TRILL OAM MIB
draft-deepak-trill-oam-mib-01.txt

Status of this Memo

Copyright Notice

Abstract

   This defines Management Information Base (MIB) for the IETF TRILL
   (Transparent Interconnection of Lots of Links) OAM objects.

Table of Contents

1. Introduction

   The general framework for TRILL OAM is specified in [TRILLOAMFRM].
   The details of the Fault Management [FM] solution, conforming to that
   framework, are presented in [TRILLOAMFM]. The solution leverages the
   message format defined in Ethernet Connectivity Fault Management
   (CFM) [802.1Q] as the basis for the TRILL OAM message channel.

   This document uses the CFM MIB modules defined in [802.1Q] as the
   basis for TRILL OAM MIB, and augments the existing tables to add new
   TRILL managed objects. The document further defines a new table with
   associated managed objects for TRILL OAM specific functionality.

2. The Internet-Standard Management Framework

   For a detailed overview of the Internet-Standard Management
   Framework, please refer to [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 Structure of Management Information (SMI) specification.
This memo specifies a MIB module that is compliant to SMIv2
[RFC2578], [RFC2579] and [RFC2580].

3. Overview

The TRILL-OAM-MIB module is intended to provide an overall framework
for managing TRILL OAM. It leverages the IEEE8021-CFM-MIB and
IEEE8021-CFM-V2-MIB modules defined in [802.1Q], and augments the Mep
and Mep Db entries. It also adds a new table for TRILL OAM specific
messages.

4. Conventions

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].

5. Structure of the MIB module

Objects in this MIB module are arranged into subtrees. Each subtree
is organized as a set of related objects. The various subtrees are
shown below, supplemented with the required elements of the IEEE8021-
CFM-MIB module.

5.1. Textual Conventions

Textual conventions are defined to represent object types relevant to
the TRILL OAM MIB.

5.2. TRILL-OAM-MIB relationship to IEEE8021-TC-MIB

In TRILL, traffic labeling can be done using either a 12-bit VLAN or
a 24-bit fine grain label.

IEEE8021-TC-MIB defines IEEE8021ServiceSelectorType with two values:

- 1 representing a vlanId, and

- 2 representing a 24 bit isid.

We propose to use value 2 for TRILL's fine grain label. As such,
TRILL-OAM-MIB will import IEEE8021ServiceSelectorType,
IEEE8021ServiceSelectorValueOrNone, and IEEE8021ServiceSelectorValue
from IEEE8021-TC-MIB.

5.3. TRILL OAM MIB Tree

    TRILL-OAM-MIB

        |--trillOamNotifications

            |--trillOamFaultAlarm

        |--trillOamMibObjects

            |--trillOamMep

                |--trillOamMepTable

                |--trillOamMepFlowCfgTable

                |--trillOamPtrTable

                |--trillOamMtrTable

                |--trillOamMepDbTable

5.3.1. Notifications

    Notification (fault alarm) is sent to the management entity with the
    OID of the MEP that has detected the fault.

5.3.2. TRILL OAM MIB Per MEP Objects

    The TRILL OAM MIB Per MEP Objects are defined in the
    trillOamMepTable. The trillOamMepTable augments the dot1agCfmMepEntry
    (please see section 6.1) defined in IEEE8021-CFM-MIB. It includes
    objects that are locally defined for an individual MEP and its
    associated Flow.

5.3.2.1. trillOamMepTable Objects

        o trillOamMepRName - This object contains the Rbridge Nickname
        as defined in RFC 6325 section 3.7.

        o trillOamMepPtmTId - indicates the next sequence
        number/transaction identifier to be sent in a Path Trace
        message. The sequence number may be zero because it wraps
        around.

        o trillOamMepNexttMtmTId - indicates the next sequence
        number/transaction identifier to be sent in a Multi-destination
        message. The sequence number may be zero because it wraps

around.

o trillOamMepMepPtrIn - indicates the total number of valid, in-order, Path Trace Replies received.

o trillOamMepPtrInOutofOrder - indicates the total number of valid, out-of-order, Path Trace Replies received.

o trillOamMepPtrOut - indicates the total number of valid Path Trace Replies transmitted.

o trillOamMepMtrIn - indicates the total number of valid, in-order, Multi-destination Replies received.

o trillOamMepMtrInOutofOrder - indicates the total number of valid, out-of-order, Multi-destination Replies received.

o trillOamMepMtrOut - indicates the total number of valid Multi-destination Replies transmitted.

o trillOamMepTxLbmDestRName - indicates the target destination Rbridge NickName as defined in [RFC6325] section 3.7.

o trillOamMepTxLbmHC - indicates the hop count field to be transmitted.

o trillOamMepTxLbmReplyModeOob - True indicates that the Reply Mode of the Loopback message is requested to be out-of-band, and that the "Out of band IP address" TLV is to be transmitted. False indicates that in-band reply is transmitted.

o trillOamMepTransmitLbmReplyIp - indicates the IP address to be transmitted in the "Out of band IP Address TLV" in the Loopback message.

o trillOamMepTxLbmFlowEntropy - indicates the 128 bytes Flow entropy to be transmitted, as defined in [TRILLOAMFM].

o trillOamMepTxPtmDestRName - indicates the target Destination Rbridge Nickname to be transmitted, as defined in [RFC6325] section 3.7.

o trillOamMepTxPtmHC - indicates the hop count field to be transmitted.

o trillOamMepTxPtmReplyModeOob - True indicates that the Reply Mode of the Path Trace message is requested to be out-of-band, and that the "Out of band IP address TLV" is to be transmitted.

False indicates that in-band reply is transmitted.

o trillOamMepTransmitPtmReplyIP - indicates the IP address to be transmitted in the "Out of band IP Address TLV" in the Path Trace message.

o trillOamMepTranmitPtmFlowEntropy - indicates the 128 bytes Flow entropy to be transmitted, as defined in [TRILLOAMFM].

o trillOamMepTxPtmStatus - A Boolean flag set to True by the MEP Path Trace Initiator State Machine or a MIB manager to indicate that another Path trace message is being transmitted. Reset to false by the MEP Initiator State Machine.

o trillOamMepTxPtmResultOK - Indicates the result of the operation, True : The Path Trace Message(s) will be (or has been) sent, False: The Path Trace Message(s) will not be sent.

o trillOamMepTxPtmMessages - The number of Path Trace messages to be transmitted.

o trillOamMepTxPtmSeqNumber - Indicates the Path Trace Transaction Identifier of the first PTM (to be) sent. The value returned is undefined if trillOamMepTxPtmResultOK is false.

o trillOamMepTxMtmTree - Indicates the Multi-destination Tree identifier as defined in RFC6325.

o trillOamMepTxMtmHC - Indicates the hop count field to be transmitted.

o trillOamMepTxMtmReplyModeOob - True indicates that the Reply of the Multi-destination message is requested to be out-of-band, and that the "Out of band IP address TLV" is to be transmitted. False indicates that in-band reply is transmitted.

o trillOamMepTransmitMtmReplyIp - the IP address to be transmitted in the "Out of band IP address TLV" in the Multi-destination message.

o trillOamMepTxMtmFlowEntropy - 128 Byte Flow Entropy to be transmitted, as defined in [TRILL-FM].

o trillOamMepTxMtmStatus - A Boolean flag set to True by the MEP Multi-Destination Initiator State Machine or a MIB manager to indicate that another Multicast trace message is being transmitted. Reset to False by the MEP Initiator State Machine.

o trillOamMepTxMtmResultOK - Indicates the result of the operation: -True The Multi-destination Message(s) will be (or has been) sent. -False The Multi-destination Message(s) will not be sent.

o trillOamMepTxMtmMessages -The number of Multi-Destination Messages to be transmitted.

o trillOamMepTxMtmSeqNumber - The Sequence Number of the first Multi-destination message (to be) sent. The value returned is undefined if trillOamMepTxMtmResultOK is false.

o trillOamMepTxMtmScopeList - The Multi-destination Rbridge Scope list, 2 octets per Rbridge.

5.3.2.2. trillOamMepFlowCfgTable Objects

Each row in this table represents a Flow Configuration Entry for the associated MEP. The table uses four indices. The first three indices are the indices of the Maintenance Domain, MaNet, and MEP tables. The fourth index is the specific Flow Configuration Entry on the selected MEP. Some write-able objects in this table are only applicable in certain cases (as described under each object below), and attempts to write values for them in other cases will be ignored.

o trillOamMepFlowCfgIndex - an index to the TRILL OAM Mep flow configuration table which indicates the specific Flow for the MEP. The index is never reused for other flow sessions on the same MEP while this session is active. The index value keeps increasing until it wraps to 0. This value can also be used in Flow-identifier TLV.

o trillOamMepFlowCfgFlowEntropy - This is 96 bytes of flow entropy as described in [TRILL-FM].

o trillOamMepFlowCfgDestRname - The target Rbridge nickname field to be transmitted as defined in [RFC6325] section 3.7.

o trillOamMepFlowCfgFlowHC - indicates the time to live field to be transmitted.

o trillOamMepFlowCfgRowStatus - indicates the status of row. The write-able columns in a row cannot be changed if the row is active. All columns MUST have a valid value before a row can be activated.

5.3.2.3. trillOamPtrTable Objects

Each row in the table represents a Path Trace Reply Entry for the defined MEP and Transaction. This table uses four indices. The first three indices identify the MEP and the fourth index specifies the Transaction Identifier, and this transaction identifier uniquely identifies the response for a MEP which can have multiple flow.

> o trillOamMepPtrTransactionId - indicates Transaction identifier/sequence number returned by a previous transmit path trace message command, indicating which PTM's response is going to be returned.

> o trillOamPtrHC - indicates hop count field value for a returned PTR.

> o trillOamMepPtrFlag - indicates FCOI field value for a returned PTR.

> o trillOamMepPtrErrorcode - indicates the Return code and Return sub-code value for a returned PTR.

> o trillOamMepPtrTerminalMep - indicates a Boolean value stating whether the forwarded PTM reached a MEP enclosing its MA, as returned in the Terminal MEP flag field.

> o trillOamMepPtrNextEgressIdentifer -An integer field holding the last Egress Identifier returned in the PTR Upstream Rbridge nickname TLV of the PTR. The Last Egress identifies the Upstream Nickname.

> o trillOamMepPtrIngress - The value returned in the Ingress Action field of the PTM. The value ingNoTlv(0) indicates that no Reply Ingress TLV was returned in the PTM.

> o trillOamMepPtrIngressMac - indicates the MAC address returned in the ingress MAC address filed.

> o trillOamMepIngressPortIdSubtype - indicates ingress Port ID. The format of this object is determined by the value of the trillOamMepPtrIngressPortIdSubtype object.

> o trillOamMepIngressPortId - indicates the ingress port ID. The format of this object is determined by the value of the trillOamMepPtrIngressPortId object.

> o trillOamMepPtrEgressPortIdSubtype - indicates the value returned in the Egress Action field of the PTM. The value ingNoTlv(0) indicates that no Reply Egress TLV was returned in the PTM.

   o trillOamMepPtrEgressPortId - indicates the egress port ID.
   The format of this object is determined by the value of
   trillOamMepPtrEgressPortId object.

   o trillOamMepPtrChassisIdSubtype - This object specifies the
   format for the Chassis ID returned in the Sender ID TLV of the
   PTR, if any. This value is ignored if the
   trillOamMepPtrChassiId has a length of 0.

   o trillOamMepPtrChassisId - indicates the chassis ID returned
   in the Sender ID TLV of the PTR, if any. The format of this
   object is determined by the value of the
   trillOamMepPtrChassisIdSubtype object.

   o trillOamMepPtrOrganizationSpecificTlv - indicates all
   Organization specific TLVs returned in the PTR, if any.
   Includes all octets including and following the TLV length
   field of each TLV, concatenated together.

   o trillOaMepPtrNextHopNicknames - indicates Next hop Rbridge
   List TLV returned in the PTR, if any. Includes all octets
   including and following the TLV length concatenated together.

5.3.2.4. trillOamMtrTable Objects

This table includes Multi-destination Reply managed objects. Each row
in the table represents a Multi-destination Reply Entry for the
defined MEP and Transaction. This table uses five indices: The first
three indices are the indices of the Maintenance Domain, MaNet, and
MEP tables. The fourth index is the specific Transaction Identifier
on the selected MEP. The fifth index is the receive order of Multi-
destination replies. Some write-able objects in this table are only
applicable in certain cases (as described under each object below),
and attempts to write a value for them in other cases will be
ignored.

   o trillOamMepMtrTransactionId - indicates Transaction
   identifier/sequence number returned by a previous transmit
   Multi-destination message command, indicating which MTM's
   response is going to be returned.

   o trillOamMepMtrReceiveOrder - indicates an index to
   distinguish among multiple MTR with same same MTR Transaction
   Identifier field value. trillOamMepMtrReceiveOrder are assigned
   sequentially from 1, in the order that the Multi-destination
   Tree Initiator received the MTRs.

o trillOamMepMtrFlag - indicates FCOI field value for a
returned MTR.

o trillOamMepMtrErrorCode - indicates return code and return
sub code value for a returned MTR.

o trillOamMepMtrLastEgressIdentifier - indicates an integer
field holding the Last Egress Identifier returned in the MTR
Upstream Rbridge Nickname TLV of the MTR. The Last Egress
Identifier identifies the Upstream Nickname.

o trillOamMepMtrIngress - indicates the value returned in the
Ingress Action Field of the MTR. The value ingNoTlv(0)
indicates that no Reply Ingress TLV was returned in the MTM.

o trillOamMepMtrIngressMac - indicates the MAC address returned
in the ingress MAC address field.

o trillOamMepMtrIngressPortIdSubtype - indicates the ingress
Port ID. The format of this object is determined by the value
of the trillOamMepMtrIngressPortIdSubtype object.

o trillOamMepMtrIngressPortId - indicates the ingress Port Id.
The format of this object is determined by the value of the
trillOamMepMtrIngressPortId object.

o trillOamMepMtrEgress - indicates the value returned in the
Egress Action field of the MTR. The value ingNoTLv(0) indicates
that no Reply Egress TLV was returned in the MTR.

o trillOamMepMtrEgressMac - indicates the MAC address returned
in the egress MAC address field.

o trillOamMepMtrEgressPortIdSubtype - indicates the egress Port
ID. The format of this object is determined by the value of the
trillOamMepMtrEgressPortIdSubtype object.

o trillOamMepMtrEgressPortId - indicates the egress port ID.
The format of this object is determined by the value of the
trillOamMepMtrEgressPortId object.

o trillOamMepMtrChassisIdSubtype - indicates the format of the
chassis ID returned in the Sender ID TLV of the MTR, if any.
The value is ignored if the trillOamMepMtrChassisId has length
of 0.

o trillOamMepMtrChassisId - indicates the chassis ID returned
in the Sender ID TLV of the MTR, if any. The format of this

object is determined by the value of the
trillOamMepMtrChassisIdSubtype object.

o trillOamMepMtrOrganizationSpecificTlv - indicates all
Organization specific TLVs returned in the MTR, if any.
Includes all octets including and following the TLV length
filed of each TLV, contacted together.

o trillOamMepMtrNextHopNicknames - indicates next hop Rbridge
List TLV returned in the PTR, if any. Includes all octets
including and following the TLV length filed of each TLV,
concatenated together.

o trillOamMepMtrNextHopTotalReceivers - indicates value
indicating that MTR response contains Multicast receiver
availability TLV.

o trillOamMepMtrReceiverCount - indicates the number of
Multicast receivers available on responding Rbridge on the VLAN
specified by the diagnostic VLAN.

5.3.2.4. trillOamMepDbTable Objects

   This table is an augmentation of the dot1agCfmMepDbTable, and rows
   are automatically added or deleted from this table based upon row
   creation and destruction of the dot1agCfmMepDbTable.

o trillOamMepDbFlowIndex - This object identifies the Flow. If
the Flow Identifier TLV is received than index received can
also be used.

o trillOamMepCfgFlowEntropy - indicates 96 bytes of Flow
entropy.

o trillOamMepDbFlowState - indicates the operational state of
the remote MEP (flow based) IFF state machines.

o trillOamMepDbRmepFailedOkTime - indicates the time
(sysUpTime) at which the Remote Mep Flow State machine last
entered either the RMEP_FAILED or RMEP_OK state.

o trillOamMepDbRbridgeName - indicates Remote MEP Rbridge
Nickname.

6. Relationship to other MIB module

        The IEEE8021-CFM-MIB, IEEE801-CFM-V2-MIB and LLDP-MIB contain

objects relevant to TRILL OAM MIB. Management objects contained
in these modules are not duplicated here, to reduce overlap to
the extent possible.

6.1. Relationship to IEEE8021-CFM-MIB

TRILL OAM MIB Imports the following management objects from
IEEE8021-CFM-MIB:

o dot1agCfmMdIndex

o dot1agCfmMaIndex

o dot1agCfmMepIdentifier

o dot1agCfmMepEntry

o dot1agCfmMepDbEntry

o Dot1agCfmIngressActionFieldValue

o Dot1agCfmEgessActionFieldValue

o Dot1agCfmRemoteMepState

trillOamMepTable Augments dot1agCfmMepEntry. Implementation of IEEE-
CFM-MIB is required as we are Augmenting the IEEE-CFM-MIB Table.
Objects/Tables which are not applicable to TRILL implementation has
to be handled by TRILL implementation back end and appropriate values
as described in IEEE-CFM-MIB has to be returned.

6.2. MIB modules required for IMPORTS

The following MIB module IMPORTS objects from SNMPv2-SMI [RFC2578],
SNMPv2-TC [RFC2579], SNMPv2-CONF [RFC2580], IEEE-8021-CFM-MIB, LLDP-
MIB.

7. Definition of the TRILL OAM MIB module

TRILL-OAM-MIB DEFINITIONS ::= BEGIN

IMPORTS

    MODULE-IDENTITY,
    OBJECT-TYPE,
    NOTIFICATION-TYPE,
    Counter32,

```
        Unsigned32,
        Integer32
           FROM SNMPv2-SMI
        RowStatus,
        TruthValue,
        TimeStamp,
        MacAddress
            FROM SNMPv2-TC
        OBJECT-GROUP,
        NOTIFICATION-GROUP,
        MODULE-COMPLIANCE
            FROM SNMPv2-CONF
        dot1agCfmMdIndex,
        dot1agCfmMaIndex,
        dot1agCfmMepIdentifier,
        dot1agCfmMepEntry,
        dot1agCfmMepDbEntry,
        Dot1agCfmIngressActionFieldValue,
        Dot1agCfmEgressActionFieldValue,
        Dot1agCfmRemoteMepState
            FROM IEEE8021-CFM-MIB
        LldpChassisId,
        LldpChassisIdSubtype,
        LldpPortId
            FROM LLDP-MIB;

    trillOamMib MODULE-IDENTITY
        LAST-UPDATED    "201310191200Z"
        ORGANIZATION    "TBD"
        CONTACT-INFO
                "E-mail:  dekumar@cisco.com
                Postal:  510 McCarthy Blvd
                         Milpitas, CA 95035
                         U.S.A.
                Phone:   +1 408 853 9760"
        DESCRIPTION
            "This MIB module contains the management objects for the
            management of Trill Services Operations, Administration
            and Maintenance.
            Initial version. Published as RFC xxxx.

            ----------------------------------------------------------------
            Reference Overview

            A number of base documents have been used to create the
            Textual Conventions MIB. The following are the
            abbreviations for the baseline documents:
```

[CFM] refers to 'Connectivity Fault Management', IEEE 802.1ag-2007, December 2007
[Q.840.1] refers to 'ITU-T Requirements and analysis for NMS-EMS management interface of Ethernet over Transport and
Metro Ethernet Network (EoT/MEN)', March 2007
[Y.1731] refers to ITU-T Y.1731 'OAM functions and mechanisms for Ethernet based networks', February 2011

Abbreviations Used

Term	Definition
CCM	Continuity Check Message
CFM	Connectivity Fault Management
CoS	Class of Service
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
ITU-T	International Telecommunication Union - Telecommunication Standardization Bureau
MAC	Media Access Control
MA	Maintenance Association (equivalent to a MEG)
MD	Maintenance Domain (equivalent to a OAM Domain in MEF 17)
MD Level	Maintenance Domain Level (equivalent to a MEG level)
ME	Maintenance Entity
MEG	Maintenance Entity Group (equivalent to a MA)
MEG Level	Maintenance Entity Group Level (equivalent to MD Level)
MEP	Maintenance Association End Point or MEG End Point
MIB	Management Information Base
MIP	Maintenance Domain Intermediate Point or MEG Intermediate Point
MP	Maintenance Point. One of either a MEP or a MIP
OAM	Operations, Administration, and Maintenance On-Demand OAM actions that are initiated via manual intervention for a limited time to carry out diagnostics. On-Demand OAM can result in singular or periodic OAM actions during the diagnostic time interval
PDU	Protocol Data Unit
RFC	Request for Comment
SNMP	Simple Network Management Protocol
SNMP Agent	An SNMP entity containing one or more command responder and/or notification originator applications (along with their associated SNMP engine). Typically implemented in an NE.
SNMP Manager	An SNMP entity containing one or more command generator and/or notification receiver applications (along with their associated SNMP engine). Typically implemented in an EMS or NMS.

```
        TLV          Type Length Value, a method of encoding Objects
        UTC          Coordinated Universal Time
        UNI          User-to-Network Interface
        VLAN         Virtual LAN"
   REVISION          "201310191200Z"
   DESCRIPTION
       "Initial version. Published as RFC xxxx."
   ::= { mib-2 xxx }


-- RFC Ed.: assigned by IANA, see section 9 for details
--
-- ********************************************************************
-- Object definitions in the TRILL OAM MIB Module
-- ********************************************************************

trillOamNotifications  OBJECT IDENTIFIER
    ::= { trillOamMib 0 }

trillOamMibObjects  OBJECT IDENTIFIER
    ::= { trillOamMib 1 }

trillOamMibConformance  OBJECT IDENTIFIER
    ::= { trillOamMib 2 }

-- ********************************************************************
-- Groups in the TRILL OAM MIB Module
-- ********************************************************************

trillOamMep  OBJECT IDENTIFIER
    ::= { trillOamMibObjects 1 }


-- ********************************************************************
-- TRILL OAM MEP Configuration
-- ********************************************************************

trillOamMepTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF TrillOamMepEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This table is an extension of the dot1agCfmMepTable and rows
        are automatically added or deleted from this table based upon
        row creation and destruction of the dot1agCfmMepTable.

        This table represents the local MEP TRILL OAM configuration
        table. The primary purpose of this table is provide local
```

```
        parameters for the TRILL OAM function found in [TRILL-FM] and
        instantiated at a MEP."
    REFERENCE        "[TRILL-FM]"
    ::= { trillOamMep 1 }

trillOamMepEntry OBJECT-TYPE
    SYNTAX           TrillOamMepEntry
    MAX-ACCESS       not-accessible
    STATUS           current
    DESCRIPTION
        "The conceptual row of trillOamMepTable."
    AUGMENTS            { dot1agCfmMepEntry  }
    ::= { trillOamMepTable 1 }

TrillOamMepEntry ::= SEQUENCE {
        trillOamMepRName              Unsigned32,
        trillOamMepNextPtmTId         Unsigned32,
        trillOamMepNextMtmTId         Unsigned32,
        trillOamMepPtrIn              Counter32,
        trillOamMepPtrInOutofOrder    Counter32,
        trillOamMepPtrOut             Counter32,
        trillOamMepMtrIn              Counter32,
        trillOamMepMtrInOutofOrder    Counter32,
        trillOamMepMtrOut             Counter32,
        trillOamMepTxLbmDestRName     Unsigned32,
        trillOamMepTxLbmHC            Unsigned32,
        trillOamMepTxLbmReplyModeOob  TruthValue,
        trillOamMepTransmitLbmReplyIp OCTET STRING,
        trillOamMepTxLbmFlowEntropy   OCTET STRING,
        trillOamMepTxPtmDestRName     Unsigned32,
        trillOamMepTxPtmHC            Unsigned32,
        trillOamMepTxPtmReplyModeOob  TruthValue,
        trillOamMepTransmitPtmReplyIp OCTET STRING,
        trillOamMepTxPtmFlowEntropy   OCTET STRING,
        trillOamMepTxPtmStatus        TruthValue,
        trillOamMepTxPtmResultOK      TruthValue,
        trillOamMepTxPtmMessages      Integer32,
        trillOamMepTxPtmSeqNumber     Unsigned32,
        trillOamMepTxMtmTree          Unsigned32,
        trillOamMepTxMtmHC            Unsigned32,
        trillOamMepTxMtmReplyModeOob  TruthValue,
        trillOamMepTransmitMtmReplyIp OCTET STRING,
        trillOamMepTxMtmFlowEntropy   OCTET STRING,
        trillOamMepTxMtmStatus        TruthValue,
        trillOamMepTxMtmResultOK      TruthValue,
        trillOamMepTxMtmMessages      Integer32,
        trillOamMepTxMtmSeqNumber     Unsigned32,
        trillOamMepTxMtmScopeList     OCTET STRING
```

    }

    trillOamMepRName OBJECT-TYPE
        SYNTAX   Unsigned32 (0..65471)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "This object contains Rbridge NickName of TRILL Rbridge as
            defined in RFC 6325 section 3.7."
        REFERENCE "TRILL-FM and RFC 6325 section 3.7"
        ::= { trillOamMepEntry 1 }

    trillOamMepNextPtmTId OBJECT-TYPE
        SYNTAX   Unsigned32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Next sequence number/transaction identifier to be sent in a
            Path Trace message. This sequence number can be zero because it
            wraps around. Implementation should be unique to identify
            Transaction Id for a MEP with multiple flows."
        REFERENCE "TRILL-FM 11.1.1.1"
        ::= { trillOamMepEntry 2 }

    trillOamMepNextMtmTId OBJECT-TYPE
        SYNTAX   Unsigned32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Next sequence number/transaction identifier to be sent in a
            Multi-destination message. This sequence number can be zero
            because it wraps around. Implementation should be unique to
            identify Transaction Id for a MEP with multiple flows."
        REFERENCE "TRILL-FM 12.2.1"
        ::= { trillOamMepEntry 3 }

    trillOamMepPtrIn OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Total number of valid, in-order Path Trace Replies received."
        REFERENCE "TRILL-FM section 11"
        ::= { trillOamMepEntry 4 }

    trillOamMepPtrInOutofOrder OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS   read-only

          STATUS   current
          DESCRIPTION
              "Total number of valid, out-of-order Path Trace Replies received."
          REFERENCE "TRILL-FM section 11"
          ::= { trillOamMepEntry 5 }

    trillOamMepPtrOut OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "Total number of valid, Path Trace Replies transmitted."
          REFERENCE "TRILL-FM section 11"
          ::= { trillOamMepEntry 6 }

    trillOamMepMtrIn OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "Total number of valid, in-order Multi-destination Replies
              received."
          REFERENCE "TRILL-FM section 12"
          ::= { trillOamMepEntry 7 }

    trillOamMepMtrInOutofOrder OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "Total number of valid, out-of-order Multi-destination Replies
              received."
          REFERENCE "TRILL-FM section 12"
          ::= { trillOamMepEntry 8 }

    trillOamMepMtrOut OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "Total number of valid, Multi-destination Replies
              transmitted."
          REFERENCE "TRILL-FM section 12"
          ::= { trillOamMepEntry 9 }

    trillOamMepTxLbmDestRName OBJECT-TYPE
          SYNTAX   Unsigned32 (0..65471)
          MAX-ACCESS   read-create

        STATUS   current
        DESCRIPTION
            "The Target Destination Rbridge NickName Field as
            defined in RFC 6325 section 3.7 to be transmitted."
        REFERENCE "TRILL-FM and RFC6325 section 3.7"
        ::= { trillOamMepEntry 10 }

    trillOamMepTxLbmHC OBJECT-TYPE
        SYNTAX   Unsigned32(1..63)
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The Hop Count to be transmitted.
            "
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepEntry 11 }

    trillOamMepTxLbmReplyModeOob OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "True Indicates that Reply of Lbm is out of band and
            out of band IP Address TLV is to be transmitted.
            False indicates that In band reply is transmitted."
        REFERENCE "TRILL-FM 10.1.2.1"
        ::= { trillOamMepEntry 12 }

    trillOamMepTransmitLbmReplyIp OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "IP address for out of band IP Address TLV is to be transmitted."
        REFERENCE "TRILL-FM 10.1.2.1"
        ::= { trillOamMepEntry 13 }

    trillOamMepTxLbmFlowEntropy OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "128 Byte Flow Entropy as defined in TRILL-FM to be transmitted."
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepEntry 14 }

    trillOamMepTxPtmDestRName OBJECT-TYPE
        SYNTAX   Unsigned32 (0..65471)

        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The Target Destination Rbridge NickName Field
            as defined in RFC 6325 section 3.7 to be transmitted."
        REFERENCE "TRILL-FM and RFC6325 section 3.7"
        ::= { trillOamMepEntry 15 }

    trillOamMepTxPtmHC OBJECT-TYPE
        SYNTAX   Unsigned32 (1..63)
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The Hop Count field to be transmitted.
            "
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepEntry 16 }

    trillOamMepTxPtmReplyModeOob OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "True Indicates that Reply of Ptm is out of band and
            out of band IP Address TLV is to be transmitted.
            False indicates that In band reply is transmitted."
        REFERENCE "TRILL-FM section 11"
        DEFVAL   { false }
        ::= { trillOamMepEntry 17 }

    trillOamMepTransmitPtmReplyIp OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "IP address for out of band IP Address TLV is to be transmitted."
        REFERENCE "TRILL-FM section 11"
        ::= { trillOamMepEntry 18 }

    trillOamMepTxPtmFlowEntropy OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "128 Byte Flow Entropy as defined in TRILL-FM to be transmitted."
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepEntry 19 }

```
    trillOamMepTxPtmStatus OBJECT-TYPE
        SYNTAX          TruthValue
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "A Boolean flag set to true by the MEP Path Trace Initiator State
            Machine or an MIB manager to indicate that another Ptm is being
            transmitted.
            Reset to false by the MEP Initiator State Machine."
        REFERENCE "TRILL-FM section 11"
        DEFVAL          { false }
        ::= { trillOamMepEntry 20 }

    trillOamMepTxPtmResultOK OBJECT-TYPE
        SYNTAX          TruthValue
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "Indicates the result of the operation:
            - true  The Path Trace Message(s) will be (or has been) sent.
            - false The Path Trace Message(s) will not be sent."
        REFERENCE "TRILL-FM section 11"
        DEFVAL          { true }
        ::= { trillOamMepEntry 21 }

    trillOamMepTxPtmMessages OBJECT-TYPE
        SYNTAX          Integer32 (1..1024)
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "The number of Path Trace messages to be transmitted."
        REFERENCE "TRILL-FM section 11"
        ::= { trillOamMepEntry 22 }

    trillOamMepTxPtmSeqNumber OBJECT-TYPE
        SYNTAX          Unsigned32
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "The Path Trace Transaction Identifier of the first PTM (to be)
            sent. The value returned is undefined if
            trillOamMepTxPtmResultOK is false."
        REFERENCE "TRILL-FM section 11"
        ::= { trillOamMepEntry 23 }

    trillOamMepTxMtmTree OBJECT-TYPE
        SYNTAX          Unsigned32
        MAX-ACCESS      read-create
```

```
        STATUS           current
        DESCRIPTION
            "The Multi-destination Tree is identifier for tree as defined in
            RFC6325."
        ::= { trillOamMepEntry 24 }

    trillOamMepTxMtmHC OBJECT-TYPE
        SYNTAX           Unsigned32(1..63)
        MAX-ACCESS       read-create
        STATUS           current
        DESCRIPTION
            "The Hop Count field to be transmitted.
            "
        REFERENCE "TRILL-FM section 3, RFC 6325 section 3"
        ::= { trillOamMepEntry 25 }

    trillOamMepTxMtmReplyModeOob OBJECT-TYPE
        SYNTAX           TruthValue
        MAX-ACCESS       read-create
        STATUS           current
        DESCRIPTION
            "True Indicates that Reply of Mtm is out of band and
            out of band IP Address TLV is to be transmitted.
            False indicates that In band reply is transmitted."
        REFERENCE "TRILL-FM section 12"
        ::= { trillOamMepEntry 26 }

    trillOamMepTransmitMtmReplyIp OBJECT-TYPE
        SYNTAX           OCTET STRING
        MAX-ACCESS       read-create
        STATUS           current
        DESCRIPTION
            "IP address for out of band IP Address TLV is to be transmitted."
        REFERENCE "TRILL-FM section 12"
        ::= { trillOamMepEntry 27 }

    trillOamMepTxMtmFlowEntropy OBJECT-TYPE
        SYNTAX           OCTET STRING
        MAX-ACCESS       read-create
        STATUS           current
        DESCRIPTION
            "128 Byte Flow Entropy as defined in TRILL-FM to be transmitted."
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepEntry 28 }

    trillOamMepTxMtmStatus OBJECT-TYPE
        SYNTAX           TruthValue
        MAX-ACCESS       read-create
```

        STATUS   current
        DESCRIPTION
            "A Boolean flag set to true by the MEP Multi Destination Initiator Sta
te
            Machine or an MIB manager to indicate that another Mtm is being
            transmitted.
            Reset to false by the MEP Initiator State Machine."
        REFERENCE "TRILL-FM section 12"
        DEFVAL   { false }
        ::= { trillOamMepEntry 29 }

    trillOamMepTxMtmResultOK OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "Indicates the result of the operation:
            - true The Multi-destination Message(s) will be (or has been) sent.
            - false The Multi-destination Message(s) will not be sent."
        REFERENCE "TRILL-FM section 12"
        DEFVAL   { true }
        ::= { trillOamMepEntry 30 }

    trillOamMepTxMtmMessages OBJECT-TYPE
        SYNTAX   Integer32 (1..1024)
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The number of Multi Destination messages to be transmitted."
        REFERENCE "TRILL-FM section 12"
        ::= { trillOamMepEntry 31 }

    trillOamMepTxMtmSeqNumber OBJECT-TYPE
        SYNTAX   Unsigned32
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The Multi-destination Transaction Identifier of the first MTM (to be)
            sent. The value returned is undefined if
            trillOamMepTxMtmResultOK is false."
        REFERENCE "TRILL-FM section 12"
        ::= { trillOamMepEntry 32 }

    trillOamMepTxMtmScopeList OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The Multi-destination Rbridge Scope list, 2 OCTET per Rbridge."

```
      REFERENCE "TRILL-FM section 12"
      ::= { trillOamMepEntry 33 }


   -- ****************************************************************
   -- TRILL OAM Tx Measurement Configuration Table
   -- ****************************************************************

   trillOamMepFlowCfgTable OBJECT-TYPE
       SYNTAX          SEQUENCE OF TrillOamMepFlowCfgEntry
       MAX-ACCESS      not-accessible
       STATUS          current
       DESCRIPTION
           "This table includes configuration objects and operations for
           the Trill OAM [TRILL-FM].

           Each row in the table represents a Flow configuration Entry for
           the defined MEP. This table uses four indices. The first
           three indices are the indices of the Maintenance Domain,
           MaNet, and MEP tables. The fourth index is the specific Flow
           configuration Entry on the selected MEP.

           Some writable objects in this table are only applicable in
           certain cases (as described under each object), and attempts to
           write values for them in other cases will be ignored."
       REFERENCE       "[TRILL-FM]"
       ::= { trillOamMep 2 }

   trillOamMepFlowCfgEntry OBJECT-TYPE
       SYNTAX          TrillOamMepFlowCfgEntry
       MAX-ACCESS      not-accessible
       STATUS          current
       DESCRIPTION
           "The conceptual row of trillOamMepFlowCfgTable."
       INDEX           {
                         dot1agCfmMdIndex,
                         dot1agCfmMaIndex,
                         dot1agCfmMepIdentifier,
                         trillOamMepFlowCfgIndex
                       }
       ::= { trillOamMepFlowCfgTable 1 }

   TrillOamMepFlowCfgEntry ::= SEQUENCE {
         trillOamMepFlowCfgIndex       Unsigned32,
         trillOamMepFlowCfgFlowEntropy OCTET STRING,
         trillOamMepFlowCfgDestRName   Unsigned32,
         trillOamMepFlowCfgFlowHC      Unsigned32,
         trillOamMepFlowCfgRowStatus   RowStatus
```

```
            }

    trillOamMepFlowCfgIndex OBJECT-TYPE
        SYNTAX          Unsigned32 (1..65535)
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "An index to the Trill OAM Mep Flow Configuration table which
            indicates the specific Flow for the MEP.

            The index is never reused for other flow sessions on the same
            MEP while this session is active.  The index value keeps
            increasing until it wraps to 0.
            This value can also be used in Flow-identifier TLV [TRILL-FM]"
        REFERENCE "TRILL-FM"
        ::= { trillOamMepFlowCfgEntry 1 }

    trillOamMepFlowCfgFlowEntropy OBJECT-TYPE
        SYNTAX          OCTET STRING
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "This is 128 byte of Flow Entropy as described in
            TRILL OAM [TRILL-FM]."
        REFERENCE "TRILL-FM section 3"
        ::= { trillOamMepFlowCfgEntry 2 }

    trillOamMepFlowCfgDestRName OBJECT-TYPE
        SYNTAX          Unsigned32 (0..65471)
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "The Target Destination Rbridge NickName Field as
            defined in RFC 6325 section 3.7 to be transmitted."
        REFERENCE "TRILL-FM section 3 and RFC 6325 section 3.7"
        ::= { trillOamMepFlowCfgEntry 3 }

    trillOamMepFlowCfgFlowHC OBJECT-TYPE
        SYNTAX          Unsigned32
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "The Time to Live field to be transmitted.
            to be transmitted."
        REFERENCE "TRILL-FM section 3 and RFC 6325 section 3.7"
        ::= { trillOamMepFlowCfgEntry 4 }

    trillOamMepFlowCfgRowStatus OBJECT-TYPE
```

```
        SYNTAX          RowStatus
        MAX-ACCESS      read-create
        STATUS          current
        DESCRIPTION
            "The status of the row.

            The writable columns in a row cannot be changed if the row
            is active. All columns MUST have a valid value before a row
            can be activated."
        ::= { trillOamMepFlowCfgEntry 5 }


    -- ******************************************************************
    -- TRILL OAM Path Trace Reply Table
    -- ******************************************************************

    trillOamPtrTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF TrillOamPtrEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "This table includes Path Trace Reply objects and operations for
            the Trill OAM [TRILL-FM].

            Each row in the table represents a Path Trace Reply Entry for
            the defined MEP and Transaction. This table uses four indices.
            The first three indices are the indices of the Maintenance Domain,
            MaNet, and MEP tables. The fourth index is the specific
            Transaction Identifier on the selected MEP.

            Some writable objects in this table are only applicable in
            certain cases (as described under each object), and attempts to
            write values for them in other cases will be ignored."
        REFERENCE       "TRILL-FM"
        ::= { trillOamMep 3 }

    trillOamPtrEntry OBJECT-TYPE
        SYNTAX          TrillOamPtrEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "The conceptual row of trillOamPtrTable."
        INDEX           {
                        dot1agCfmMdIndex,
                        dot1agCfmMaIndex,
                        dot1agCfmMepIdentifier,
                        trillOamMepPtrTransactionId
                        }
```

```
        ::= { trillOamPtrTable 1 }

    TrillOamPtrEntry ::= SEQUENCE {
            trillOamMepPtrTransactionId          Unsigned32,
            trillOamMepPtrHC                     Unsigned32,
            trillOamMepPtrFlag                   Unsigned32,
            trillOamMepPtrErrorCode              Unsigned32,
            trillOamMepPtrTerminalMep            TruthValue,
            trillOamMepPtrLastEgressId           Unsigned32,
            trillOamMepPtrIngress                Dot1agCfmIngressActionFieldValue
,
            trillOamMepPtrIngressMac             MacAddress,
            trillOamMepPtrIngressPortIdSubtype   LldpPortId,
            trillOamMepPtrIngressPortId          LldpPortId,
            trillOamMepPtrEgress                 Dot1agCfmEgressActionFieldValue,
            trillOamMepPtrEgressMac              MacAddress,
            trillOamMepPtrEgressPortIdSubtype    LldpPortId,
            trillOamMepPtrEgressPortId           LldpPortId,
            trillOamMepPtrChassisIdSubtype       LldpChassisIdSubtype,
            trillOamMepPtrChassisId              LldpChassisId,
            trillOamMepPtrOrganizationSpecificTlv OCTET STRING,
            trillOamMepPtrNextHopNicknames       OCTET STRING
    }

    trillOamMepPtrTransactionId OBJECT-TYPE
        SYNTAX          Unsigned32 (0..4294967295)
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "Transaction identifier/sequence number returned by a previous
            transmit path trace message command, indicating which PTM's
            response is going to be returned."
        REFERENCE       "TRILL-FM section 11"
        ::= { trillOamPtrEntry 1 }

    trillOamMepPtrHC  OBJECT-TYPE
        SYNTAX          Unsigned32 (1..63)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Hop Count field value for a returned PTR."
        REFERENCE       "TRILL-FM"
        ::= { trillOamPtrEntry 2 }

    trillOamMepPtrFlag OBJECT-TYPE
        SYNTAX          Unsigned32 (0..15)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
```

```
              "FCOI (TRILL OAM Message TLV) field value for a
               returned PTR."
          REFERENCE       "TRILL-FM, 9.4.2.1"
          ::= { trillOamPtrEntry 3 }

      trillOamMepPtrErrorCode OBJECT-TYPE
          SYNTAX          Unsigned32 (0..65535)
          MAX-ACCESS      read-only
          STATUS          current
          DESCRIPTION
              "Return Code and Return Sub code value for a returned PTR."
          REFERENCE       "TRILL-FM, 9.4.2.1"
          ::= { trillOamPtrEntry 4 }

      trillOamMepPtrTerminalMep OBJECT-TYPE
          SYNTAX          TruthValue
          MAX-ACCESS      read-only
          STATUS          current
          DESCRIPTION
              "A boolean value stating whether the forwarded PTM reached a
              MEP enclosing its MA, as returned in the Terminal MEP flag of
              the Flags field."
          REFERENCE       "TRILL-FM"
          ::= { trillOamPtrEntry 5 }

      trillOamMepPtrLastEgressId OBJECT-TYPE
          SYNTAX          Unsigned32 (0..65535)
          MAX-ACCESS      read-only
          STATUS          current
          DESCRIPTION
              "An Integer field holding the Last Egress Identifier returned
              in the PTR Upstream Rbridge nickname TLV of the PTR.
              The Last Egress Identifier identifies the Upstream Nickname"
          REFERENCE       "TRILL-FM 9.4.3.4"
          ::= { trillOamPtrEntry 6 }

      trillOamMepPtrIngress OBJECT-TYPE
          SYNTAX          Dot1agCfmIngressActionFieldValue
          MAX-ACCESS      read-only
          STATUS          current
          DESCRIPTION
              "The value returned in the Ingress Action Field of the PTM.
              The value ingNoTlv(0) indicates that no Reply Ingress TLV was
              returned in the PTM."
          REFERENCE       "TRILL-FM 9.4.1"
          ::= { trillOamPtrEntry 7 }

      trillOamMepPtrIngressMac OBJECT-TYPE
```

```
        SYNTAX          MacAddress
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "MAC address returned in the ingress MAC address field."
        REFERENCE       "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 8 }


    trillOamMepPtrIngressPortIdSubtype OBJECT-TYPE
        SYNTAX          LldpPortId
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Ingress Port ID. The format of this object is determined by
            the value of the trillOamMepPtrIngressPortIdSubtype object."
        REFERENCE       "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 9 }


    trillOamMepPtrIngressPortId OBJECT-TYPE
        SYNTAX          LldpPortId
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Ingress Port ID. The format of this object is determined by
            the value of the trillOamMepPtrIngressPortId object."
        REFERENCE       "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 10 }


    trillOamMepPtrEgress OBJECT-TYPE
        SYNTAX          Dot1agCfmEgressActionFieldValue
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "The value returned in the Egress Action Field of the PTM.
            The value ingNoTlv(0) indicates that no Reply Egress TLV was
            returned in the PTM."
        REFERENCE       "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 11 }


    trillOamMepPtrEgressMac OBJECT-TYPE
        SYNTAX          MacAddress
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "MAC address returned in the egress MAC address field."
        REFERENCE       "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 12 }
```

    trillOamMepPtrEgressPortIdSubtype OBJECT-TYPE
        SYNTAX   LldpPortId
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Egress Port ID. The format of this object is determined by
            the value of the trillOamMepPtrEgressPortIdSubtype object."
        REFERENCE   "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 13 }

    trillOamMepPtrEgressPortId OBJECT-TYPE
        SYNTAX   LldpPortId
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Egress Port ID. The format of this object is determined by
            the value of the trillOamMepPtrEgressPortId object."
        REFERENCE   "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 14 }

    trillOamMepPtrChassisIdSubtype OBJECT-TYPE
        SYNTAX   LldpChassisIdSubtype
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "This object specifies the format of the Chassis ID returned
            in the Sender ID TLV of the PTR, if any. This value is
            meaningless if the trillOamMepPtrChassisId has a length of 0."
        REFERENCE   "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 15 }

    trillOamMepPtrChassisId OBJECT-TYPE
        SYNTAX   LldpChassisId
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The Chassis ID returned in the Sender ID TLV of the PTR, if
            any. The format of this object is determined by the
            value of the trillOamMepPtrChassisIdSubtype object."
        REFERENCE   "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 16 }

    trillOamMepPtrOrganizationSpecificTlv OBJECT-TYPE
        SYNTAX   OCTET STRING (SIZE (0..0 | 4..1500))
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "All Organization specific TLVs returned in the PTR, if

```
            any.  Includes all octets including and following the TLV
            Length field of each TLV, concatenated together."
        REFERENCE        "TRILL-FM 9.4.1"
        ::= { trillOamPtrEntry 17 }

    trillOamMepPtrNextHopNicknames OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE  (0..0 | 4..1500))
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Next hop Rbridge List TLV returned in the PTR, if
            any.  Includes all octets including and following the TLV
            Length field of each TLV, concatenated together."
        REFERENCE        "TRILL-FM 9.4.3.5"
        ::= { trillOamPtrEntry 18 }


    -- ******************************************************************
    -- TRILL OAM Multi Destination Reply Table
    -- ******************************************************************

    trillOamMtrTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF TrillOamMtrEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "This table includes Multi-destination Reply objects and
             operations for the Trill OAM [TRILL-FM].

            Each row in the table represents a Multi-destination Reply
            Entry for the defined MEP and Transaction.
            This table uses five indices.
            The first three indices are the indices of the Maintenance Domain,
            MaNet, and MEP tables. The fourth index is the specific
            Transaction Identifier on the selected MEP.
            The fifth index is the receive order of Multi-destination
            replies.

            Some writable objects in this table are only applicable in
            certain cases (as described under each object), and attempts to
            write values for them in other cases will be ignored."
        REFERENCE        "TRILL-FM"
        ::= { trillOamMep 4 }

    trillOamMtrEntry OBJECT-TYPE
        SYNTAX          TrillOamMtrEntry
        MAX-ACCESS      not-accessible
        STATUS          current
```

```
        DESCRIPTION
            "The conceptual row of trillOamMtrTable."
        INDEX           {
                        dot1agCfmMdIndex,
                        dot1agCfmMaIndex,
                        dot1agCfmMepIdentifier,
                        trillOamMepPtrTransactionId,
                        trillOamMepMtrReceiveOrder
                    }
        ::= { trillOamMtrTable 1 }

    TrillOamMtrEntry ::= SEQUENCE {
        trillOamMepMtrTransactionId         Unsigned32,
        trillOamMepMtrReceiveOrder          Unsigned32,
        trillOamMepMtrFlag                  Unsigned32,
        trillOamMepMtrErrorCode             Unsigned32,
        trillOamMepMtrLastEgressId          Unsigned32,
        trillOamMepMtrIngress               Dot1agCfmIngressActionFieldValue
,
        trillOamMepMtrIngressMac            MacAddress,
        trillOamMepMtrIngressPortIdSubtype  LldpPortId,
        trillOamMepMtrIngressPortId         LldpPortId,
        trillOamMepMtrEgress                Dot1agCfmEgressActionFieldValue,
        trillOamMepMtrEgressMac             MacAddress,
        trillOamMepMtrEgressPortIdSubtype   LldpPortId,
        trillOamMepMtrEgressPortId          LldpPortId,
        trillOamMepMtrChassisIdSubtype      LldpChassisIdSubtype,
        trillOamMepMtrChassisId             LldpChassisId,
        trillOamMepMtrOrganizationSpecificTlv OCTET STRING,
        trillOamMepMtrNextHopNicknames      OCTET STRING,
        trillOamMepMtrReceiverAvailability  TruthValue,
        trillOamMepMtrReceiverCount         TruthValue
    }

    trillOamMepMtrTransactionId OBJECT-TYPE
        SYNTAX          Unsigned32 (0..4294967295)
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "Transaction identifier/sequence number returned by a previous
            transmit Multi-destination message command, indicating
            which MTM's response is going to be returned."
        REFERENCE       "TRILL-FM section 12"
        ::= { trillOamMtrEntry 1 }

    trillOamMepMtrReceiveOrder OBJECT-TYPE
        SYNTAX          Unsigned32 (1..4294967295)
        MAX-ACCESS      not-accessible
        STATUS          current
```

         DESCRIPTION
             "An index to distinguish among multiple MTR with same
              MTR Transaction Identifier field value.
              trillOamMepMtrReceiveOrder are assigned sequentially from 1,
              in the order that the Multi-destination Tree Initiator
              received the MTRs."
         REFERENCE   "TRILL-FM"
         ::= { trillOamMtrEntry 2 }

    trillOamMepMtrFlag OBJECT-TYPE
         SYNTAX   Unsigned32 (0..15)
         MAX-ACCESS   read-only
         STATUS   current
         DESCRIPTION
             "FCOI (TRILL OAM Message TLV) field value for a
              returned MTR."
         REFERENCE   "TRILL-FM, 9.4.2.1"
         ::= { trillOamMtrEntry 3 }

    trillOamMepMtrErrorCode OBJECT-TYPE
         SYNTAX   Unsigned32 (0..65535)
         MAX-ACCESS   read-only
         STATUS   current
         DESCRIPTION
             "Return Code and Return Sub code value for a returned MTR."
         REFERENCE   "TRILL-FM, 9.4.2.1"
         ::= { trillOamMtrEntry 4 }

    trillOamMepMtrLastEgressId OBJECT-TYPE
         SYNTAX   Unsigned32 (0..65535)
         MAX-ACCESS   read-only
         STATUS   current
         DESCRIPTION
             "An Integer field holding the Last Egress Identifier returned
              in the MTR Upstream Rbridge Nickname TLV of the MTR.
              The Last Egress Identifier identifies the Upstream Nickname."
         REFERENCE   "TRILL-FM 9.4.3.4"
         ::= { trillOamMtrEntry 5 }

    trillOamMepMtrIngress OBJECT-TYPE
         SYNTAX   Dot1agCfmIngressActionFieldValue
         MAX-ACCESS   read-only
         STATUS   current
         DESCRIPTION
             "The value returned in the Ingress Action Field of the MTR.
              The value ingNoTlv(0) indicates that no Reply Ingress TLV was
              returned in the MTM."
         REFERENCE   "TRILL-FM 12.2.3"

```
        ::= { trillOamMtrEntry 6 }

    trillOamMepMtrIngressMac OBJECT-TYPE
        SYNTAX          MacAddress
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "MAC address returned in the ingress MAC address field."
        REFERENCE       "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 7 }

    trillOamMepMtrIngressPortIdSubtype OBJECT-TYPE
        SYNTAX          LldpPortId
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Ingress Port ID. The format of this object is determined by
            the value of the trillOamMepMtrIngressPortIdSubtype object."
        REFERENCE       "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 8 }

    trillOamMepMtrIngressPortId OBJECT-TYPE
        SYNTAX          LldpPortId
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "Ingress Port ID. The format of this object is determined by
            the value of the trillOamMepMtrIngressPortId object."
        REFERENCE       "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 9 }

    trillOamMepMtrEgress OBJECT-TYPE
        SYNTAX          Dot1agCfmEgressActionFieldValue
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "The value returned in the Egress Action Field of the MTR.
            The value ingNoTlv(0) indicates that no Reply Egress TLV was
            returned in the MTR."
        REFERENCE       "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 10 }

    trillOamMepMtrEgressMac OBJECT-TYPE
        SYNTAX          MacAddress
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "MAC address returned in the egress MAC address field."
```

```
        REFERENCE         "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 11 }

    trillOamMepMtrEgressPortIdSubtype OBJECT-TYPE
        SYNTAX           LldpPortId
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "Egress Port ID. The format of this object is determined by
            the value of the trillOamMepMtrEgressPortIdSubtype object."
        REFERENCE         "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 12 }

    trillOamMepMtrEgressPortId OBJECT-TYPE
        SYNTAX           LldpPortId
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "Egress Port ID. The format of this object is determined by
            the value of the trillOamMepMtrEgressPortId object."
        REFERENCE         "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 13 }

    trillOamMepMtrChassisIdSubtype OBJECT-TYPE
        SYNTAX           LldpChassisIdSubtype
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "This object specifies the format of the Chassis ID returned
            in the Sender ID TLV of the MTR, if any.  This value is
            meaningless if the trillOamMepMtrChassisId has a length of 0."
        REFERENCE         "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 14 }

    trillOamMepMtrChassisId OBJECT-TYPE
        SYNTAX           LldpChassisId
        MAX-ACCESS       read-only
        STATUS           current
        DESCRIPTION
            "The Chassis ID returned in the Sender ID TLV of the MTR, if
            any. The format of this object is determined by the
            value of the trillOamMepMtrChassisIdSubtype object."
        REFERENCE         "TRILL-FM 12.2.3"
        ::= { trillOamMtrEntry 15 }

    trillOamMepMtrOrganizationSpecificTlv OBJECT-TYPE
        SYNTAX             OCTET STRING (SIZE  (0..0 | 4..1500))
        MAX-ACCESS         read-only
```

```
     STATUS          current
     DESCRIPTION
         "All Organization specific TLVs returned in the MTR, if
         any.  Includes all octets including and following the TLV
         Length field of each TLV, concatenated together."
     REFERENCE       "TRILL-FM 12.2.3"
     ::= { trillOamMtrEntry 16 }

 trillOamMepMtrNextHopNicknames OBJECT-TYPE
     SYNTAX          OCTET STRING (SIZE  (0..0 | 4..1500))
     MAX-ACCESS      read-only
     STATUS          current
     DESCRIPTION
         "Next hop Rbridge List TLV returned in the PTR, if
         any.  Includes all octets including and following the TLV
         Length field of each TLV, concatenated together."
     REFERENCE       "TRILL-FM 9.4.3.5"
     ::= { trillOamMtrEntry 17 }

 trillOamMepMtrReceiverAvailability OBJECT-TYPE
     SYNTAX          TruthValue
     MAX-ACCESS      read-only
     STATUS          current
     DESCRIPTION
         "True value indicates that MTR response contained
         Multicast receiver availability TLV"
     REFERENCE       "TRILL-FM 9.4.3.6"
     ::= { trillOamMtrEntry 18 }

 trillOamMepMtrReceiverCount OBJECT-TYPE
     SYNTAX          TruthValue
     MAX-ACCESS      read-only
     STATUS          current
     DESCRIPTION
         "Indicates the number of Multicast receivers available on
         responding RBridge on the VLAN specified by the
         diagnostic VLAN."
     REFERENCE       "TRILL-FM 9.4.3.6"
     ::= { trillOamMtrEntry 19 }

 -- ****************************************************************
 -- TRILL OAM MEP Database Table
 -- ****************************************************************

 trillOamMepDbTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF TrillOamMepDbEntry
     MAX-ACCESS  not-accessible
     STATUS      current
```

        DESCRIPTION
          "This table is an extension of the dot1agCfmMepDbTable and rows
           are automatically added or deleted from this table based upon
           row creation and destruction of the dot1agCfmMepDbTable.
          "
        REFERENCE
          "[TRILL-FM]"
        ::= { trillOamMep 5 }

    trillOamMepDbEntry OBJECT-TYPE
        SYNTAX   TrillOamMepDbEntry
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
          "The conceptual row of trillOamMepDbTable."
        AUGMENTS {
                dot1agCfmMepDbEntry
                }
        ::= { trillOamMepDbTable 1 }

    TrillOamMepDbEntry ::= SEQUENCE {
         trillOamMepDbFlowIndex   Unsigned32,
         trillOamMepDbFlowEntropy   OCTET STRING,
         trillOamMepDbFlowState   Dot1agCfmRemoteMepState,
         trillOamMepDbFlowFailedOkTime   TimeStamp,
         trillOamMepDbRbridgeName   Unsigned32,
         trillOamMepDbLastGoodSeqNum   Counter32
         }

    trillOamMepDbFlowIndex OBJECT-TYPE
        SYNTAX   Unsigned32 (1..65535)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
          "This object identifies the Flow. If Flow Identifier TLV is received
           than index received can also be used.
          "
        REFERENCE "TRILL-FM"
        ::= {trillOamMepDbEntry 1 }

    trillOamMepDbFlowEntropy OBJECT-TYPE
        SYNTAX   OCTET STRING
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
          "128 byte Flow Entropy.
          "
        REFERENCE "TRILL-FM section 3."

        ::= {trillOamMepDbEntry 2 }

    trillOamMepDbFlowState OBJECT-TYPE
        SYNTAX   Dot1agCfmRemoteMepState
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The operational state of the remote MEP (flow based)
             IFF State machines. State Machine is running now per
             flow."
        REFERENCE "TRILL-FM"
        ::= {trillOamMepDbEntry 3 }

     trillOamMepDbFlowFailedOkTime OBJECT-TYPE
        SYNTAX   TimeStamp
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The Time (sysUpTime) at which the Remote Mep Flow state
             machine last entered either the RMEP_FAILED or RMEP_OK
             state.
             "
        REFERENCE "TRILL-FM"
        ::= {trillOamMepDbEntry 4 }

    trillOamMepDbRbridgeName OBJECT-TYPE
        SYNTAX   Unsigned32(0..65471)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Remote MEP Rbridge Nickname"
        REFERENCE "TRILL-FM RFC 6325 section 3"
        ::= {trillOamMepDbEntry 5 }

    trillOamMepDbLastGoodSeqNum OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Last Sequence Number received."
        REFERENCE "TRILL-FM 13.1"
        ::= {trillOamMepDbEntry 6}

    -- **
**
    -- TRILL OAM MIB NOTIFICATIONS (TRAPS)
    -- This notification is sent to management entity whenever a MEP loses/restore
s
    -- contact with its peer Flow Meps
    -- **
**

```
trillOamFaultAlarm NOTIFICATION-TYPE
    OBJECTS         { trillOamMepDbFlowState }
    STATUS          current
    DESCRIPTION
        "A MEP Flow has a persistent defect condition.
         A notification (fault alarm) is sent to the management
         entity with the OID of the Flow that has detected the fault.

        The management entity receiving the notification can identify
        the system from the network source address of the
        notification, and can identify the Flow reporting the defect
        by the indices in the OID of the
        trillOamMepFlowIndex, and trillOamFlowDefect
        variable in the notification:

            dot1agCfmMdIndex - Also the index of the MEP's
                               Maintenance Domain table entry
                               (dot1agCfmMdTable).
            dot1agCfmMaIndex - Also an index (with the MD table index)
                               of the MEP's Maintenance Association
                               network table entry
                               (dot1agCfmMaNetTable), and (with the MD
                               table index and component ID) of the
                               MEP's MA component table entry
                               (dot1agCfmMaCompTable).
            dot1agCfmMepIdentifier - MEP Identifier and final index
                               into the MEP table (dot1agCfmMepTable).
            trillOamMepFlowCfgIndex - Index identifies
                               indicates the specific Flow for the MEP"
    REFERENCE       "TRILL-FM"
    ::= { trillOamNotifications 1 }

-- ************************************************************************
**
-- TRILL OAM MIB Module - Conformance Information
-- ************************************************************************
**

trillOamMibCompliances  OBJECT IDENTIFIER
    ::= { trillOamMibConformance 1 }

trillOamMibGroups  OBJECT IDENTIFIER
    ::= { trillOamMibConformance 2 }


-- ****************************************************************
-- TRILL OAM MIB Units of conformance
-- ****************************************************************

trillOamMepMandatoryGroup OBJECT-GROUP
```

```
        OBJECTS         {
                        trillOamMepRName,
                        trillOamMepNextPtmTId,
                        trillOamMepNextMtmTId,
                        trillOamMepPtrIn,
                        trillOamMepPtrInOutofOrder,
                        trillOamMepPtrOut,
                        trillOamMepMtrIn,
                        trillOamMepMtrInOutofOrder,
                        trillOamMepMtrOut,
                        trillOamMepTxLbmDestRName,
                        trillOamMepTxLbmHC,
                        trillOamMepTxLbmReplyModeOob,
                        trillOamMepTransmitLbmReplyIp,
                        trillOamMepTxLbmFlowEntropy,
                        trillOamMepTxPtmDestRName,
                        trillOamMepTxPtmHC,
                        trillOamMepTxPtmReplyModeOob,
                        trillOamMepTransmitPtmReplyIp,
                        trillOamMepTxPtmFlowEntropy,
                        trillOamMepTxPtmStatus,
                        trillOamMepTxPtmResultOK,
                        trillOamMepTxPtmMessages,
                        trillOamMepTxPtmSeqNumber,
                        trillOamMepTxMtmTree,
                        trillOamMepTxMtmHC,
                        trillOamMepTxMtmReplyModeOob,
                        trillOamMepTransmitMtmReplyIp,
                        trillOamMepTxMtmFlowEntropy,
                        trillOamMepTxMtmStatus,
                        trillOamMepTxMtmResultOK,
                        trillOamMepTxMtmMessages,
                        trillOamMepTxMtmSeqNumber,
                        trillOamMepTxMtmScopeList
                    }
        STATUS          current
        DESCRIPTION
            "Mandatory objects for the TRILL OAM MEP group."
        ::= { trillOamMibGroups 1 }

   trillOamMepFlowCfgTableGroup OBJECT-GROUP
        OBJECTS         {
                        trillOamMepFlowCfgFlowEntropy,
                        trillOamMepFlowCfgDestRName,
                        trillOamMepFlowCfgFlowHC,
                        trillOamMepFlowCfgRowStatus
                    }
        STATUS          current
```

          DESCRIPTION
              "Trill OAM MEP Flow Configuration objects group."
          ::= { trillOamMibGroups 2 }

      trillOamPtrTableGroup OBJECT-GROUP
          OBJECTS   {
                          trillOamMepPtrHC,
                          trillOamMepPtrFlag,
                          trillOamMepPtrErrorCode,
                          trillOamMepPtrTerminalMep,
                          trillOamMepPtrLastEgressId,
                          trillOamMepPtrIngress,
                          trillOamMepPtrIngressMac,
                          trillOamMepPtrIngressPortIdSubtype,
                          trillOamMepPtrIngressPortId,
                          trillOamMepPtrEgress,
                          trillOamMepPtrEgressMac,
                          trillOamMepPtrEgressPortIdSubtype,
                          trillOamMepPtrEgressPortId,
                          trillOamMepPtrChassisIdSubtype,
                          trillOamMepPtrChassisId,
                          trillOamMepPtrOrganizationSpecificTlv,
                          trillOamMepPtrNextHopNicknames
                          }
          STATUS   current
          DESCRIPTION
              "Trill OAM MEP PTR objects group."
          ::= { trillOamMibGroups 3 }

      trillOamMtrTableGroup OBJECT-GROUP
          OBJECTS   {
                          trillOamMepMtrFlag,
                          trillOamMepMtrErrorCode,
                          trillOamMepMtrLastEgressId,
                          trillOamMepMtrIngress,
                          trillOamMepMtrIngressMac,
                          trillOamMepMtrIngressPortIdSubtype,
                          trillOamMepMtrIngressPortId,
                          trillOamMepMtrEgress,
                          trillOamMepMtrEgressMac,
                          trillOamMepMtrEgressPortIdSubtype,
                          trillOamMepMtrEgressPortId,
                          trillOamMepMtrChassisIdSubtype,
                          trillOamMepMtrChassisId,
                          trillOamMepMtrOrganizationSpecificTlv,
                          trillOamMepMtrNextHopNicknames,
                          trillOamMepMtrReceiverAvailability,
                          trillOamMepMtrReceiverCount

```
                    }
        STATUS          current
        DESCRIPTION
            "Trill OAM MEP MTR objects group."
        ::= { trillOamMibGroups 4 }

    trillOamMepDbGroup  OBJECT-GROUP
        OBJECTS   {
          trillOamMepDbFlowIndex,
          trillOamMepDbFlowEntropy,
          trillOamMepDbFlowState,
          trillOamMepDbFlowFailedOkTime,
          trillOamMepDbRbridgeName,
          trillOamMepDbLastGoodSeqNum
        }

        STATUS      current
        DESCRIPTION
           "Trill OAM MEP DB objects group."
        ::= { trillOamMibGroups 5 }

    trillOamNotificationGroup NOTIFICATION-GROUP
        NOTIFICATIONS  {
            trillOamFaultAlarm
        }
        STATUS current
        DESCRIPTION
            "Objects for Notification Group"
        ::= { trillOamMibGroups 6 }

    -- ****************************************************************
    -- TRILL OAM MIB Module Compliance statements
    -- ****************************************************************

    trillOamMibCompliance MODULE-COMPLIANCE
        STATUS          current
        DESCRIPTION
            "The compliance statement for the TRILL OAM MIB."
        MODULE          -- this module
        MANDATORY-GROUPS {
                        trillOamMepMandatoryGroup,
                        trillOamMepFlowCfgTableGroup,
                        trillOamPtrTableGroup,
                        trillOamMtrTableGroup,
                        trillOamMepDbGroup,
                        trillOamNotificationGroup
                    }
        ::= { trillOamMibCompliances 1 }
```

    -- Compliance requirement for read-only implementation.

    trillOamMibReadOnlyCompliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
            "Compliance requirement for implementation that only
             provide read-only support for TRILL-OAM-MIB.
             Such devices can be monitored but cannot be configured
             using this MIB module
            "
        MODULE -- this module
        MANDATORY-GROUPS {
                            trillOamMepMandatoryGroup,
                            trillOamMepFlowCfgTableGroup,
                            trillOamPtrTableGroup,
                            trillOamMtrTableGroup,
                            trillOamMepDbGroup,
                            trillOamNotificationGroup
                         }
        -- trillOamMepTable

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

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

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

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

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

        OBJECT trillOamMepTxPtmDestRName
        MIN-ACCESS read-only

```
        DESCRIPTION
            "Write access is not required."


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


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


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


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


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


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


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


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


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

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

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

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

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

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

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

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

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

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


   -- trillOamMepFlowCfgTable
```

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


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


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


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



        ::= { trillOamMibCompliances 2 }



    END
```

8. Security Considerations

   This MIB relates to a system which will provide network connectivity
   and packet forwarding services. As such, improper manipulation of the
   objects represented by this MIB may result in denial of service to a
   large number of end-users.

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

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

   SNMP version prior to SNMPv3 did not include adequate security. Even

if the network itself is secure, 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 mechanism (for authentication and privacy).

Further, deployment of SNMP version 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.

9. IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER value recorded in the SMI Numbers registry:

```
Descriptor    OBJECT    IDENTIFIER    value
----------------------------------------
trillOamMIB  { mib-2 xxx }
```

Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "xxx" under the 'mib-2' subtree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace "XXX" (here and in the MIB module) with the assigned value and to remove this note.

10. Conclusions

11. References
11.1. Normative References

> [1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
>
> [2] Crocker, D. and Overell, P.(Editors), "Augmented BNF for Syntax Specifications: ABNF", RFC 2234, Internet Mail Consortium and Demon Internet Ltd., November 1997.
>
> [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2234] Crocker, D. and Overell, P.(Editors), "Augmented BNF for Syntax Specifications: ABNF", RFC 2234, Internet Mail Consortium and Demon Internet Ltd., November 1997.

[RFC6325] Perlman, R., et.al., "Routing Bridges (RBridges): Base Protocol Specification", RFC 6325, July 2011.

[RFCfgl] D. Eastlake, M. Zhang, P. Agarwal, R. Perlman, D. Dutt, "TRILL: Fine-Grained Labeling", draft-ietf-trill-fine-labeling, work in progress.

11.2. Informative References

[3] Faber, T., Touch, J. and W. Yue, "The TIME-WAIT state in TCP and Its Effect on Busy Servers", Proc. Infocom 1999 pp. 1573-1583.

[Fab1999]Faber, T., Touch, J. and W. Yue, "The TIME-WAIT state in TCP and Its Effect on Busy Servers", Proc. Infocom 1999 pp. 1573-1583.

[TRILLOAMREQ] Senevirathne, T., et.al., "Requirements for Operations, Administration and Maintenance (OAM) in   TRILL", draft-ietf-trill-oam-req, Work in Progress, November, 2012.

[TRILLOAMFM] Salam, S., et.al., "TRILL OAM Framework", draft-ietf-trill-oam-framework, Work in Progress,November, 2012.

[TRILL-FM] Senevirathne, T., et.al., "TRILL Fault Management", draft-tissa-trill-oam-fm, Work in Progress, Feburary, 2013.

12. Acknowledgments

Authors' Addresses

     Deepak Kumar
     Cisco
     510 McCarthy Blvd,
     Milpitas, CA 95035, USA
     Phone : +1 408-853-9760
     Email: dekumar@cisco.com

     Samer Salam
     Cisco
     595 Burrard St. Suite 2123
     Vancouver, BC V7X 1J1, Canada
     Email: ssalam@cisco.com

     Tissa Senevirathne
     Cisco
     375 East Tasman Drive
     San Jose, CA 95134, USA
     Email: tsenevir@cisco.com