postal: C/O IEEE 802.1 Working Group
                    IEEE Standards Association
                    445 Hoes Lane
                    Piscataway
                    NJ 08854
                    USA
            E-mail: STDS-802-1-L@listserv.ieee.org"
    DESCRIPTION
        "The Bridge MIB module for managing devices that support
        the frame preemption enhancements
        for 802.1Q Bridges.

        Unless otherwise indicated, the references in this MIB
        module are to IEEE Std 802.1Q-2014.

        Copyright (C) IEEE (2014).
        This version of this MIB module is part of IEEE802.1Q;
        see the draft itself for full legal notices."

    REVISION "201608150000Z" -- August 15, 2016
    DESCRIPTION
            "Initial version published as part of IEEE Std 802.1Qbu."
```

```
        ::= { ieee802dot1mibs 29 }


-- ================================================================
-- subtrees in the Preemption MIB
-- ================================================================

ieee8021PreemptionNotifications
    OBJECT IDENTIFIER ::= { ieee8021PreemptionMib 0 }

ieee8021PreemptionObjects
    OBJECT IDENTIFIER ::= { ieee8021PreemptionMib 1 }

ieee8021PreemptionConformance
    OBJECT IDENTIFIER ::= { ieee8021PreemptionMib 2 }

ieee8021PreemptionParameters
    OBJECT IDENTIFIER ::= { ieee8021PreemptionObjects 1 }

-- ================================================================
-- The ieee8021PreemptionNotifications subtree
-- This subtree defines any notifications necessary for the management
-- of frame preemption on a Port. This subtree is currently unused,
-- but is retained as a place-holder for future standardisation.
-- ================================================================


-- ================================================================
-- The ieee8021PreemptionParameters subtree
-- This subtree defines the objects necessary for the management
-- of the frame preemption parameters for each priority value
-- on a Port.
-- ================================================================

-- ================================================================
-- the ieee8021PreemptionParameterTable
-- ================================================================

ieee8021PreemptionParameterTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021PreemptionParameterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing a set of frame preemption
        parameters, one for each priority value.
        All writeable objects in this table must be
        persistent over power up restart/reboot."
    REFERENCE   "6.7.2, 12.30.1"
    ::= { ieee8021PreemptionParameters 1 }

ieee8021PreemptionParameterEntry OBJECT-TYPE
    SYNTAX      Ieee8021PreemptionParameterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of objects containing preemption parameters
        for each  priority value."
    INDEX  { ieee8021BridgeBaseComponentId,
             ieee8021BridgeBasePort,
```

```
                ieee8021PreemptionPriority  }
    ::= { ieee8021PreemptionParameterTable 1 }

Ieee8021PreemptionParameterEntry ::=
    SEQUENCE {
        ieee8021PreemptionPriority
            IEEE8021PriorityValue,
        ieee8021FramePreemptionAdminStatus
            INTEGER
        }

ieee8021PreemptionPriority OBJECT-TYPE
    SYNTAX      IEEE8021PriorityValue
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The priority number associated with the row of
        the table.

        A row in this table is created for each priority value."
    REFERENCE   "6.7.2, 12.30.1"
    ::= { ieee8021PreemptionParameterEntry 1 }


ieee8021FramePreemptionAdminStatus OBJECT-TYPE
    SYNTAX      INTEGER {express (1), preemptable (2)}
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value of the framePreemptionAdminStatus parameter
        for the traffic class.

        The default value of the framePreemptionAdminStatus parameter
        is express (1).

        The value of this object MUST be retained across
        reinitializations of the management system."
    REFERENCE   "6.7.2, 12.30.1"
    ::= { ieee8021PreemptionParameterEntry 2}


-- ================================================================
-- the ieee8021PreemptionConfigTable
-- ================================================================

ieee8021PreemptionConfigTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021PreemptionConfigEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table containing a set of frame preemption
        parameters, one for each Port.
        All writeable objects in this table must be
        persistent over power up restart/reboot."
    REFERENCE   "6.7.2, 12.30.1"
    ::= { ieee8021PreemptionParameters 2 }

ieee8021PreemptionConfigEntry OBJECT-TYPE
    SYNTAX      Ieee8021PreemptionConfigEntry
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of objects containing preemption parameters
        for each Port."
    INDEX  { ieee8021BridgeBaseComponentId,
             ieee8021BridgeBasePort }
    ::= { ieee8021PreemptionConfigTable 1 }

Ieee8021PreemptionConfigEntry ::=
    SEQUENCE {
        ieee8021FramePreemptionHoldAdvance
            Unsigned32,
        ieee8021FramePreemptionReleaseAdvance
            Unsigned32,
        ieee8021FramePreemptionActive
            INTEGER,
        ieee8021FramePreemptionHoldRequest
            INTEGER
        }

ieee8021FramePreemptionHoldAdvance OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the holdAdvance parameter
        for the Port in nanoseconds.

        There is no default value; the holdAdvance is
        a property of the underlying MAC."
    REFERENCE   "6.7.2, 12.30.1.2"
    ::= { ieee8021PreemptionConfigEntry 1 }


ieee8021FramePreemptionReleaseAdvance OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the releaseAdvance parameter
        for the Port in nanoseconds.

        There is no default value; the releaseAdvance is
        a property of the underlying MAC."
    REFERENCE   "6.7.2, 12.30.1.3"
    ::= { ieee8021PreemptionConfigEntry 2}

ieee8021FramePreemptionActive OBJECT-TYPE
    SYNTAX      INTEGER {idle (1), active (2)}
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is active (2) when preemption is operationally
        active for the Port, and idle (1) otherwise."
    REFERENCE   "6.7.2, 12.30.1.4"
    ::= { ieee8021PreemptionConfigEntry 3}

ieee8021FramePreemptionHoldRequest OBJECT-TYPE
```

```
    SYNTAX      INTEGER {hold (1), release (2)}
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is hold (1) when the sequence of gate operations
        for the Port has executed a Set-And-Hold-MAC operation,
        and release (2) when the sequence of gate operations has
        executed a Set-And-Release-MAC operation. The
        value of this object is release (2) on system
        initialization."
    REFERENCE   "6.7.2, Table 8-6, 12.30.1.5"
    ::= { ieee8021PreemptionConfigEntry 4}


-- ================================================================
-- IEEE8021 Preemption MIB - Conformance Information
-- ================================================================

ieee8021PreemptionCompliances
    OBJECT IDENTIFIER ::= { ieee8021PreemptionConformance 1 }
ieee8021PreemptionGroups
    OBJECT IDENTIFIER ::= { ieee8021PreemptionConformance 2 }

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

-- ================================================================
-- the ieee8021PreemptionGroup group
-- ================================================================

ieee8021PreemptionGroup OBJECT-GROUP
    OBJECTS {
        ieee8021FramePreemptionAdminStatus,
        ieee8021FramePreemptionHoldAdvance,
        ieee8021FramePreemptionReleaseAdvance,
        ieee8021FramePreemptionActive,
        ieee8021FramePreemptionHoldRequest
    }
    STATUS      current
    DESCRIPTION
        "Objects that allow management of frame preemption."
    ::= { ieee8021PreemptionGroups 1 }


-- ================================================================
-- compliance statements
-- ================================================================

ieee8021PreemptionCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for devices supporting
        frame preemption.

        Support of the objects defined in this MIB module
        also requires support of the IEEE8021-BRIDGE-MIB; the
        provisions of 17.3.2 apply to implementations claiming
        support of this MIB. "
```