Ethernet in the First Mile (EFM) OAM MIB

Status of this Memo

Abstract

   This document defines objects for managing Operations,
   Administration, and Maintenance (OAM) capabilities on Ethernet-like
   interfaces conformant to the Ethernet OAM functionality defined in
   [802.3ah].   The Ethernet OAM functionality is complementary to SNMP
   management in that it is focused on a small set of link-specific
   functions for Ethernet interfaces. This document defines objects for
   controlling those link OAM functions, and on providing mechanisms to
   take status and input from Ethernet OAM and feed it into a larger
   TCP/IP network management system.

Conventions used in this document

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in RFC 2119 [RFC2119].

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1. Introduction

   The IEEE 802.3ah Ethernet in the First Mile (EFM) task force added
   new management capabilities to Ethernet like interfaces. These
   management capabilities were introduced to provide some basic OAM
   function on Ethernet media. The defined functionality includes
   discovery, error signaling, loopback, and link monitoring. This memo
   defines a portion of the Management Information Base (MIB) for use
   with network management protocols in the Internet community to manage
   these new EFM interface capabilities.

2. The Internet-Standard Management Framework

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

   Managed objects are accessed via a virtual information store, termed
   the Management Information Base or MIB. MIB objects are generally
   accessed through the Simple Network Management Protocol (SNMP).

Objects in the MIB are defined using the mechanisms defined in the
Structure of Management Information (SMI). This memo specifies a MIB
module that is compliant to the SMIv2, which is described in STD 58,
RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580
[RFC2580].

3. **Overview**

Ethernet networks have evolved over the past 30 years from simple
LANs to a variety of other applications, including wide area
networks. To address some of these emerging markets, the IEEE
802.3ah task force defined additional clauses for the IEEE 802.3
standard [802.3-2002] to better address Ethernet deployments in the
public access network.

The Ethernet in the First Mile (EFM) task force was focused on four
somewhat independent objectives to better address Ethernet access
deployments: optics, copper, Ethernet passive optical networks
(Ethernet PON, or EPON), and operations, administration, and
maintenance (OAM). The optics sub-taskforce developed new optical
physical layers that better served the long-reach outside plant
networks typically found in the access network, including developing
physical layers that operate up to 20Km and supporting the
environmental conditions of outside deployments. The copper sub
taskforce developed two new physical layers that run Ethernet
natively over existing twisted pair wires that have been supporting
voice services for decades. The EPON sub-taskforce developed a new
point-to-multipoint Ethernet physical layer, utilizing Ethernet
framing natively over a time-division multiple-access (TDMA)
infrastructure. The OAM sub-taskforce introduced some basic
management functionality into an Ethernet link to better monitor and
maintain Ethernet networks in geographically disparate networks.

This document defines the management objects necessary to integrate
Ethernet OAM functionality into the SNMP management framework.

Ethernet OAM is composed of a core set of functions and a set of
optional functional groups that are not required to be implemented
along with the core set. The mandatory functions include discovery
operations (determining if the other end of the link is OAM capable,
and what OAM functions it implements), state machine implementation,
and some critical event flows. The optional functional groups are
for (a) link events, (b) remote loopback, and (c) variable retrieval
and response. Each optional functional group is controlled by a
separate MIB table(s).

Ethernet OAM is complementary, not competitive, with SNMP management

in that it provides some basic management functions at layer two,

rather than using layer three and above as required by SNMP over an
IP infrastructure. Ethernet OAM provides single-hop functionality in
that it works only between two directly connected Ethernet stations.
SNMP can be used to manage the Ethernet OAM interactions of one
Ethernet station with another.

Ethernet OAM has three functional objectives which are detailed in
the following sections.

3.1 Remote fault indication

Remote fault indication provides a mechanism for one end of an
Ethernet link to signal the other end that the receive path is non
operational. Some Ethernet physical layers offer mechanisms to
signal this condition at the physical layer. Ethernet OAM added a
mechanism so that some Ethernet physical layers can operate in
unidirectional mode, allowing frames to be transmitted in one
direction even when the other direction is non-operational.
Traditionally, Ethernet PHYs do not allow frame transmission in one
direction if the other direction is not operational. Using this
mode, Ethernet OAM allows frame-based signaling of remote fault
conditions while still not allowing higher layer applications to be
aware of the unidirectional capability. This document includes
mechanisms for capturing that information and reflecting such
information in objects and notifications into the SNMP management
framework.

3.2 Link monitoring

Ethernet OAM includes event signaling capability so that one end of
an Ethernet link can indicate the occurrence of certain important
events to the other end of the link. This happens via a layer two
protocol. This document defines methods for incorporating the
occurrence of these layer two events, both at the local end and far
end of the link, into the SNMP management framework.

Ethernet OAM also includes mechanisms for one Ethernet station to
query another directly connected Ethernet station about the status of
its Ethernet interface variables and status. This document DOES NOT
include mechanisms for controlling how one Ethernet endpoint may use
this functionality to query the status or statistics of a peer
Ethernet entity.

3.3 Remote loopback

Remote loopback is a link state where the peer Ethernet entity echoes
every received packet (without modifications) back onto the link.
Remote loopback is intrusive in that the other end of the link is not
forwarding traffic from higher layers out over the link. This

   document defines objects controlling loopback operation and reading
   the status of the loopback state.

4. Relation to the Other MIBs

   The definitions presented here are based on Clauses 30 and 57 of
   [802.3ah]. Note that these clauses describe many of these variables
   and their affects on the MAC layer. In some cases there is a one-to
   one relationship between an object in this document and an object in
   the Clause 30 MIB of [802.3ah]. In other cases, the objects of this
   document reflect a more complex entity and are reflected by more than
   one objectx in the Clause 30 MIB of [802.3ah].

4.1 Relation to other SNMP MIBs

   This objects defined in this document do not overlap with MIB-2
   [RFC1213], the interfaces MIB [RFC2863], or the Ethernet-like
   interfaces MIB [RFC3635]. The objects defined here are defined for
   Ethernet-like interfaces only and use the same ifIndex as the
   associated Ethernet interface.

   This document is independent of the other MIBs derived from [802.3ah]
   for copper [802.3ah-copper] and EPON [802.3ah-epon].

4.2 IANA Considerations

   The EFM OAM MIB requires the allocation of a single object identifier
   for its MODULE-IDENTITY under the MIB-2 tree. IANA has not yet
   allocated this object identifier.

4.3 Mapping of IEEE 802.3ah Managed Objects

   This section contains the mapping between managed objects defined in
   [802.3ah] Clause 30, and managed objects defined in this document.

   IEEE 802.3 Managed Object   Corresponding SNMP object

    .aOAMID   IF-MIB ifIndex
    .aOAMAdminState   dot3OamAdminState
    .aOAMMode   dot3OamMode
    .aOAMDiscoveryState   dot3OamOperStatus
    .aOAMRemoteMACAddress   dot3OamPeerMacAddress
    .aOAMLocalConfiguration   dot3OamFunctionsSupported
    .aOAMRemoteConfiguration   dot3OamPeerFunctionsSupported,
                                    dot3OamPeerMode
    .aOAMLocalPDUConfiguration   dot3OamMaxOamPduSize
    .aOAMRemotePDUConfiguration   dot3OamPeerMaxOamPduSize
    .aOAMLocalFlagsField   dot3OamOperStatus,

```
                                 dot3OamLclErrEventFlagsData
.aOAMRemoteFlagsField            dot3OamOperStatus,
                                 dot3OamRmtErrEventFlagsData
.aOAMLocalRevision               dot3OamConfigRevision
.aOAMRemoteRevision              dot3OamPeerConfigRevision
.aOAMLocalState                  dot3OamLoopbackStatus
.aOAMRemoteState                 dot3OamLoopbackStatus
.aOAMRemoteVendorOUI             dot3OamPeerVendorOui
.aOAMRemoteVendorSpecificInfo    dot3OamPeerVendorInfo

.aOAMUnsupportedCodesTx          dot3OamUnsupportedCodesTx
.aOAMUnsupportedCodesRx          dot3OamUnsupportedCodesRx
.aOAMInformationTx               dot3OamInformationTx
.aOAMInformationRx               dot3OamInformationRx
.aOAMUniqueEventNotificationTx   dot3OamUniqueEventNotificationTx
.aOAMUniqueEventNotificationRx   dot3OamUniqueEventNotificationRx
.aOAMDuplicateEventNotificationTx
                                 dot3OamDuplicateEventNotificationTx
.aOAMDuplicateEventNotificationRx
                                 dot3OamDuplicateEventNotificationRx
.aOAMLoopbackControlTx           dot3OamLoopbackControlTx
.aOAMLoopbackControlRx           dot3OamLoopbackControlRx
.aOAMVariableRequestTx           dot3OamVariableRequestTx
.aOAMVariableRequestRx           dot3OamVariableRequestRx
.aOAMVariableResponseTx          dot3OamVariableResponseTx
.aOAMVariableResponseRx          dot3OamVariableResponseRx
.aOAMOrganizationSpecificTx      dot3OamOrgSpecificTx
.aOAMOrganizationSpecificRx      dot3OamOrgSpecificTx

.aOAMLocalErrSymPeriodConfig     dot3OamErrSymPeriodWindow,
                                 dot3OamErrSymPeriodThreshold
.aOAMLocalErrSymPeriodEvent      dot3OamLclErrSymPeriodData
.aOAMLocalErrFrameConfig         dot3OamErrFrameWindow,
                                 dot3OamErrFrameThreshold
.aOAMLocalErrFrameEvent          dot3OamLclErrFrameData
.aOAMLocalErrFramePeriodConfig   dot3OamErrFramePeriodWindow,
                                 dot3OamErrFramePeriodThreshold
.aOAMLocalErrFramePeriodEvent    dot3OamLclErrFramePeriodData
.aOAMLocalErrFrameSecsSummaryConfig
                                 dot3OamErrFrameSecsSummaryWindow,
                                 dot3OamErrFrameSecssummaryThreshold

.aOAMLocalErrFrameSecsSummaryEvent
                                 dot3OamLclErrFrameSecsSumData
.aOAMRemoteErrSymPeriodEvent     dot3OamRmtErrSymPeriodData
.aOAMRemoteErrFrameEvent         dot3OamRmtErrFrameData
.aOAMRemoteErrFramePeriodEvent   dot3OamRmtErrFramePeriodData
.aOAMRemoteErrFrameSecsSummaryEvent
```

dot3OamRmtErrFrameSecsSumData

```
   .aFramesLostDueToOAmError
   .acOAmAdminControl                 dot3OamFramesLostDueToOam
```

There are no IEEE 802.3ah managed objects that are not reflected in
this MIB in some way.

[5]. **MIB Structure**

The common EFM MIB objects of this memo focus on the OAM capabilities
introduced in IEEE 802.3ah. The MIB objects are partitioned into
four (4) different MIB groups.

The dot3OamTable group manages the primary OAM objects of the
Ethernet interface. This group controls the state and status of OAM
as well as the mode in which it operates.
The dot3OamStats table maintains statistics on the number and type of
Ethernet OAM frames being transmitted and received on the Ethernet
interface.

The dot3OamPeer table maintains the current information on the status
and configuration of the peer OAM entity on the Ethernet interface.
Managed information includes the capabilities and function available
on the peer OAM entity.

The dot3OamEvent table defines the management objects for the event
notification capability available in IEEE P802.3ah OAM. With IEEE
P802.3ah OAM, one device may send notifications to its peer devices
whenever an important event happens on the local device.

[6]. **MIB Definition**


```
   EFM-COMMON-MIB DEFINITIONS ::= BEGIN
    IMPORTS
      MODULE-IDENTITY, mib-2, OBJECT-TYPE, Counter32, Unsigned32,
        Integer32, NOTIFICATION-TYPE
        FROM SNMPv2-SMI
      TEXTUAL-CONVENTION, RowStatus, MacAddress, TimeStamp
        FROM SNMPv2-TC
      ifIndex
        FROM IF-MIB
      MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
        FROM SNMPv2-CONF;
```

    efmOamMIB MODULE-IDENTITY
      LAST-UPDATED "200406010000Z" -- June 01, 2004"
      ORGANIZATION
        "IETF Ethernet Interfaces and Hub MIB Working Group"
      CONTACT-INFO
        "WG Charter:
          http://www.ietf.org/html.charters/hubmib-charter.html
        Mailing lists:
          General Discussion: hubmib@ietf.org
          To Subscribe: hubmib-requests@ietf.org
          In Body: subscribe your_email_address
        Chair: Dan Romascanu, Avaya
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          Fax: +1-919-991-0743
          E-mail: msquire@hatterasnetworks.com
        "
      DESCRIPTION
        "The MIB module for managing the new Ethernet OAM features
        introduced by the Ethernet in the First Mile task force (IEEE
        P802.3ah). The functionality presented here is based on IEEE
        P802.3ah/D3.3 [802.3ah], released in April, 2004.

        In particular, this MIB focused on the changes to Clause 30 of
        the draft that are not specific to any physical layer. These
        changes are primarily reflected in the new OAM features
        developed under this project, that can be applied to any
        Ethernet like interface. The OAM features are described in
        Clause 57 of [802.3ah].

        The following reference is used throughout this MIB module:

          [802.3ah] refers to:
            IEEE Draft P802.3ah/D3.3: 'Draft amendment to -
            Information technology - Telecommunications and
            information exchange between systems - Local and
            metropolitan are networks - Specific requirements - Part
            3: Carrier sense multiple access with collision detection
            (CSMA/CD) access method and physical layer specifications
            - Media Access Control Parameters, Physical Layers and
            Management Parameters for subscriber access networks',
            April 2004.
    -- Editor's note - update this to normative reference when finalized

          [802-2001] refers to:

'IEEE Standard for LAN/MAN (Local Area

           Network/Metropolitan Area Network): Overview and
           Architecture', IEEE 802, June 2001.

        Copyright (c) The Internet Society (2004). This version of
        this MIB module is part of RFC XXXX; See the RFC itself for
        full legal notices. "
-- RFC Editor: Update XXXX to appropriate RFC number
-- RFC Editor: Remove these notes

     REVISION   "200406010000Z" -- June 01, 2004"
     DESCRIPTION "Initial version, published as RFC XXXX."
-- RFC Editor: Update XXXX to appropriate RFC number
-- RFC Editor: Remove these notes

     ::= { mib-2 XXX }
-- RFC Editor: Replace value with IANA assigned number
-- RFC Editor: Remove these notes

   --
   -- Sections of the EFM OAM MIB
   --
     dot3OamMIB   OBJECT IDENTIFIER ::= { efmOamMIB 1 }
     dot3OamConformance OBJECT IDENTIFIER ::= { efmOamMIB 2 }

   --
   -- Textual conventions for OAM MIB
   --
   Dot3Oui ::= TEXTUAL-CONVENTION
     STATUS   current
     DESCRIPTION
       "24-bit Organizationally Unique Identifier. Information on
       OUIs can be found in IEEE 802-2001 [802-2001] Clause 9."
     SYNTAX   OCTET STRING(SIZE(3))

   Dot3OamUnsigned64 ::= TEXTUAL-CONVENTION
     STATUS   current
     DESCRIPTION
       "This convention represents a 64 bit unsigned integer. The
       convention replaces the Counter64 type for objects requiring
       read-write access."
    SYNTAX   OCTET STRING (SIZE(8))

   Dot3OamEventTLVData ::= TEXTUAL-CONVENTION
     STATUS   current
     DESCRIPTION
       "This convention represents the fields in an Event TLV in an

     Event Notification OAMPDU. The datas is interpreted as a
     sequence of six integer fields. Some fields are longer than is
     required for specific TLVs, but since this convention will be
     shared between all TLVs, the maximum size field is used.

     In the list below, TYPE indicates one of Symbol, Frame, Frame
     Period or Frame Seconds Summary. See [802.3ah], 57.5.3, for
     details.

     - The first field is 16 bit wide, and represents the
       Event Time Stamp field.
     - The second field is 64 bit wide, and represents the
       Errored TYPE Window field.
     - The third field is 64 bit wide, and represents the
       Errored TYPE Threshold field.
     - The fourth field is 64 bit wide, and represents the
       Errored TYPE field.
     - The fifth field is 64 bit wide, and represents the
       Error Running Total field.
     - The sixth field is 32 bit wide, and represents the
       Event Running Total field.

     Each integer field is encoded with the most important byte at
     the lowest number octet. The first integer field starts at
     location 0.

     Values which do not use the whole field width, will be aligned
     to the right, with zeros padded at the start of the field."
   SYNTAX   OCTET STRING (SIZE (38))

--
-- Ethernet OAM Control group
--

dot3OamTable OBJECT-TYPE
   SYNTAX   SEQUENCE OF Dot3OamEntry
   MAX-ACCESS   not-accessible
   STATUS   current
   DESCRIPTION
     "Primary controls and status for the OAM capabilities of an
     Ethernet like interface. There will be one row in this table
     for each Ethernet-like interface in the system that supports
     the Ethernet OAM functions defined in [802.3ah]."
   ::= { dot3OamMIB 1 }

     dot3OamEntry OBJECT-TYPE
       SYNTAX   Dot3OamEntry
       MAX-ACCESS not-accessible
       STATUS   current
       DESCRIPTION
         "An entry in the table, containing information on the Ethernet
         OAM function for a single Ethernet-like interface."
       INDEX   { ifIndex }
       ::= { dot3OamTable 1 }

     Dot3OamEntry ::=
       SEQUENCE {
          dot3OamRowStatus   RowStatus,
          dot3OamAdminState   INTEGER,
          dot3OamOperStatus   INTEGER,
          dot3OamMode   INTEGER,
          dot3OamMaxOamPduSize   Integer32,
          dot3OamConfigRevision   Unsigned32,
          dot3OamFunctionsSupported   BITS
       }

     dot3OamRowStatus OBJECT-TYPE
       SYNTAX   RowStatus
       MAX-ACCESS read-create
       STATUS   current
       DESCRIPTION
         "Row creation is automatic for each Ethernet- like interface
         that supports OAM functionality as defined in [802.3ah].

         Note that implementation of OAM is not required for any
         Ethernet like interface.   "
       REFERENCE   "[802.3ah], 57.1.2 point d.1"
       ::= { dot3OamEntry 1}

     dot3OamAdminState OBJECT-TYPE
       SYNTAX   INTEGER {
                      disabled(1),
                      enabled(2)
                    }
       MAX-ACCESS read-write
       STATUS   current
       DESCRIPTION
         "This object is used to provision the default administrative
         OAM mode for this interface. This object represents the
         desired state of OAM for this interface.

         The dot3OamAdminState always starts in the disabled(1) state
         until an explicity management action or configuration

information retained by the system causes a transition to the

      enabled(2) state.

      Note that the value of this object is ignored when the
      interface is not operating in full-duplex mode. OAM is not
      supported on half-duplex links. "
    REFERENCE   "[802.3ah], 30.3.6.1.2"
    ::= { dot3OamEntry 2 }

dot3OamOperStatus OBJECT-TYPE
    SYNTAX   INTEGER {
                   disabled(1),
                   linkfault(2),
                   passiveWait(3),
                   activeSendLocal(4),
                   sendLocalAndRemote(5),
                   sendLocalAndRemoteOk(6),
                   oamPeeringLocallyRejected(7),
                   oamPeeringRemotelyRejected(8),
                   operational(9)
                }
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
      "At initialization and failure conditions, two OAM entities on
      the same full-duplex Ethernet link begin a discovery phase to
      determine what OAM capabilities may be used on that link. The
      progress of this initialization is controlled by the OAM
      sublayer.

      This value is always disabled(1) if OAM is disabled on this
      interface via the dot3OamAdminState.

      If the link has detected a fault and is transmitting OAMPDUs
      with a link fault indication, the value is linkFault(2).

      The passiveWait(3) state is returned only by OAM entities in
      passive mode (dot3OamMode) and reflects the state in which the
      OAM entity is waiting to see if the peer device is OAM
      capable. The activeSendLocal(4) is used by active mode
      devices (dot3OamMode) and reflects the OAM entity actively
      trying to discover whether the peer has OAM capability but has
      not yet made that determination.

      The state sendLocalAndRemote(5) reflects that the local OAM
      entity has discovered the peer but has not yet accepted or
      rejected the configuration of the peer. The local device can,
      for whatever reason, decide that the peer device is
      unacceptable and decline OAM peering. If the local OAM entity

rejects the peer OAM entity, the state becomes

oamPeeringLocallyRejected(7). If the OAM peering is allowed
by the local device, the state moves to
sendLocalAndRemoteOk(6). Note that both the
sendLocalAndRemote(5) and oamPeeringLocallyRejected(7) states
fall within the state SEND_LOCAL_REMOTE of the Discovery state
diagram [802.3ah, Figure 57-5], with the difference being
whether the local OAM client has actively rejected the peering
or has just not indicated any decision yet. Whether a peering
decision has been made is indicated via the local flags field
in the OAMPDU (reflected in the aOAMLocalFlagsField of
30.3.6.1.10).

If the remote OAM entity rejects the peering, the state
becomes oamPeeringRemotelyRejected(8). Note that both the
sendLocalAndRemoteOk(6) and oamPeeringRemotelyRejected(8)
states fall within the state SEND_LOCAL_REMOTE_OK of the
Discovery state diagram [802.3ah, Figure 57-5], with the
difference being whether the remote OAM client has rejected
the peering or has just not yet decided. This is indicated
via the remote flags field in the OAM PDU (reflected in the
aOAMRemoteFlagsField of 30.3.6.1.11).

When the local OAM entity learns that both it and the remote
OAM entity have accepted the peering, the state moves to
operational(9) corresponding to the SEND_ANY state of the
Discovery state diagram [802.3ah, Figure 57-5]. "
REFERENCE   "[802.3ah], 30.3.6.1.4, 30.3.6.1.10, 30.3.6.1.11"
::= { dot3OamEntry 3 }

dot3OamMode OBJECT-TYPE
  SYNTAX   INTEGER {
                 active(1),
                 passive(2)
               }
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
    "This object configures the mode of OAM operation for this
    Ethernet like interface. OAM on Ethernet interfaces may be in
    'active' mode or 'passive' mode. These two modes differ in
    that active mode provides additional capabilities to initiate
    monitoring activities with the remote OAM peer entity, while
    passive mode generally waits for the peer to initiate OAM
    actions with it. As an example, an active OAM entity can put
    the remote OAM entity in a loopback state, where a passive OAM
    entity cannot.

    Changing this value results in incrementing the configuration

revision field of locally generated OAMPDUs (30.3.6.1.12) and

      potentially re-doing the OAM discovery process if the
      dot3OamOperStatus was already operational(9). "
    REFERENCE   "[802.3ah], 30.3.6.1.3"
    ::= { dot3OamEntry 4 }

  dot3OamMaxOamPduSize OBJECT-TYPE
    SYNTAX   Integer32 (64..1522)
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
      "The largest OAMPDU that the OAM entity supports. OAM
      entities exchange maximum OAMPDU sizes and negotiate to use
      the smaller of the two maximum OAMPDU sizes between the peers.
      "
    REFERENCE   "[802.3ah], REFERENCE 30.3.6.1.8"
    ::= { dot3OamEntry 5 }

  dot3OamConfigRevision OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
      "The configuration revision of the OAM entity as reflected in
      the latest OAMPDU sent by the OAM entity. The config revision
      is used by OAM entities to indicate configuration changes have
      occured which might require the peer OAM entity to re-evaluate
      whether the peering is allowed. See local_satisfied in
      [802.3ah, 57.3.1.2]. "
    REFERENCE   "[802.3ah], 30.3.6.1.12"
    ::= { dot3OamEntry 6 }

  dot3OamFunctionsSupported OBJECT-TYPE
    SYNTAX   BITS {
                   unidirectionalSupport (0),
                   loopbackSupport(1),
                   eventSupport(2),
                   variableSupport(3)
                 }
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
      "The OAM functions supported on this Ethernet- like interface.
      OAM consists of separate functional sets beyond the basic
      discovery process which is always required. These functional
      groups can be supported independently by any implementation.
      These values are communicated to the peer via the local
      configuration field of Information OAMPDUs. "
    REFERENCE   "[802.3ah], 30.3.6.1.6"

```
        ::= { dot3OamEntry 7 }
```

```
   ---------------------------------------------------------------------
   --
   -- Ethernet OAM Peer group
   --


   dot3OamPeerTable OBJECT-TYPE
     SYNTAX        SEQUENCE OF Dot3OamPeerEntry
     MAX-ACCESS  not-accessible
     STATUS        current
     DESCRIPTION
       "Information about the OAM peer for a particular Ethernet like
       interface. OAM entities communicate with a single OAM peer
       entity on full-duplex Ethernet links on which OAM is enabled
       and operating properly.  "
     ::= { dot3OamMIB 2 }

   dot3OamPeerEntry OBJECT-TYPE
     SYNTAX        Dot3OamPeerEntry
     MAX-ACCESS  not-accessible
     STATUS        current
     DESCRIPTION
       "An entry in the table, containing information on the peer OAM
       entity for a single Ethernet like interface.

       Note that there is at most one OAM peer for each Ethernet like
       interface.  "
     INDEX        { ifIndex }
     ::= { dot3OamPeerTable 1 }


   Dot3OamPeerEntry ::=
     SEQUENCE {
       dot3OamPeerRowStatus                RowStatus,
       dot3OamPeerMacAddress               MacAddress,
       dot3OamPeerVendorOui                Dot3Oui,
       dot3OamPeerVendorInfo               Unsigned32,
       dot3OamPeerMode                     INTEGER,
       dot3OamPeerMaxOamPduSize            Integer32,
       dot3OamPeerConfigRevision           Unsigned32,
       dot3OamPeerFunctionsSupported       BITS
     }

   dot3OamPeerRowStatus OBJECT-TYPE
     SYNTAX        RowStatus
     MAX-ACCESS  read-create
     STATUS        current
```

   DESCRIPTION
     "The peer row is automatically created when the
     dot3OamOperStatus of this particular Ethernet interface is not
     'disabled', 'linkFault', 'passiveWait' or 'activeSendLocal'.
     In such cases, the remote OAM entity has been identified and
     its information and status can be made available.

     This row is automatically deleted if the dot3OamOperStatus
     changes to 'disabled', 'linkfault', 'passiveWait', or
     'activeSendLocal'. "
   REFERENCE   "N/A"
   ::= { dot3OamPeerEntry 1}

dot3OamPeerMacAddress OBJECT-TYPE
   SYNTAX   MacAddress
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The MAC address of the peer OAM entity. The MAC address is
     derived from the most recently received OAMPDU.

     An OAMPDU is indicated by a valid frame with (1) destination
     MAC address equal to that of the reserved MAC address for Slow
     Protocols (See 43B of [802.3ah]), (2) a lengthOrType field
     equal to the reserved type for Slow Protocols, (3) and a Slow
     Protocols subtype equal to that of the subtype reserved for
     OAM. "
   REFERENCE   "[802.3ah], 30.3.6.1.5."
   ::= { dot3OamPeerEntry 2 }

dot3OamPeerVendorOui OBJECT-TYPE
   SYNTAX   Dot3Oui
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The OUI of the OAM peer as reflected in the latest
     Information OAMPDU received with a Local Information TLV. The
     OUI can be used to identify the vendor of the remote OAM
     entity.

     An Information OAMPDU is indicated by a valid frame with (1)
     destination MAC address equal to that of the reserved MAC
     address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, (4) a OAM code that equals the code
     reserved for Information OAMPDUs. "

REFERENCE   "[802.3ah], 30.3.6.1.16."

   ::= { dot3OamPeerEntry 3 }

dot3OamPeerVendorInfo OBJECT-TYPE
   SYNTAX   Unsigned32
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The Vendor Info of the OAM peer as reflected in the latest
     Information OAMPDU received with a Local Information TLV. The
     vendor information field is within the Local Information TLV,
     and can be used to determine additional information about the
     peer entity. The format of the vendor information is
     unspecified within the 32-bit field.

     An Information OAMPDU is indicated by a valid frame with (1)
     destination MAC address equal to that of the reserved MAC
     address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) a OAM code that equals the
     code reserved for Information OAMPDUs. "
   REFERENCE   "[802.3ah], 30.3.6.1.17."
   ::= { dot3OamPeerEntry 4 }

dot3OamPeerMode OBJECT-TYPE
   SYNTAX   INTEGER {
                  active(1),
                  passive(2)
               }
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The mode of the OAM peer as reflected in the latest
     Information OAMPDU received with a Local Information TLV. The
     mode of the peer can be determined from the Configuration
     field in the Local Information TLV of the last Information
     OAMPDU received from the peer.

     An Information OAMPDU is indicated by a valid frame with (1)
     destination MAC address equal to that of the reserved MAC
     address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) a OAM code that equals the
     code reserved for Information OAMPDUs. "
   REFERENCE   "[802.3ah], 30.3.6.1.7."

```
          ::= { dot3OamPeerEntry 5 }
```

dot3OamPeerMaxOamPduSize OBJECT-TYPE
  SYNTAX   Integer32 (64..1522)
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "The maximum size of OAMPDU supported by the peer as reflected
    in the latest Information OAMPDU received with a Local
    Information TLV.   Ethernet OAM on this interface must not use
    OAMPDUs that exceed this size. The maximum OAMPDU size can be
    determined from the PDU Configuration field of the Local
    Information TLV of the last Information OAMPDU received from
    the peer.

    An Information OAMPDU is indicated by a valid frame with (1)
    destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) a OAM code that equals the
    code reserved for Information OAMPDUs.   "
  REFERENCE   "[802.3ah], 30.3.6.1.9."
  ::= { dot3OamPeerEntry 6 }

dot3OamPeerConfigRevision OBJECT-TYPE
  SYNTAX   Unsigned32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "The configuration revision of the OAM peer as reflected in
    the latest OAMPDU. This attribute is changed by the peer
    whenever it has a local configuration change for Ethernet OAM
    this interface.

    The configuration revision can be determined from the Revision
    field of the Local Information TLV of the most recently
    received Information OAMPDU with a Local Information TLV.

    An Information OAMPDU is indicated by a valid frame with (1)
    destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) a OAM code that equals the
    code reserved for Information OAMPDUs.   "
  REFERENCE   "[802.3ah], 30.3.6.1.13."
  ::= { dot3OamPeerEntry 7 }

dot3OamPeerFunctionsSupported OBJECT-TYPE
  SYNTAX   BITS {
                 unidirectionalSupport (0),
                 loopbackSupport(1),
                 eventSupport(2),
                 variableSupport(3)
               }
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "The OAM functions supported on this Ethernet like interface.
    OAM consists of separate functionality sets above the basic
    discovery process. This value indicates the capabilities of
    the peer OAM entity with respect to these functions.

    The capbilities of the OAM peer can be determined from the
    configuration field of the Local Information TLV of the most
    recently received Information OAMPDU with a Local Information
    TLV.

    An Information OAMPDU is indicated by a valid frame with (1)
    destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) a OAM code that equals the
    code reserved for Information OAMPDUs. "
  REFERENCE   "[802.3ah], REFERENCE 30.3.6.1.7."
  ::= { dot3OamPeerEntry 8 }

--
-- Ethernet OAM Loopback group
--

dot3OamLoopbackTable OBJECT-TYPE
  SYNTAX   SEQUENCE OF Dot3OamLoopbackEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "This table contains methods to control the loopback state of
    the local link as well as indicating the status of the
    loopback function.

    Loopback can be used to place the remote OAM entity in a state
    where every received frame (except OAMPDUs) are echoed back

    over the same interface on which they were received.   In this
    state, at the remote entity, 'normal' traffic is disabled as
    only the looped back frames are transmitted on the interface.
    Loopback is thus an intrusive operation that prohibits normal
    data flow and should be used accordingly. "
  ::= { dot3OamMIB 3 }

dot3OamLoopbackEntry OBJECT-TYPE
  SYNTAX   Dot3OamLoopbackEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "An entry in the table, containing information on the loopback
    status for a single Ethernet like interface. There is an
    entry in this table for every Ethernet-like interface on which
    supports OAM and loopback function within OAM (as indicated in
    dot3OamFunctionsSupported). "
  INDEX   { ifIndex }
  ::= { dot3OamLoopbackTable 1 }

Dot3OamLoopbackEntry ::=
  SEQUENCE {
    dot3OamLoopbackCommand   INTEGER,
    dot3OamLoopbackStatus   INTEGER,
    dot3OamLoopbackIgnoreRx   INTEGER
  }

dot3OamLoopbackCommand OBJECT-TYPE
  SYNTAX   INTEGER {
                 noLoopback (1),
                 startRemoteLoopback (2),
                 stopRemoteLoopback (3)
              }
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
    "This attribute initiates or terminates remote loopback with
    an OAM peer. Writing startRemoteLoopback(2) to this attribute
    cause the local OAM client to send a loopback OAMPDU to the
    OAM peer with the loopback enable flags set. Writing
    stopRemoteLoopback(3) to this attribute will cause the local
    OAM client to send a loopback OAMPDU to the OAM peer with the
    loopback enable flags cleared. Writing noLoopback to this
    attribute has no effect.

    Writes to this attribute are ignored unless the OAM status of
    this interface is 'operational' (dot3OamOperStatus).

The attribute always returns noLoopback on a read. To

     determine the loopback status, use the attribute
     dot3OamLoopbackStatus. "
   REFERENCE   "[802.3ah], 57.2.11"
   ::= { dot3OamLoopbackEntry 1 }

dot3OamLoopbackStatus OBJECT-TYPE
   SYNTAX   INTEGER {
                  noLoopback (1),
                  initiatingLoopback (2),
                  remoteLoopback (3),
                  terminatingLoopback (4),
                  localLoopback (5),
                  unknown (6)
               }
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The loopback status of the OAM entity. This status is
     determined by a combination of the local parser and
     multiplexer states, the remote parser and multiplexer states,
     as well as by the actions of the local OAM client. When
     operating in normal mode with no loopback in progress, the
     status reads noLoopback(1).

     If the OAM client has sent an Loopback OAMPDU and is waiting
     for a response, where the local parser and multiplexer states
     are DISCARD (see [802.3ah, 57.2.11.1]), the status is
     'initiatingLoopback'. In this case, the local OAM entity has
     yet to receive any acknowledgement that the remote OAM entity
     has received its loopback command request.

     If the local OAM client knows that the remote OAM entity is in
     loopback mode (via the remote state information as described
     in [802.3ah, 57.2.11.1, 30.3.6.1.15]), the status is
     remoteLoopback(3). If the local OAM client is in the process
     of terminating the remote loopback [802.3ah, 57.2.11.3,
     30.3.6.1.14], with its local multiplexer and parser states in
     DISCARD, the status is terminatingLoopback(4). If the remote
     OAM client has put the local OAM entity in loopback mode as
     indicated by its local parser state, the status is
     localLoopback(5).

     The unknown(6) status indicates the parser and multiplexer
     combination is unexpected. This status may be returned if the
     OAM loopback is in a transition state but should not persist.

     The values of this attribute correspond to the following
     values of the local and remote parser and multiplexer states.

```
      value              LclPrsr    LclMux     RmtPrsr    RmtMux
      noLoopback           FWD        FWD        FWD        FWD
      initLoopback       DISCARD    DISCARD      FWD        FWD
      rmtLoopback        DISCARD      FWD       LPBK      DISCARD
      tmtngLoopback      DISCARD    DISCARD     LPBK      DISCARD
      lclLoopback          LPBK     DISCARD    DISCARD      FWD
      unknown              ***    any other combination    ***
   "
REFERENCE   "[802.3ah], REFERENCE 57.2.11, 30.3.61.14,
   30.3.6.1.15"
::= { dot3OamLoopbackEntry 2 }
```

dot3OamLoopbackIgnoreRx OBJECT-TYPE
  SYNTAX   INTEGER { ignore(1), process(2) }
  MAX-ACCESS read-write
  STATUS   current
  DESCRIPTION
    "Since OAM loopback is a distruptive operation (user traffic
    does not pass), this attribute provides a mechanism to provide
    controls over whether received OAM loopback commands are
    processed or ignored. When the value is ignore(1), received
    loopback commands are ignored. When the value is process(2),
    OAM loopback commands are processed. The default value is to
    ignore loopback commands.

    The attribute has no meaning if the local OAM entity does not
    support the loopback function (as defined in
    dot3OamFunctionsSupported). "
  REFERENCE   "[802.3ah], REFERENCE 57.2.11, 30.3.61.14,
    30.3.6.1.15"
  ::= { dot3OamLoopbackEntry 3 }

--
-- Ethernet OAM Statistics group
--

dot3OamStatsTable OBJECT-TYPE
  SYNTAX   SEQUENCE OF Dot3OamStatsEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "Statistics for the OAM function on a particular Ethernet like
    interface."
  ::= { dot3OamMIB 4 }

dot3OamStatsEntry OBJECT-TYPE

```
     SYNTAX       Dot3OamStatsEntry
     MAX-ACCESS   not-accessible
     STATUS       current
     DESCRIPTION
       "An entry in the table, containing statistics information on
       the Ethernet OAM function for a single Ethernet-like
       interface."
     INDEX        { ifIndex }
     ::= { dot3OamStatsTable 1 }

 Dot3OamStatsEntry ::=
     SEQUENCE {
             dot3OamInformationTx                Counter32,
             dot3OamInformationRx                Counter32,
             dot3OamUniqueEventNotificationTx    Counter32,
             dot3OamUniqueEventNotificationRx    Counter32,
             dot3OamDuplicateEventNotificationTx Counter32,
             dot3OamDuplicateEventNotificationRx Counter32,
             dot3OamLoopbackControlTx            Counter32,
             dot3OamLoopbackControlRx            Counter32,
             dot3OamVariableRequestTx            Counter32,
             dot3OamVariableRequestRx            Counter32,
             dot3OamVariableResponseTx           Counter32,
             dot3OamVariableResponseRx           Counter32,
             dot3OamOrgSpecificTx                Counter32,
             dot3OamOrgSpecificRx                Counter32,
             dot3OamUnsupportedCodesTx           Counter32,
             dot3OamUnsupportedCodesRx           Counter32,
             dot3OamFramesLostDueToOam           Counter32
           }


 dot3OamInformationTx OBJECT-TYPE
     SYNTAX       Counter32
     MAX-ACCESS   read-only
     STATUS       current
     DESCRIPTION
       "A count of the number of Information OAMPDUs transmitted on
       this interface.

       An Information OAMPDU is indicated by a valid frame with (1)
       destination MAC address equal to that of the reserved MAC
       address for Slow Protocols (See 43B of [802.3ah]), (2) a
       lengthOrType field equal to the reserved type for Slow
       Protocols, (3) a Slow Protocols subtype equal to that of the
       subtype reserved for OAM, and (4) an OAMPDU code equals the
       OAM Information code.
```

Discontinuities of this counter can occur at re-initialization

of the management system, and at other times as indicated by
the value of the ifCounterDiscontinuityTime. "
REFERENCE   "[802.3ah], 30.3.6.1.20."
::= { dot3OamStatsEntry 1 }

dot3OamInformationRx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "A count of the number of Information OAMPDUs received on this
     interface.

     An Information OAMPDU is indicated by a valid frame with (1)
     destination MAC address equal to that of the reserved MAC
     address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) an OAMPDU code equals the
     OAM Information code.

     Discontinuities of this counter can occur at re-initialization
     of the management system, and at other times as indicated by
     the value of the ifCounterDiscontinuityTime. "
   REFERENCE   "[802.3ah], 30.3.6.1.21."
   ::= { dot3OamStatsEntry 2 }

dot3OamUniqueEventNotificationTx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "A count of the number of unique Event OAMPDUs transmitted on
     this interface. Event notifications may be sent in duplicate
     to increase the probability of successfully being received,
     given the possiblity that a frame may be lost in transit.

     An Event Notification OAMPDU is indicated by a valid frame
     with (1) destination MAC address equal to that of the reserved
     MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) an OAMPDU code equals the
     OAM Event code.

     A unique Event Notification OAMPDU is indicated as an Event
     Notification OAMPDU with a Sequence Number field that is
     distinct from the previously transmitted Event Notification

OAMPDU Sequence Number.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "

  REFERENCE   "[802.3ah], 30.3.6.1.22."
  ::= { dot3OamStatsEntry 3 }

dot3OamUniqueEventNotificationRx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of unique Event OAMPDUs received on
    this interface. Event notification OAMPDUs may be sent in
    duplicate to increase the probability of successfully being
    received, given the possiblity that a frame may be lost in
    transit.

    An Event Notification OAMPDU is indicated by a valid frame
    with (1) destination MAC address equal to that of the reserved
    MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the
    OAM Event code.

    A unique Event Notification OAMPDU is indicated as an Event
    Notification OAMPDU with a Sequence Number field that is
    distinct from the previously received Event Notification
    OAMPDU Sequence Number.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "
  REFERENCE   "[802.3ah], 30.3.6.1.24."
  ::= { dot3OamStatsEntry 4 }

dot3OamDuplicateEventNotificationTx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of duplicate Event OAMPDUs transmitted
    on this interface. Event notification OAMPDUs may be sent in
    duplicate to increase the probability of successfully being
    received, given the possiblity that a frame may be lost in
    transit.

An Event Notification OAMPDU is indicated by a valid frame
with (1) destination MAC address equal to that of the reserved
MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
lengthOrType field equal to the reserved type for Slow
Protocols, (3) a Slow Protocols subtype equal to that of the
subtype reserved for OAM, and (4) an OAMPDU code equals the
OAM Event code.

A duplicate Event Notification OAMPDU is indicated as an Event
Notification OAMPDU with a Sequence Number field that is
identical to the previously transmitted Event Notification
OAMPDU Sequence Number.

Discontinuities of this counter can occur at re-initialization
of the management system, and at other times as indicated by
the value of the ifCounterDiscontinuityTime. "
      REFERENCE   "[802.3ah], 30.3.6.1.23."
      ::= { dot3OamStatsEntry 5 }

dot3OamDuplicateEventNotificationRx OBJECT-TYPE
      SYNTAX   Counter32
      MAX-ACCESS   read-only
      STATUS   current
      DESCRIPTION
        "A count of the number of duplicate Event OAMPDUs received on
        this interface. Event notification OAMPDUs may be sent in
        duplicate to increase the probability of successfully being
        received, given the possiblity that a frame may be lost in
        transit.

An Event Notification OAMPDU is indicated by a valid frame
with (1) destination MAC address equal to that of the reserved
MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
lengthOrType field equal to the reserved type for Slow
Protocols, (3) a Slow Protocols subtype equal to that of the
subtype reserved for OAM, and (4) an OAMPDU code equals the
OAM Event code.

A duplicate Event Notification OAMPDU is indicated as an Event
Notification OAMPDU with a Sequence Number field that is
identical to the previously received Event Notification OAMPDU
Sequence Number.

Discontinuities of this counter can occur at re-initialization
of the management system, and at other times as indicated by
the value of the ifCounterDiscontinuityTime. "
      REFERENCE   "[802.3ah], 30.3.6.1.25."
      ::= { dot3OamStatsEntry 6 }

dot3OamLoopbackControlTx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of Loopback Control OAMPDUs transmitted
    on this interface.

    An Loopback Conrol OAMPDU is indicated by a valid frame with
    (1) destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the
    OAM Loopback Control code.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "
  REFERENCE   "[802.3ah], 30.3.6.1.26."
  ::= { dot3OamStatsEntry 7 }

dot3OamLoopbackControlRx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of Loopback Control OAMPDUs transmitted
    on this interface.

    An Loopback Control OAMPDU is indicated by a valid frame with
    (1) destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the
    OAM Loopback Control code.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "
  REFERENCE   "[802.3ah], 30.3.6.1.27."
  ::= { dot3OamStatsEntry 8 }

dot3OamVariableRequestTx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current

DESCRIPTION

      "A count of the number of Variable Request OAMPDUs transmitted
      on this interface.

      An Variable Request OAMPDU is indicated by a valid frame with
      (1) destination MAC address equal to that of the reserved MAC
      address for Slow Protocols (See 43B of [802.3ah]), (2) a
      lengthOrType field equal to the reserved type for Slow
      Protocols, (3) a Slow Protocols subtype equal to that of the
      subtype reserved for OAM, and (4) an OAMPDU code equals the
      OAM Variable Request code.

      Discontinuities of this counter can occur at re-initialization
      of the management system, and at other times as indicated by
      the value of the ifCounterDiscontinuityTime. "
   REFERENCE   "[802.3ah], 30.3.6.1.28."
   ::= { dot3OamStatsEntry 9 }

dot3OamVariableRequestRx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
      "A count of the number of Variable Request OAMPDUs received on
      this interface.

      An Variable Request OAMPDU is indicated by a valid frame with
      (1) destination MAC address equal to that of the reserved MAC
      address for Slow Protocols (See 43B of [802.3ah]), (2) a
      lengthOrType field equal to the reserved type for Slow
      Protocols, (3) a Slow Protocols subtype equal to that of the
      subtype reserved for OAM, and (4) an OAMPDU code equals the
      OAM Variable Request code.

      Discontinuities of this counter can occur at re-initialization
      of the management system, and at other times as indicated by
      the value of the ifCounterDiscontinuityTime. "
   REFERENCE   "[802.3ah], 30.3.6.1.29."
   ::= { dot3OamStatsEntry 10 }

dot3OamVariableResponseTx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
      "A count of the number of Variable Response OAMPDUs
      transmitted on this interface.

      An Variable Response OAMPDU is indicated by a valid frame with

(1) destination MAC address equal to that of the reserved MAC

    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the
    OAM Variable Response code.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "
  REFERENCE   "[802.3ah], 30.3.6.1.30."
  ::= { dot3OamStatsEntry 11 }

dot3OamVariableResponseRx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of Variable Response OAMPDUs received
    on this interface.

    An Variable Response OAMPDU is indicated by a valid frame with
    (1) destination MAC address equal to that of the reserved MAC
    address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the
    OAM Variable Response code.

    Discontinuities of this counter can occur at re-initialization
    of the management system, and at other times as indicated by
    the value of the ifCounterDiscontinuityTime. "
  REFERENCE   "[802.3ah], 30.3.6.1.31."
  ::= { dot3OamStatsEntry 12 }

 dot3OamOrgSpecificTx OBJECT-TYPE
  SYNTAX   Counter32
  MAX-ACCESS read-only
  STATUS   current
  DESCRIPTION
    "A count of the number of Organization Specific OAMPDUs
    transmitted on this interface.

    An Organization Specific OAMPDU is indicated by a valid frame
    with (1) destination MAC address equal to that of the reserved
    MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
    lengthOrType field equal to the reserved type for Slow
    Protocols, (3) a Slow Protocols subtype equal to that of the
    subtype reserved for OAM, and (4) an OAMPDU code equals the

OAM Organization Specific code.

     Discontinuities of this counter can occur at re-initialization
     of the management system, and at other times as indicated by
     the value of the ifCounterDiscontinuityTime. "
   REFERENCE   "[802.3ah], 30.3.6.1.32."
   ::= { dot3OamStatsEntry 13 }

dot3OamOrgSpecificRx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION

     "A count of the number of Organization Specific OAMPDUs
     received on this interface.

     An Organization Specific OAMPDU is indicated by a valid frame
     with (1) destination MAC address equal to that of the reserved
     MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) an OAMPDU code equals the
     OAM Organization Specific code.

     Discontinuities of this counter can occur at re-initialization
     of the management system, and at other times as indicated by
     the value of the ifCounterDiscontinuityTime. "
   REFERENCE   "[802.3ah], 30.3.6.1.33."
   ::= { dot3OamStatsEntry 14 }

dot3OamUnsupportedCodesTx OBJECT-TYPE
   SYNTAX   Counter32
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "A count of the number of OAMPDUs transmitted on this
     interface with an unsupported op-code.

     An unsupported opcode OAMPDU is indicated by a valid frame
     with (1) destination MAC address equal to that of the reserved
     MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
     lengthOrType field equal to the reserved type for Slow
     Protocols, (3) a Slow Protocols subtype equal to that of the
     subtype reserved for OAM, and (4) an OAMPDU code equals the
     opcode for a function that is not supported by the device.

     Discontinuities of this counter can occur at re-initialization
     of the management system, and at other times as indicated by
     the value of the ifCounterDiscontinuityTime. "

     REFERENCE   "[802.3ah], 30.3.6.1.18."
     ::= { dot3OamStatsEntry 15 }

  dot3OamUnsupportedCodesRx OBJECT-TYPE
     SYNTAX   Counter32
     MAX-ACCESS   read-only
     STATUS   current
     DESCRIPTION
       "A count of the number of OAMPDUs received on this interface
       with an unsupported op-code.

       An unsupported opcode OAMPDU is indicated by a valid frame
       with (1) destination MAC address equal to that of the reserved
       MAC address for Slow Protocols (See 43B of [802.3ah]), (2) a
       lengthOrType field equal to the reserved type for Slow
       Protocols, (3) a Slow Protocols subtype equal to that of the
       subtype reserved for OAM, and (4) an OAMPDU code equals the
       opcode for a function that is not supported by the device.

       Discontinuities of this counter can occur at re-initialization
       of the management system, and at other times as indicated by
       the value of the ifCounterDiscontinuityTime. "
     REFERENCE   "[802.3ah], 30.3.6.1.19."
     ::= { dot3OamStatsEntry 16 }

  dot3OamFramesLostDueToOam OBJECT-TYPE
     SYNTAX   Counter32
     MAX-ACCESS   read-only
     STATUS   current
     DESCRIPTION
       "A count of the number of frames that were dropped by the OAM
       multiplexer. Since the OAM mulitplexer has multiple inputs
       and a single output, there may be cases where frames are
       dropped due to transmit resource contention. This counter is
       incremented whenever a frame is dropped by the OAM layer.
       When this counter is incremented, no other counters in this
       MIB are incremented.

       Discontinuities of this counter can occur at re-initialization
       of the management system, and at other times as indicated by
       the value of the ifCounterDiscontinuityTime. "
     REFERENCE   "[802.3ah], 30.3.6.1.46."
     ::= { dot3OamStatsEntry 17 }

  --
  -- Ethernet OAM Event group

--

dot3OamEventConfigTable OBJECT-TYPE
  SYNTAX   SEQUENCE OF Dot3OamEventConfigEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "Ethernet OAM includes the ability to generate and receive
    event notifications to indicate various link problems. This
    table contains the mechanisms to configure the thresholds to
    generate the standard Ethernet OAM events.

    These events are:
      - Errored Symbol Period Event. Generated when the number of
        symbol errors exceeds a threshold within a given window
        defined by a number of symbols (e.g. 1,000 symbols out of
        1,000,000 had errors).
      - Errored Frame Period Event. Generated when the number of
        frame errors exceeds a threshold within a given window
        defined by a number of frames (e.g. 10 frames out of 1000
        had errors).
      - Errored Frame Event. Generated when the number of frame
        errors exceeds a threshold within a given window defined
        by a period of time (e.g. 10 frames in 1 second had
        errors).
      - Errored Frame Seconds Summary Event. Generated when the
        number of errored frame seconds exceeds a threshold within
        a given time period (e.g. 10 errored frame seconds within
        the last 100 seconds). An errored frame second is defined
        as a 1 second interval which had >0 frame errors.
    "
  ::= { dot3OamMIB 5 }

dot3OamEventConfigEntry OBJECT-TYPE
  SYNTAX   Dot3OamEventConfigEntry
  MAX-ACCESS not-accessible
  STATUS   current
  DESCRIPTION
    "Event configuration information is available for every
    Ethernet like interface that supports OAM and the event
    function of OAM as indicated in the dot3OamFunctionsSupported
    attribute.

    Event configuration controls when the local management entity
    sends Event Notification OAMPDUs to its OAM peer. "
  INDEX   { ifIndex }
  ::= { dot3OamEventConfigTable 1 }

```
   Dot3OamEventConfigEntry ::=
```

```
    SEQUENCE {
            dot3OamErrSymPeriodWindow          Dot3OamUnsigned64,
            dot3OamErrSymPeriodThreshold       Dot3OamUnsigned64,
            dot3OamErrSymPeriodEvNotifEnable   INTEGER,
            dot3OamErrFramePeriodWindow        Unsigned32,
            dot3OamErrFramePeriodThreshold     Unsigned32,
            dot3OamErrFramePeriodEvNotifEnable INTEGER,
            dot3OamErrFrameWindow              Unsigned32,
            dot3OamErrFrameThreshold           Unsigned32,
            dot3OamErrFrameEvNotifEnable       INTEGER,
            dot3OamErrFrameSecsSummaryWindow   Integer32,
            dot3OamErrFrameSecsSummaryThreshold Integer32,
            dot3OamErrFrameSecsEvNotifEnable   INTEGER
          }

dot3OamErrSymPeriodWindow OBJECT-TYPE
  SYNTAX       Dot3OamUnsigned64
  MAX-ACCESS   read-write
  STATUS       current
  DESCRIPTION
    "The number of symbols over which the threshold is defined.

    If dot3OamErrSymPeriodThreshold symbol errors occur within a
    window of dot3OamErrSymPeriodWindow symbols, an Event
    Notification OAMPDU should be generated with an Errored Symbol
    Period Event TLV indicating the threshold has been crossed in
    this window.  "
  REFERENCE   "[802.3ah], 30.3.6.1.34"
  ::= { dot3OamEventConfigEntry 1 }

dot3OamErrSymPeriodThreshold OBJECT-TYPE
  SYNTAX       Dot3OamUnsigned64
  MAX-ACCESS   read-write
  STATUS       current
  DESCRIPTION
    "The number of symbols errors that must occur for this event
    to be triggered.

    If dot3OamErrSymPeriodThreshold symbol errors occur within a
    window of dot3OamErrSymPeriodWindow symbols, an Event
    Notification OAMPDU should be generated with an Errored Symbol
    Period Event TLV indicating the threshold has been crossed in
    this window.  "
  REFERENCE   "[802.3ah], 30.3.6.1.34"
  ::= { dot3OamEventConfigEntry 2 }

dot3OamErrSymPeriodEvNotifEnable OBJECT-TYPE
  SYNTAX       INTEGER { enabled(1), disabled(2) }
```

MAX-ACCESS read-write

      STATUS   current
      DESCRIPTION
        "Indicates whether the occurence of Errored Symbol Period
        Events should result in Event Notification OAMPDUs generated
        by the OAM layer.

        By default, this object should have the value enabled(1) for
        Ethernet like interfaces that support OAM. If the OAM layer
        does not support event notifications (as indicated via the
        dot3OamFunctionsSupported attribute), this value is ignored.
        "
      REFERENCE   "N/A"
      ::= { dot3OamEventConfigEntry 3 }

   dot3OamErrFramePeriodWindow OBJECT-TYPE
      SYNTAX   Unsigned32
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
        "The number of frames over which the threshold is defined.

        If dot3OamErrFramePeriodThreshold frame errors occur within a
        window of dot3OamErrFramePeriodWindow frames, an Event
        Notification OAMPDU should be generated with an Errored Frame
        Period Event TLV indicating the threshold has been crossed in
        this window. "
      REFERENCE   "[802.3ah], 30.3.6.1.38"
      ::= { dot3OamEventConfigEntry 4 }

   dot3OamErrFramePeriodThreshold OBJECT-TYPE
      SYNTAX   Unsigned32
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
        "The number of frame errors that must occur for this event to
        be triggered.

        If dot3OamErrFramePeriodThreshold frame errors occur within a
        window of dot3OamErrFramePeriodWindow frames, an Event
        Notification OAMPDU should be generated with an Errored Frame
        Period Event TLV indicating the threshold has been crossed in
        this window. "
      REFERENCE   "[802.3ah], 30.3.6.1.38"
      ::= { dot3OamEventConfigEntry 5 }

   dot3OamErrFramePeriodEvNotifEnable OBJECT-TYPE
      SYNTAX   INTEGER { enabled(1), disabled(2) }
      MAX-ACCESS read-write

STATUS   current

    DESCRIPTION
      "Indicates whether the occurence of an Errored Frame Period
      Event should result in an Event Notification OAMPDU generated
      by the OAM layer.

      By default, this object should have the value enabled(1) for
      Ethernet like interfaces that support OAM. If the OAM layer
      does not support event notifications (as indicated via the
      dot3OamFunctionsSupported attribute), this value is ignored. "
    REFERENCE   "N/A"
    ::= { dot3OamEventConfigEntry 6 }

dot3OamErrFrameWindow OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS   read-write
    STATUS   current
    DESCRIPTION
      "The amount of time (in 100ms increments) over which the
      threshold is defined.

     If dot3OamErrFrameThreshold frame errors occur within a window
     of dot3OamErrFrameWindow seconds (measured in tenths of
     seconds), an Event Notification OAMPDU should be generated with
     an Errored Frame Event TLV indicating the threshold has been
     crossed in this window. "
    REFERENCE   "[802.3ah], 30.3.6.1.36"
    ::= { dot3OamEventConfigEntry 7 }

dot3OamErrFrameThreshold OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS   read-write
    STATUS   current
    DESCRIPTION
      "The number of frame errors that must occur for this event to
      be triggered.

      If dot3OamErrFrameThreshold frame errors occur within a window
      of dot3OamErrFrameWindow (in tenths of seconds), an Event
      Notification OAMPDU should be generated with an Errored Frame
      Event TLV indicating the threshold has been crossed in this
      window. "
    REFERENCE   "[802.3ah], 30.3.6.1.36"
    ::= { dot3OamEventConfigEntry 8 }

dot3OamErrFrameEvNotifEnable OBJECT-TYPE
    SYNTAX   INTEGER { enabled(1), disabled(2) }
    MAX-ACCESS   read-write

```
        STATUS        current
```

      DESCRIPTION
        "Indicates whether the occurence of an Errored Frame Event
        should result in an Event Notification OAMPDU generated by the
        OAM layer.

        By default, this object should have the value enabled(1) for
        Ethernet like interfaces that support OAM. If the OAM layer
        does not support event notifications (as indicated via the
        dot3OamFunctionsSupported attribute), this value is ignored. "
      REFERENCE   "N/A"
      ::= { dot3OamEventConfigEntry 9 }

  dot3OamErrFrameSecsSummaryWindow OBJECT-TYPE
      SYNTAX   Integer32 (100..9000)
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
        "The amount of time (in 100ms intervals) over which the
        threshold is defined.

        If dot3OamErrFrameSecsSummaryThreshold frame errors occur
        within a window of dot3OamErrFrameSecsSummaryWindow (in tenths
        of seconds), an Event Notification OAMPDU should be generated
        with an Errored Frame Seconds Summary Event TLV indicating the
        threshold has been crossed in this window. "
      REFERENCE   "[802.3ah], 30.3.6.1.40"
      ::= { dot3OamEventConfigEntry 10 }

  dot3OamErrFrameSecsSummaryThreshold OBJECT-TYPE
      SYNTAX   Integer32 (1..900)
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
        "The number of errored frame seconds that must occur for this
        event to be triggered.

        If dot3OamErrFrameSecsSummaryThreshold frame errors occur
        within a window of dot3OamErrFrameSecsSummaryWindow (in tenths
        of seconds), an Event Notification OAMPDU should be generated
        with an Errored Frame Seconds Summary Event TLV indicating the
        threshold has been crossed in this window. "
      REFERENCE   "[802.3ah], 30.3.6.1.40"
      ::= { dot3OamEventConfigEntry 11 }

  dot3OamErrFrameSecsEvNotifEnable OBJECT-TYPE
      SYNTAX   INTEGER { enabled(1), disabled(2) }
      MAX-ACCESS read-write
      STATUS   current

DESCRIPTION

     "Indicates whether the occurence of an Errored Frame Seconds
     Summary Event should result in an Event Notification OAMPDU
     generated by the OAM layer.

     By default, this object should have the value enabled(1) for
     Ethernet like interfaces that support OAM. If the OAM layer
     does not support event notifications (as indicated via the
     dot3OamFunctionsSupported attribute), this value is ignored."
   REFERENCE   "N/A"
   ::= { dot3OamEventConfigEntry 12 }

--
-- Ethernet OAM Event Status group
--

dot3OamEventStatusTable   OBJECT-TYPE
   SYNTAX   SEQUENCE OF Dot3OamEventStatusEntry
   MAX-ACCESS   not-accessible
   STATUS   current
   DESCRIPTION
     "OAM event status information for a particular Ethernet-like
     interface. These objects will contain the most recently
     transmitted or received TLV event.

     There is a strict one-to-one relation between entries in this
     table and entries in the dot3OamTable. "
   ::= { dot3OamMIB 6 }

dot3OamEventStatusEntry OBJECT-TYPE
   SYNTAX   Dot3OamEventStatusEntry
   MAX-ACCESS not-accessible
   STATUS   current
   DESCRIPTION "An entry in the dot3OamEventStatusTable."
   INDEX   { ifIndex }
   ::= { dot3OamEventStatusTable 1 }

Dot3OamEventStatusEntry ::=
   SEQUENCE {
     -- Local events
     dot3OamLclErrSymPeriodTime   TimeStamp,
     dot3OamLclErrSymPeriodData   Dot3OamEventTLVData,
     dot3OamLclErrFramePeriodTime   TimeStamp,
     dot3OamLclErrFramePeriodData   Dot3OamEventTLVData,
     dot3OamLclErrFrameTime   TimeStamp,
     dot3OamLclErrFrameData   Dot3OamEventTLVData,
     dot3OamLclErrFrameSecsSumTime   TimeStamp,

```
        dot3OamLclErrFrameSecsSumData       Dot3OamEventTLVData,
```

```
      dot3OamLclErrEventFlagsTime          TimeStamp,
      dot3OamLclErrEventFlagsData          BITS,
      dot3OamLclErrEventOtherTime          TimeStamp,
      dot3OamLclErrEventOtherData          OCTET STRING,

      -- Remote events
      dot3OamRmtErrSymPeriodTime           TimeStamp,
      dot3OamRmtErrSymPeriodData           Dot3OamEventTLVData,
      dot3OamRmtErrFramePeriodTime         TimeStamp,
      dot3OamRmtErrFramePeriodData         Dot3OamEventTLVData,
      dot3OamRmtErrFrameTime               TimeStamp,
      dot3OamRmtErrFrameData               Dot3OamEventTLVData,
      dot3OamRmtErrFrameSecsSumTime        TimeStamp,
      dot3OamRmtErrFrameSecsSumData        Dot3OamEventTLVData,
      dot3OamRmtErrEventFlagsTime          TimeStamp,
      dot3OamRmtErrEventFlagsData          BITS,
      dot3OamRmtErrEventOtherTime          TimeStamp,
      dot3OamRmtErrEventOtherData          OCTET STRING
    }


dot3OamLclErrSymPeriodTime      OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The time at which the last Errored Symbol Period Event
    occurred locally.  "
  REFERENCE   "[802.3ah], 30.3.6.1.35 and 57.5.3.1."
  ::= { dot3OamEventStatusEntry 1 }

dot3OamLclErrSymPeriodData  OBJECT-TYPE
  SYNTAX      Dot3OamEventTLVData
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "A sequence of six integers corresponding to the respective
    fields in the most recently transmitted Errored Symbol Period
    Event TLV in an Event Notification OAMPDU.  "
  REFERENCE   "[802.3ah], 30.3.6.1.35 and 57.5.3.1."
  ::= { dot3OamEventStatusEntry 2 }

dot3OamLclErrFramePeriodTime      OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The time at which the last Errored Frame Period Event
```

occurred locally. "

   REFERENCE   "[802.3ah], 30.3.6.1.39 and 57.5.3.3."
   ::= { dot3OamEventStatusEntry 3 }

dot3OamLclErrFramePeriodData OBJECT-TYPE
   SYNTAX   Dot3OamEventTLVData
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently transmitted Errored Frame Period
     Event TLV in an Event Notification OAMPDU."
   REFERENCE   "[802.3ah], 30.3.6.1.39 and 57.5.3.3."
   ::= { dot3OamEventStatusEntry 4 }

dot3OamLclErrFrameTime   OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The time at which the last Errored Frame Event occurred
     locally. "
   REFERENCE   "[802.3ah], 30.3.6.1.37 and 57.5.3.2."
   ::= { dot3OamEventStatusEntry 5 }

dot3OamLclErrFrameData OBJECT-TYPE
   SYNTAX   Dot3OamEventTLVData
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently transmitted Errored Frame Event
     TLV in an Event Notification OAMPDU."
   REFERENCE   "[802.3ah], 30.3.6.1.37 and 57.5.3.2."
   ::= { dot3OamEventStatusEntry 6 }

dot3OamLclErrFrameSecsSumTime OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The time at which the last Errored Frame Seconds Summary
     Event occurred locally. "
   REFERENCE   "[802.3ah], 30.3.6.1.36 and 57.5.3.4."
   ::= { dot3OamEventStatusEntry 7 }

dot3OamLclErrFrameSecsSumData OBJECT-TYPE
   SYNTAX   Dot3OamEventTLVData
   MAX-ACCESS read-only

STATUS   current

   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently transmitted Errored Frame Seconds
     Summary Event TLV in an Event Notification OAMPDU."
   REFERENCE   "[802.3ah], 30.3.6.1.36 and 57.5.3.4."
   ::= { dot3OamEventStatusEntry 8 }

dot3OamLclErrEventFlagsTime OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The time at which the flag field in outgoing OAMPDUs changed.
     "
   REFERENCE   "[802.3ah], 30.3.6.1.10"
   ::= { dot3OamEventStatusEntry 9 }

dot3OamLclErrEventFlagsData OBJECT-TYPE
   SYNTAX   BITS {
                 linkFault (0),
                 dyingGasp(1),
                 miscCritical(2)
               }
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The value of the OAM event flags on the most recently
     generated OAMPDU. These flags are used to signal critical
     events to an OAM peer entity. "
   REFERENCE   "[802.3ah], 30.3.6.1.10"
   ::= { dot3OamEventStatusEntry 10 }

dot3OamLclErrEventOtherTime OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS read-only
   STATUS   current
   DESCRIPTION
     "The time at which the last non-802.3 define link event
     occurred.

     The 802.3ah OAM protocol allows for organization specific
     events to be defined by any organization. Whenever a
     non-802.3 defined link event occurs, this timestamp is updated
     to reflect that occurrence. "
   REFERENCE   "[802.3ah], 57.5.3.5"
   ::= { dot3OamEventStatusEntry 11 }

dot3OamLclErrEventOtherData OBJECT-TYPE

```
        SYNTAX      OCTET STRING ( SIZE(3..255) )
```

```
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The value of the data field for the most recent Organization
    Specific link event occuring on the interface.  The
    information syntax is defined by the vendor specified in the
    OUI field (the first 3 octets) of the data.  "
  REFERENCE   "[802.3ah], 57.5.3.5"
  ::= { dot3OamEventStatusEntry 12 }

dot3OamRmtErrSymPeriodTime  OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The time at which the last Errored Symbol Period TLV was
    received in a unique Event Notification OAMPDU, indicating
    receipt of a notification about a remote Errored Symbol Period
    Event.  "
  REFERENCE   "[802.3ah], 30.3.6.1.42 and 57.5.3.1."
  ::= { dot3OamEventStatusEntry 13 }

dot3OamRmtErrSymPeriodData  OBJECT-TYPE
  SYNTAX      Dot3OamEventTLVData
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "A sequence of six integers corresponding to the respective
    fields in the most recently received Errored Symbol Period
    Event TLV in an Event Notification OAMPDU."
  REFERENCE   "[802.3ah], 30.3.6.1.42 and 57.5.3.1."
  ::= { dot3OamEventStatusEntry 14 }

dot3OamRmtErrFramePeriodTime  OBJECT-TYPE
  SYNTAX      TimeStamp
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The time at which the last Errored Frame Period TLV was
    received in a unique Event Notification OAMPDU, indicating
    receipt of a notification about a remote Errored Frame Period
    Event.  "
  REFERENCE   "[802.3ah], 30.3.6.1.44 and 57.5.3.3."
  ::= { dot3OamEventStatusEntry 15 }

dot3OamRmtErrFramePeriodData OBJECT-TYPE
  SYNTAX      Dot3OamEventTLVData
  MAX-ACCESS  read-only
```

STATUS   current

   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently received Errored Frame Period
     Event TLV in an Event Notification OAMPDU."
   REFERENCE   "[802.3ah], 30.3.6.1.44 and 57.5.3.3."
   ::= { dot3OamEventStatusEntry 16 }

dot3OamRmtErrFrameTime OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "The time at which the last Errored Frame TLV was received in
     a unique Event Notification OAMPDU, indicating receipt of a
     notification about a remote Errored Frame Event. "
   REFERENCE   "[802.3ah], 30.3.6.1.43 and 57.5.3.2."
   ::= { dot3OamEventStatusEntry 17 }

dot3OamRmtErrFrameData OBJECT-TYPE
   SYNTAX   Dot3OamEventTLVData
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently received Errored Frame Event TLV
     in an Event Notification OAMPDU."
   REFERENCE   "[802.3ah], 30.3.6.1.43 and 57.5.3.2."
   ::= { dot3OamEventStatusEntry 18 }

dot3OamRmtErrFrameSecsSumTime OBJECT-TYPE
   SYNTAX   TimeStamp
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "The time at which the last Errored Frame Seconds Summary TLV
     was received in a unique Event Notification OAMPDU, indicating
     receipt of a notification about a remote Errored Frame Seconds
     Summary Event. "
   REFERENCE   "[802.3ah], 30.3.6.1.45 and 57.5.3.4."
   ::= { dot3OamEventStatusEntry 19 }

dot3OamRmtErrFrameSecsSumData OBJECT-TYPE
   SYNTAX   Dot3OamEventTLVData
   MAX-ACCESS   read-only
   STATUS   current
   DESCRIPTION
     "A sequence of six integers corresponding to the respective
     fields in the most recently received Errored Frame Seconds

Summary Event TLV in an Event Notification OAMPDU."

```
   REFERENCE    "[802.3ah], 30.3.6.1.45 and 57.5.3.4."
   ::= { dot3OamEventStatusEntry 20 }

dot3OamRmtErrEventFlagsTime  OBJECT-TYPE
   SYNTAX       TimeStamp
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
     "The time at which the flags field in incoming OAMPDUs last
     changed.
     "
   REFERENCE    "[802.3ah], 30.3.6.1.10"
   ::= { dot3OamEventStatusEntry 21 }

dot3OamRmtErrEventFlagsData OBJECT-TYPE
   SYNTAX       BITS {
                  linkFault (0),
                  dyingGasp(1),
                  miscCritical(2)
                }
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
     "The value of the OAM event flags on the most recently
     received OAMPDU.  These flags are used to signal critical
     events to an OAM peer entity.  "
   REFERENCE    "[802.3ah], 30.3.6.1.10"
   ::= { dot3OamEventStatusEntry 22 }

dot3OamRmtErrEventOtherTime  OBJECT-TYPE
   SYNTAX       TimeStamp
   MAX-ACCESS   read-only
   STATUS       current
   DESCRIPTION
     "The time at which the last non-802.3 defined link event
     TLV was received.

     The 802.3ah OAM protocol allows for organization specific
     events to be defined by any organization.  Whenever an
     Organization Specific Link Event TLV is received in a Event
     OAMPDU, this timestamp is updated to reflect the occurrence."
   REFERENCE    "[802.3ah], 57.5.3.5"
   ::= { dot3OamEventStatusEntry 23 }

dot3OamRmtErrEventOtherData OBJECT-TYPE
   SYNTAX       OCTET STRING ( SIZE(3..255) )
   MAX-ACCESS   read-only
   STATUS       current
```

DESCRIPTION

       "The value of the data field for the most recent Organization
       Specific Link Event TLV received on the interface. The
       information syntax is defined by the vendor specified in the
       OUI field (the first 3 octets) of the data. "
     REFERENCE   "[802.3ah], 57.5.3.5"
     ::= { dot3OamEventStatusEntry 24 }

--
-- Ethernet OAM Notifications
--

dot3OamTraps OBJECT IDENTIFIER ::= { dot3OamMIB 7 }
dot3OamTrapsPrefix OBJECT IDENTIFIER ::= {dot3OamTraps 0}

dot3OamLclErrSymPeriod NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamLclErrSymPeriodData
            }
   STATUS current
   DESCRIPTION
      "A dot3OamLclErrSymPeriod trap is sent when the value of the
      dot3OamLclErrSymPeriodTime changes for an Ethernet like
      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that too many symbol errors have occured on the specified
      interface, resulting in an Event Notification OAMPDU to a peer
      and trap to the management entity.

      The management entity should periodically check the value of
      dog3LclErrSymPeriodTime to detect any missed
      dot3OamErrSymPeriod trap-events. "
  ::= { dot3OamTrapsPrefix 1 }

dot3OamLclErrFramePeriod NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamLclErrFramePeriodData
            }
   STATUS current
   DESCRIPTION
      "A dot3OamLclErrFramePeriod trap is sent when the value of the
      dot3OamLclErrFramePeriodTime changes for an Ethernet like
      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that too many frame errors have occured on the specified
      interface, resulting in an Event Notification OAMPDU to a peer

      and trap to the management entity.

      The management entity should periodically check the value of
      dog3LclErrFramePeriodTime to detect any missed
      dot3OamErrFramePeriod trap-events. "
   ::= { dot3OamTrapsPrefix 2 }

dot3OamLclErrFrame NOTIFICATION-TYPE
   OBJECTS { ifIndex,
             dot3OamLclErrFrameData
           }
   STATUS current
   DESCRIPTION
     "A dot3OamLclErrFrame trap is sent when the value of the
     dot3OamLclErrFrameTime changes for an Ethernet like interface
     supporting Ethernet OAM.

     This trap can be utilized to indicate to a management system
     that too many frame errors have occured on the specified
     interface, resulting in an Event Notification OAMPDU to a peer
     and trap to the management entity.

     The management entity should periodically check the value of
     dog3LclErrFrameTime to detect any missed dot3OamErrFrame
     trap-events. "
   ::= { dot3OamTrapsPrefix 3 }

dot3OamLclErrFrameSecsSum NOTIFICATION-TYPE
   OBJECTS { ifIndex,
             dot3OamLclErrFrameSecsSumData
           }
   STATUS current
   DESCRIPTION
     "A dot3OamLclErrFrameSecsSum trap is sent when the value of
     the dot3OamLclErrFrameSecsSumTime changes for an Ethernet like
     interface supporting Ethernet OAM.

     This trap can be utilized to indicate to a management system
     that too many errored frame seconds have occured on the
     specified interface, resulting in an Event Notification OAMPDU
     to a peer and trap to the management entity.

     The management entity should periodically check the value of
     dog3LclErrFrameSecsSumTime to detect any missed
     dot3OamErrFrameSecsSum trap-events. "

   ::= { dot3OamTrapsPrefix 4 }

dot3OamLclErrEventFlags NOTIFICATION-TYPE

    OBJECTS { ifIndex,
               dot3OamLclErrEventFlagsData
             }
    STATUS current
    DESCRIPTION
      "A dot3OamLclErrEventFlags trap is sent when the value of
      the dot3OamLclErrEventFlagsTime changes for an Ethernet like
      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that a critical link event has been signaled by the sending
      entity on the given interface. The value of the
      dot3OamLclErrEventFlagsData provides additional details on the
      critical event.

      The management entity should periodically check the value of
      dog3LclErrEventFlagsTime to detect any missed
      dot3OamEventFlags trap-events. "
   ::= { dot3OamTrapsPrefix 5 }

dot3OamLclErrEventOther NOTIFICATION-TYPE
    OBJECTS { ifIndex,
               dot3OamLclErrEventOtherData
             }
    STATUS current
    DESCRIPTION
      "A dot3OamLclErrEventOther trap is sent when the value of
      the dot3OamLclErrEventOtherTime changes for an Ethernet like
      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that an organization specific link event has occurred on the
      specified interface. The value of the
      dot3OamLclErrEventOtherData provides additional details on the
      organization specific link event.

      The management entity should periodically check the value of
      dog3LclErrEventOtherTime to detect any missed
      dot3OamEventOther trap-events. "
   ::= { dot3OamTrapsPrefix 6 }

dot3OamRmtErrSymPeriod NOTIFICATION-TYPE
    OBJECTS { ifIndex,
               dot3OamRmtErrSymPeriodData
             }
    STATUS current
    DESCRIPTION
      "A dot3OamRmtErrSymPeriod trap is sent when the value of the

dot3OamRmtErrSymPeriodTime changes for an Ethernet like

      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that a Event Notification OAMPDU has been received on the
      specified interface indicating an Errored Symbol Period Event
      on the OAM peer entity.

      The management entity should periodically check the value of
      dog3RmtErrSymPeriodTime to detect any missed
      dot3OamErrSymPeriod trap-events. "
   ::= { dot3OamTrapsPrefix 7 }

dot3OamRmtErrFramePeriod NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamRmtErrFramePeriodData
            }
   STATUS current
   DESCRIPTION
      "A dot3OamRmtErrFramePeriod trap is sent when the value of the
      dot3OamRmtErrFramePeriodTime changes for an Ethernet like
      interface supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that a Event Notification OAMPDU has been received on the
      specified interface indicating an Errored Frame Period Event
      on the OAM peer entity.

      The management entity should periodically check the value of
      dog3RmtErrFramePeriodTime to detect any missed
      dot3OamErrFramePeriod trap-events. "
   ::= { dot3OamTrapsPrefix 8 }

dot3OamRmtErrFrame NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamRmtErrFrameData
            }
   STATUS current
   DESCRIPTION
      "A dot3OamRmtErrFrame trap is sent when the value of the
      dot3OamRmtErrFrameTime changes for an Ethernet like interface
      supporting Ethernet OAM.

      This trap can be utilized to indicate to a management system
      that a Event Notification OAMPDU has been received on the
      specified interface indicating an Errored Frame Event on the
      OAM peer entity.

      The management entity should periodically check the value of
      dog3RmtErrFrameTime to detect any missed dot3OamErrFrame

```
     trap-events. "
  ::= { dot3OamTrapsPrefix 9 }

dot3OamRmtErrFrameSecsSum NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamRmtErrFrameSecsSumData
           }
   STATUS  current
   DESCRIPTION
     "A dot3OamRmtErrFrameSecsSum trap is sent when the value of
     the dot3OamRmtErrFrameSecsSumTime changes for an Ethernet like
     interface supporting Ethernet OAM.

     This trap can be utilized to indicate to a management system
     that a Event Notification OAMPDU has been received on the
     specified interface indicating an Errored Frame Seconds
     Summary Event on the OAM peer entity.

     The management entity should periodically check the value of
     dog3RmtErrFrameSecsSumTime to detect any missed
     dot3OamErrFrameSecsSum trap-events. "

  ::= { dot3OamTrapsPrefix 10 }

dot3OamRmtErrEventFlags NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamRmtErrEventFlagsData
           }
   STATUS  current
   DESCRIPTION
     "A dot3OamRmtErrEventFlags trap is sent when the value of
     the dot3OamRmtErrEventFlagsTime changes for an Ethernet like
     interface supporting Ethernet OAM.

     This trap can be utilized to indicate to a management system
     that a Event Notification OAMPDU has been received on the
     specified interface indicating a change in the critical event
     flags carried in the Flags field of the OAMPDU.

     The management entity should periodically check the value of
     dog3RmtErrEventFlagsTime to detect any missed
     dot3OamEventFlags trap-events. "
  ::= { dot3OamTrapsPrefix 11 }

dot3OamRmtErrEventOther NOTIFICATION-TYPE
   OBJECTS { ifIndex,
              dot3OamRmtErrEventOtherData
           }
   STATUS  current
```

  DESCRIPTION
    "A dot3OamRmtErrEventOther trap is sent when the value of
    the dot3OamRmtErrEventOtherTime changes for an Ethernet like
    interface supporting Ethernet OAM.

    This trap can be utilized to indicate to a management system
    that an organization specific link event has been received on
    the speified interface indicating an Organization Specific
    Link Event has occurred on the OAM Peer entity.

    The management entity should periodically check the value of
    dog3RmtErrEventOtherTime to detect any missed
    dot3OamRmtErrEventOther trap-events. "
 ::= { dot3OamTrapsPrefix 12 }

--
-- Ethernet OAM Compliance group
--

dot3OamGroups OBJECT IDENTIFIER ::= { dot3OamConformance 1 }
dot3OamCompliances OBJECT IDENTIFIER ::= { dot3OamConformance 2 }

-- Compliance statements

dot3OamCompliance MODULE-COMPLIANCE
  STATUS   current
  DESCRIPTION "The compliance statement for managed entities
               supporting OAM on Ethernet like interfaces.
               "
MODULE   -- this module
  MANDATORY-GROUPS { dot3OamControlGroup,
                     dot3OamPeerGroup,
                     dot3OamStatsBaseGroup
                   }

  GROUP   dot3OamLoopbackGroup
  DESCRIPTION
    "This group is mandatory for all IEEE 802.3 OAM
    implementations that support loopback functionality. "

  GROUP   dot3OamErrSymbolPeriodEventGroup
  DESCRIPTION
    "This group is mandatory for all IEEE 802.3 OAM
    implementations that support event functionality. "

```
     GROUP         dot3OamErrFramePeriodEventGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support event functionality. "

     GROUP         dot3OamErrFrameEventGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support event functionality. "

     GROUP         dot3OamErrFrameSecsSummaryEventGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support event functionality. "

     GROUP         dot3OamEventFlagsGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support criticle event functionality. "

     GROUP         dot3OamEventOtherGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support Organization Specific Event
       signaling.  "

     GROUP         dot3OamNotificationGroup
     DESCRIPTION
       "This group is mandatory for all IEEE 802.3 OAM
       implementations that support criticle event functionality. "

     ::= { dot3OamCompliances 1}


dot3OamControlGroup OBJECT-GROUP
     OBJECTS      {  dot3OamRowStatus,
                     dot3OamAdminState,
                     dot3OamOperStatus,
                     dot3OamMode,
                     dot3OamMaxOamPduSize,
                     dot3OamConfigRevision,
                     dot3OamFunctionsSupported
                  }
     STATUS      current
     DESCRIPTION
       "A collection of objects providing the abilities,
       configuration, and status of an Ethernet OAM entity.  "
     ::= { dot3OamGroups 1 }
```

dot3OamPeerGroup OBJECT-GROUP
    OBJECTS   { dot3OamPeerRowStatus,
                    dot3OamPeerMacAddress,
                    dot3OamPeerVendorOui,
                    dot3OamPeerVendorInfo,
                    dot3OamPeerMode,
                    dot3OamPeerFunctionsSupported,
                    dot3OamPeerMaxOamPduSize,
                    dot3OamPeerConfigRevision
                 }
   STATUS   current
   DESCRIPTION
     "A collection of objects providing the abilities,
      configuration, and status of a peer Ethernet OAM entity. "
   ::= { dot3OamGroups 2 }

dot3OamStatsBaseGroup OBJECT-GROUP
    OBJECTS   { dot3OamInformationTx,
                    dot3OamInformationRx,
                    dot3OamUniqueEventNotificationTx,
                    dot3OamUniqueEventNotificationRx,
                    dot3OamDuplicateEventNotificationTx,
                    dot3OamDuplicateEventNotificationRx,
                    dot3OamLoopbackControlTx,
                    dot3OamLoopbackControlRx,
                    dot3OamVariableRequestTx,
                    dot3OamVariableRequestRx,
                    dot3OamVariableResponseTx,
                    dot3OamVariableResponseRx,
                    dot3OamOrgSpecificTx,
                    dot3OamOrgSpecificRx,
                    dot3OamUnsupportedCodesTx,
                    dot3OamUnsupportedCodesRx,
                    dot3OamFramesLostDueToOam
                 }
   STATUS   current
   DESCRIPTION
     "A collection of objects providing the statistics for the
      number of various transmit and recieve events for OAM on an
      Ethernet like interface. Note that all of these counters must
      be supported even if the related function (as described in
      dot3OamFunctionsSupported) is not supported. "
   ::= { dot3OamGroups 3 }

dot3OamLoopbackGroup OBJECT-GROUP
    OBJECTS   { dot3OamLoopbackCommand,
                    dot3OamLoopbackStatus,
                    dot3OamLoopbackIgnoreRx

```
                         }
```

       STATUS   current
       DESCRIPTION
         "A collection of objects for controlling the OAM remote
          loopback function.   "
       ::= { dot3OamGroups 4 }

   dot3OamErrSymbolPeriodEventGroup OBJECT-GROUP
        OBJECTS   {   dot3OamErrSymPeriodWindow,
                         dot3OamErrSymPeriodThreshold,
                         dot3OamErrSymPeriodEvNotifEnable,
                         dot3OamLclErrSymPeriodTime,
                         dot3OamLclErrSymPeriodData,
                         dot3OamRmtErrSymPeriodTime,
                         dot3OamRmtErrSymPeriodData
                     }
       STATUS   current
       DESCRIPTION
         "A collection of objects for configuring the thresholds for an
          Errored Symbol Period Event and maintaining the event
          information.   "
       ::= { dot3OamGroups 5 }

   dot3OamErrFramePeriodEventGroup OBJECT-GROUP
        OBJECTS   {   dot3OamErrFramePeriodWindow,
                         dot3OamErrFramePeriodThreshold,
                         dot3OamErrFramePeriodEvNotifEnable,
                         dot3OamLclErrFramePeriodTime,
                         dot3OamLclErrFramePeriodData,
                         dot3OamRmtErrFramePeriodTime,
                         dot3OamRmtErrFramePeriodData
                     }
       STATUS   current
       DESCRIPTION
         "A collection of objects for configuring the thresholds for an
          Errored Frame Period Event and maintaining the event
          information.   "
       ::= { dot3OamGroups 6 }

   dot3OamErrFrameEventGroup OBJECT-GROUP
        OBJECTS   {   dot3OamErrFrameWindow,
                         dot3OamErrFrameThreshold,
                         dot3OamErrFrameEvNotifEnable,
                         dot3OamLclErrFrameTime,
                         dot3OamLclErrFrameData,
                         dot3OamRmtErrFrameTime,
                         dot3OamRmtErrFrameData
                     }
       STATUS   current

DESCRIPTION

      "A collection of objects for configuring the thresholds for an
      Errored Frame Event and maintaining the event information. "
    ::= { dot3OamGroups 7 }

dot3OamErrFrameSecsSummaryEventGroup OBJECT-GROUP
     OBJECTS   { dot3OamErrFrameSecsSummaryWindow,
                    dot3OamErrFrameSecsSummaryThreshold,
                    dot3OamErrFrameSecsEvNotifEnable,
                    dot3OamLclErrFrameSecsSumTime,
                    dot3OamLclErrFrameSecsSumData,
                    dot3OamRmtErrFrameSecsSumTime,
                    dot3OamRmtErrFrameSecsSumData
                 }
    STATUS   current
    DESCRIPTION
      "A collection of objects for configuring the thresholds for an
      Errored Frame Seconds Summary Event and maintaining the event
      information. "
    ::= { dot3OamGroups 8 }

dot3OamEventFlagsGroup OBJECT-GROUP
   OBJECTS {   dot3OamLclErrEventFlagsTime,
               dot3OamLclErrEventFlagsData,
               dot3OamRmtErrEventFlagsTime,
               dot3OamRmtErrEventFlagsData
            }
    STATUS   current
    DESCRIPTION
      "A collection of objects for displayng the status of the event
      flags (link fault, critical, dying gasp) in transmitted and
      received OAMPDUs, reflecting the current status of critical
      event information. "
    ::= { dot3OamGroups 9 }

dot3OamEventOtherGroup OBJECT-GROUP
   OBJECTS {   dot3OamLclErrEventOtherTime,
               dot3OamLclErrEventOtherData,
               dot3OamRmtErrEventOtherTime,
               dot3OamRmtErrEventOtherData
            }
    STATUS   current
    DESCRIPTION
      "A collection of objects for displayng the status of any
      Organization Specific Events that have occurred on the
      Ethernet-like interface. "
    ::= { dot3OamGroups 10 }

dot3OamNotificationGroup NOTIFICATION-GROUP

```
      NOTIFICATIONS {
```

```
                dot3OamLclErrSymPeriod,
                dot3OamLclErrFramePeriod,
                dot3OamLclErrFrame,
                dot3OamLclErrFrameSecsSum,
                dot3OamLclErrEventFlags,
                dot3OamLclErrEventOther,
                dot3OamRmtErrSymPeriod,
                dot3OamRmtErrFramePeriod,
                dot3OamRmtErrFrame,
                dot3OamRmtErrFrameSecsSum,
                dot3OamRmtErrEventFlags,
                dot3OamRmtErrEventOther
            }
    STATUS      current
    DESCRIPTION
       "A collection of notifications used by Ethernet OAM to signal
        to a management entity that local or remote events have occured
        on a specified Ethernet link."
     ::= { dot3OamGroups 11 }


    END
```

7. **Security Considerations**

   The readable objects in this module can provide information about
   network traffic, and therefore may be considered sensitive. In
   particular, OAM provides mechanisms for reading the IEEE 802.3 Clause
   30 MIB attributes from a link partner via a specialized layer two
   protocol. Unlike SNMP, IEEE P802.3ah OAM does not include encryption
   or authorization mechanisms. It should be used in environments where
   either this interface information is not considered sensitive, or
   where the facility terminations are protected. By default, OAM is
   disabled on Ethernet-like interfaces and is therefore not a risk.

   IEEE 802.3ah OAM is designed to support deployment in access and
   enterprise networks. In access networks, one end of a link is the
   CO-side, and the other is the CPE-side, and the facilities are often
   protected in wiring cages or closets. In such deployments, it is
   often the case that the CO-side is protected from access from the CPE
   side. Within IEEE P802.3ah OAM, this protection from remote access
   is accomplished by configuring the CPE-side in passive mode using the
   dot3OamMode attribute. This prevents the CPE from accessing
   functions and information at the CO-side of the connection. In
   enterprise networks, read-only interface information is often
   considered non-sensitive.

   The operation of OAM on an Ethernet interface does not adversely
   affect data traffic as OAM is a slow protocol with very limited
   bandwidth potential, and it is not required for normal link
   operation. And although there are a number of objects in this module
   with read-write or read-create MAX-ACCESS, they only affect the
   operation of the OAM protocol itself and not user data traffic.

   The loopback capability of OAM can have potentially disruptive
   effects in that the when enabling remote loopback, the remote station
   automatically transmits all received traffic back to the local
   station except for OAM traffic. This completely disrupts all higher
   layer protocols such as bridging, IP, and SNMP. Therefore an
   attribute (dot3OamLoopbackIgnoreRx) was introduced to control whether
   the local station processes or ignores received loopback commands.

   SNMP versions prior to SNMPv3 did not include adequate security. Even
   if the network itself is secure (for example by using IPSec), even
   then, there is no control as to who on the secure network is allowed
   to access and GET/SET (read/change/create/delete) the objects in this
   MIB module.

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

   Further, deployment of SNMP versions prior to SNMPv3 is NOT
   RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to
   enable cryptographic security. It is then a customer/operator
   responsibility to ensure that the SNMP entity giving access to an
   instance of this MIB module is properly configured to give access to
   the objects only to those principals (users) that have legitimate
   rights to indeed GET or SET (change/create/delete) them

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