

TRILL Working Group
Internet Draft
Intended Status: Standard Track

Expires December 2015

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June 26, 2015

TRILL OAM MIB
draft-ietf-trill-oam-mib-04.txt

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Abstract

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

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[1. Introduction](#)

Overall, TRILL OAM is intended to meet the requirements given in [\[RFC6905\]](#). The general framework for TRILL OAM is specified in [\[RFC7174\]](#). The details of the Fault Management (FM) solution, conforming to that framework, are presented in [RFC 7455](#). 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 [[802.10](#)] as the basis for TRILL OAM MIB, and augments the existing tables to add new TRILL managed objects required by TRILL. This document further specifies a new table with associated managed objects for TRILL OAM specific 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

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 [[802.10](#)], and augments the Maintenance End Point(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", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC-2119](#) [[RFC2119](#)].

Acronyms used in the document include the following:

MTVM - Multi-destination Tree Verification Message [[RFC7455](#)]

MTVR - Multi-destination Tree Verification Reply [[RFC7455](#)]

PTM - Path Trace Message [[RFC7455](#)]

PTR - Path Trace Reply [[RFC7455](#)]

MEP - Maintenance End Point [[RFC7174](#)] [8021Q]

MIP - Maintenance Intermediate Point [[RFC7174](#)] [8021Q]
MP - Maintenance Point [[RFC7174](#)]
CCM - Continuity Check Message [8021Q]
FGL - Fine-Grained Label
LBM - Loopback Message [8021Q]
LBR - Loopback Reply [8021Q]
TRILL - Transparent Interconnection of Lots of Links [[RFC6325](#)]

[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 [[RFC7172](#)].

IEEE8021-TC-MIB defines IEEE8021ServiceSelectorType with two values:

- 1 representing a vlanId, and
- 2 representing a 24 bit isid.

We have chosen 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 Tree describe below consists of trilloamNotifications (Traps) and trillOamMibObjects. trilloamNotifications are sent to management entity whenever a MEP loses/restores contact with its peer Flow MEPs.

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.

TRILL-OAM-MIB

```
|--trillOamNotifications
    |--trillOamFaultAlarm
|--trillOamMibObjects
    |--trillOamMep
        |--trillOamMepTable
        |--trillOamMepFlowCfgTable
        |--trillOamPtrTable
        |--trillOamMtvrTable
        |--trillOamMepDbTable
```

5.3.1. TRILL OAM MIB Notifications

Notifications (fault alarm) are sent to the management entity with the OID of the MEP that has detected the fault. Notifications are generated whenever MEP loses/restores contact with its peer Flow MEPs.

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

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 [RFC 7455](#) and instantiated at a MEP.

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.

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.

5.3.2.4. trillOamMtvrTable 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.

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.

6. Relationship to other MIB module

The IEEE8021-CFM-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. From IEEE8021-CFM-MIB following objects are imported

- o dot1agCfmMdIndex
- o dot1agCfmMaIndex
- o dot1agCfmMepIdentifier
- o dot1agCfmMepEntry
- o dot1agCfmMepDbEntry
- o Dot1agCfmIngressActionFieldValue
- o Dot1agCfmEgressActionFieldValue
- o Dot1agCfmRemoteMepState

From LLDP-MIB following objects are imported

- o LldpChassisId
- o LldpChassisIdSubtype
- o LldpPortId

6.1. Relationship to IEEE8021-CFM-MIB

trillOamMepTable Augments dot1agCfmMepEntry. Implementation of IEEE8021-CFM-MIB is required as we are Augmenting the IEEE-CFM-MIB Table. Objects/Tables that are not applicable to a TRILL implementation have to be handled by the TRILL implementation back end and appropriate default values as described in IEEE8021-CFM-MIB have to be returned.

TRILL Implementation doesn't support Link Trace Message and Link Trace Reply and statistics with respect of these message should be default as per IEEE8021-CFM-MIB.

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,
    Counter32,
    Unsigned32,
    Integer32,
    mib-2,
    NOTIFICATION-TYPE
        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      "201506261200Z"
    ORGANIZATION      "TBD"
    CONTACT-INFO
        "E-mail:   dekuar@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
 PTR Path Trace Reply
 PTM Path Trace Message
 MTRV Multi-destination Tree Verification Reply
 MTVM Multi-destination Tree Verification Message"

REVISION "201506261200Z"

DESCRIPTION

"Initial version. Published as RFC xxxx."

::= { mib-2 12000 }

-- 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 RFC 7455 and instantiated at a MEP."
    REFERENCE       "RFC 7455"
    ::= { 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     Counter32,
    trillOamMepNextMtvmtid    Counter32,
    trillOamMepPtrIn          Counter32,
    trillOamMepPtrInOutOfOrder Counter32,
    trillOamMepPtrOut         Counter32,
```



```

    trillOamMepMtvrIn          Counter32,
    trillOamMepMtvrInOutofOrder Counter32,
    trillOamMepMtvrOut         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,
    trillOamMepTxPtmSeqNumber   Unsigned32,
    trillOamMepTxPtmMessages   Integer32,
    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   "RFC 7455 and RFC 6325 section 3.7"
    ::= { trillOamMepEntry 1 }

trillOamMepNextPtmTid OBJECT-TYPE
    SYNTAX      Counter32
    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 "[RFC 7455](#) 10.1.1"
::= { trillOamMepEntry 2 }

trillOamMepNextMtvmtId OBJECT-TYPE

SYNTAX Counter32
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 "[RFC 7455](#) 11.2.1"
::= { 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 "[RFC 7455 section 10](#)"
::= { 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 "[RFC 7455 section 10](#)"
::= { trillOamMepEntry 5 }

trillOamMepPtrOut OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"Total number of valid, Path Trace Replies transmitted."

REFERENCE "[RFC 7455 section 10](#)"
::= { trillOamMepEntry 6 }

trillOamMepMtvrIn OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only

STATUS current
DESCRIPTION
"Total number of valid, in-order Multi-destination
Replies received."
REFERENCE "[RFC 7455 section 11](#)"
::= { trillOamMepEntry 7 }

trillOamMepMtvrInOutOfOrder OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of valid, out-of-order Multi-destination
Replies received."
REFERENCE "[RFC 7455 section 11](#)"
::= { trillOamMepEntry 8 }

trillOamMepMtvrOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of valid, Multi-destination Replies
transmitted."
REFERENCE "[RFC 7455 section 11](#)"
::= { 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 "[RFC 7455](#) 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 "[RFC 7455 section 9](#) and 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 [RFC 7455](#) 9.2.1"
::= { trillOamMepEntry 12 }

trillOamMepTransmitLbmReplyIp OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (4..16))
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "IP address for out of band IP Address TLV is to be
 transmitted, Maximum length for IPv6 is 16 OCTET
 and IPv4 is 4 OCTET."
REFERENCE [RFC 7455 section 3](#)"
::= { trillOamMepEntry 13 }

trillOamMepTxLbmFlowEntropy OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (96))
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "96 Byte Flow Entropy as defined in [RFC 7455](#) to be
 transmitted."
REFERENCE [RFC 7455 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 [RFC 7455](#) 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 [RFC 7455 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 "[RFC 7455 section 10](#)"

DEFVAL { false }

::= { trillOamMepEntry 17 }

trillOamMepTransmitPtmReplyIp OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (4..16))
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"IP address for out of band IP Address TLV is to be
transmitted, Maximum length for IPv6 is 16 OCTET
and IPv4 is 4 OCTET."

REFERENCE "[RFC 7455 section 3](#) and 10"

::= { trillOamMepEntry 18 }

trillOamMepTxPtmFlowEntropy OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (96))
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"96 Byte Flow Entropy as defined in [RFC 7455](#) to be
transmitted."

REFERENCE "[RFC 7455 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 "[RFC 7455 section 10](#)"

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 "[RFC 7455 section 10](#)"

DEFVAL { true }

::= { trillOamMepEntry 21 }

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 "[RFC 7455 section 10](#)"

::= { trillOamMepEntry 22 }

trillOamMepTxPtmMessages OBJECT-TYPE

SYNTAX Integer32 (1..1024)
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"The number of Path Trace messages to be transmitted."

REFERENCE "[RFC 7455 section 10](#)"

::= { 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 "[RFC 7455 section 3](#), [RFC 6325 section 3](#)"
::= { trillOamMepEntry 25 }

trillOamMepTxMtmvReplyMode0ob OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"True Indicates that Reply of Mtmv is out of band and
out of band IP Address TLV is to be transmitted.
False indicates that In band reply is transmitted."

REFERENCE "[RFC 7455 section 11](#)"
::= { trillOamMepEntry 26 }

trillOamMepTransmitMtmvReplyIp OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (4..16))
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"IP address for out of band IP Address TLV is to be
transmitted, Maximum length for IPv6 is 16 OCTET
and IPv4 is 4 OCTET."

REFERENCE "[RFC 7455 section 11](#)"
::= { trillOamMepEntry 27 }

trillOamMepTxMtmvFlowEntropy OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (96))
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"96 Byte Flow Entropy as defined in [RFC 7455](#) to be
transmitted."

REFERENCE "[RFC 7455 section 3](#)"
::= { trillOamMepEntry 28 }

trillOamMepTxMtmvStatus OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"A Boolean flag set to true by the MEP Multi Destination
Initiator State
Machine or an MIB manager to indicate that another
Mtmv is being transmitted.
Reset to false by the MEP Initiator State Machine."

REFERENCE "[RFC 7455 section 11](#)"


```
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 "RFC 7455 section 11"  
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 "RFC 7455 section 11"  
::= { trillOamMepEntry 31 }
```

trillOamMepTxMtmSeqNumber OBJECT-TYPE

```
SYNTAX          Unsigned32  
MAX-ACCESS      read-create  
STATUS          current  
DESCRIPTION  
    "The Multi-destination Transaction Identifier of the  
    first MTVM (to be)  
    sent. The value returned is undefined if  
    trillOamMepTxMtmResultOK is false."  
REFERENCE "RFC 7455 section 11"  
::= { 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 "RFC 7455 section 11"  
::= { 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 [RFC 7455](#).

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 "[RFC 7455](#)"

::= { 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 [RFC 7455](#)."

REFERENCE "[RFC 7455](#)"

::= { trillOamMepFlowCfgEntry 1 }

trillOamMepFlowCfgFlowEntropy OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (96))

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This is 96 byte of Flow Entropy as described in TRILL OAM [RFC 7455](#)."

REFERENCE "[RFC 7455 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 "[RFC 7455 section 3](#) and [RFC 6325 section 3.7](#)"

::= { trillOamMepFlowCfgEntry 3 }

trillOamMepFlowCfgFlowHC OBJECT-TYPE

SYNTAX Unsigned32 (1..63)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Time to Live field to be transmitted.
to be transmitted."

REFERENCE "[RFC 7455 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 RFC 7455.

        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       "RFC 7455"
    ::= { 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    "RFC 7455 section 10"
    ::= { 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    "RFC 7455"
    ::= { 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 ["RFC 7455"](#), 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 ["RFC 7455"](#), 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 ["RFC 7455"](#)

::= { 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 ["RFC 7455"](#) 8.4.1"

::= { 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 "[RFC 7455](#) 8.4.1"
::= { trillOamPtrEntry 7 }

trillOamMepPtrIngressMac OBJECT-TYPE
SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "MAC address returned in the ingress MAC address field."
REFERENCE "[RFC 7455](#) 8.4.1"
::= { 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 "[RFC 7455](#) 8.4.1"
::= { 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 "[RFC 7455](#) 8.4.1"
::= { 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 "[RFC 7455](#) 8.4.1"
::= { trillOamPtrEntry 11 }

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

DESCRIPTION

"MAC address returned in the egress MAC address field."

REFERENCE "[RFC 7455](#) 8.4.1"

::= { 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 "[RFC 7455](#) 8.4.1"

::= { 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 "[RFC 7455](#) 8.4.1"

::= { 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 "[RFC 7455](#) 8.4.1"

::= { 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 "[RFC 7455](#) 8.4.1"

::= { trillOamPtrEntry 16 }

trillOamMepPtrOrganizationSpecificTlv OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (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 ["RFC 7455 8.4.1"](#)

::= { trillOamPtrEntry 17 }

trillOamMepPtrNextHopNicknames OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (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 ["RFC 7455 8.4.1"](#)

::= { trillOamPtrEntry 18 }

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

trillOamMtvrTable OBJECT-TYPE

SYNTAX SEQUENCE OF TrillOamMtvrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table includes Multi-destination Reply objects and operations for the Trill OAM [RFC 7455](#)."

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 ["RFC 7455"](#)

::= { trillOamMep 4 }

trillOamMtvrEntry OBJECT-TYPE

SYNTAX TrillOamMtvrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The conceptual row of trillOamMtvrTable."

INDEX {
 dot1agCfmMdIndex,
 dot1agCfmMaIndex,
 dot1agCfmMepIdentifier,
 trillOamMepPtrTransactionId,
 trillOamMepMtvrReceiveOrder
 }

::= { trillOamMtvrTable 1 }

TrillOamMtvrEntry ::= SEQUENCE {

trillOamMepMtvrTransactionId	Unsigned32,
trillOamMepMtvrReceiveOrder	Unsigned32,
trillOamMepMtvrFlag	Unsigned32,
trillOamMepMtvrErrorCode	Unsigned32,
trillOamMepMtvrLastEgressId	Unsigned32,
trillOamMepMtvrIngress	Dot1agCfmIngressActionFieldValue,
trillOamMepMtvrIngressMac	MacAddress,
trillOamMepMtvrIngressPortIdSubtype	LldpPortId,
trillOamMepMtvrIngressPortId	LldpPortId,
trillOamMepMtvrEgress	Dot1agCfmEgressActionFieldValue,
trillOamMepMtvrEgressMac	MacAddress,
trillOamMepMtvrEgressPortIdSubtype	LldpPortId,
trillOamMepMtvrEgressPortId	LldpPortId,
trillOamMepMtvrChassisIdSubtype	LldpChassisIdSubtype,
trillOamMepMtvrChassisId	LldpChassisId,
trillOamMepMtvrOrganizationSpecificTlv	OCTET STRING,
trillOamMepMtvrNextHopNicknames	OCTET STRING,
trillOamMepMtvrReceiverAvailability	TruthValue,
trillOamMepMtvrReceiverCount	TruthValue

}

trillOamMepMtvrTransactionId 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 MTVM's response is going to be returned."

REFERENCE ["RFC 7455 section 11"](#)

::= { trillOamMtvrEntry 1 }

trillOamMepMtvrReceiveOrder OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index to distinguish among multiple MTVR with same MTVR Transaction Identifier field value.

trillOamMepMtvrReceiveOrder are assigned sequentially from 1,

in the order that the Multi-destination Tree Initiator received the MTVRs."

REFERENCE ["RFC 7455 section 11"](#)

::= { trillOamMtvrEntry 2 }

trillOamMepMtvrFlag OBJECT-TYPE

SYNTAX Unsigned32 (0..15)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"FCOI (TRILL OAM Message TLV) field value for a returned MTVR."

REFERENCE ["RFC 7455, 8.4.2"](#)

::= { trillOamMtvrEntry 3 }

trillOamMepMtvrErrorCode OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Return Code and Return Sub code value for a returned MTVR."

REFERENCE ["RFC 7455, 8.4.2"](#)

::= { trillOamMtvrEntry 4 }

trillOamMepMtvrLastEgressId OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An Integer field holding the Last Egress Identifier returned in the MTVR Upstream Rbridge Nickname TLV of the MTVR.

The Last Egress Identifier identifies the Upstream Nickname."

REFERENCE ["RFC 7455 8.4.1"](#)
::= { trillOamMtvrEntry 5 }

trillOamMepMtvrIngress OBJECT-TYPE

SYNTAX Dot1agCfmIngressActionFieldValue
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The value returned in the Ingress Action Field of
the MTVR.

The value ingNoTlv(0) indicates that no
Reply Ingress TLV was returned in the MTVM."

REFERENCE ["RFC 7455 11.2.3"](#)
::= { trillOamMtvrEntry 6 }

trillOamMepMtvrIngressMac OBJECT-TYPE

SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"MAC address returned in the ingress MAC address field."

REFERENCE ["RFC 7455 8.4.1"](#)
::= { trillOamMtvrEntry 7 }

trillOamMepMtvrIngressPortIdSubtype 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 trillOamMepMtvrIngressPortIdSubtype
object."

REFERENCE ["RFC 7455 8.4.1"](#)
::= { trillOamMtvrEntry 8 }

trillOamMepMtvrIngressPortId 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 trillOamMepMtvrIngressPortId object."

REFERENCE ["RFC 7455 8.4.1"](#)
::= { trillOamMtvrEntry 9 }

trillOamMepMtvrEgress OBJECT-TYPE

SYNTAX Dot1agCfmEgressActionFieldValue

MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The value returned in the Egress Action Field of the MTRV.
 The value ingNoTlv(0) indicates that no Reply Egress TLV was
 returned in the MTRV."
REFERENCE "RFC 7455 8.4.1"
::= { trillOamMtrvEntry 10 }

trillOamMepMtrvEgressMac OBJECT-TYPE

SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "MAC address returned in the egress MAC address field."
REFERENCE "RFC 7455 8.4.1"
::= { trillOamMtrvEntry 11 }

trillOamMepMtrvEgressPortIdSubtype 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 trillOamMepMtrvEgressPortIdSubtype object."
REFERENCE "RFC 7455 8.4.1"
::= { trillOamMtrvEntry 12 }

trillOamMepMtrvEgressPortId 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 trillOamMepMtrvEgressPortId object."
REFERENCE "RFC 7455 8.4.1"
::= { trillOamMtrvEntry 13 }

trillOamMepMtrvChassisIdSubtype 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 MTRV, if any. This value is
 meaningless if the trillOamMepMtrvChassisId has a
 length of 0."
REFERENCE "RFC 7455 8.4.1"


```
::= { trillOamMtvrEntry 14 }
```

trillOamMepMtvrChassisId OBJECT-TYPE

SYNTAX LldpChassisId

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Chassis ID returned in the Sender ID TLV of the MTVR, if any. The format of this object is determined by the value of the trillOamMepMtvrChassisIdSubtype object."

REFERENCE ["RFC 7455 8.4.1"](#)

```
::= { trillOamMtvrEntry 15 }
```

trillOamMepMtvrOrganizationSpecificTlv OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0 | 4..1500))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"All Organization specific TLVs returned in the MTVR, if any. Includes all octets including and following the TLV Length field of each TLV, concatenated together."

REFERENCE ["RFC 7455 8.4.1"](#)

```
::= { trillOamMtvrEntry 16 }
```

trillOamMepMtvrNextHopNicknames OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (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 ["RFC 7455 8.4.3"](#)

```
::= { trillOamMtvrEntry 17 }
```

trillOamMepMtvrReceiverAvailability OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"True value indicates that MTVR response contained Multicast receiver availability TLV."

REFERENCE ["RFC 7455 8.4.10"](#)

```
::= { trillOamMtvrEntry 18 }
```

trillOamMepMtvrReceiverCount 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       "RFC 7455 8.4.10"
::= { 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 to or deleted from this table based
        upon row creation and destruction of the
        dot1agCfmMepDbTable."
    REFERENCE
        "RFC 7455"
    ::= { 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 ["RFC 7455"](#)
::= {trillOamMepDbEntry 1 }

trillOamMepDbFlowEntropy OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (96))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "96 byte Flow Entropy."
REFERENCE ["RFC 7455 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 ["RFC 7455"](#)
::= {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 ["RFC 7455"](#)
::= {trillOamMepDbEntry 4 }

trillOamMepDbRbridgeName OBJECT-TYPE
SYNTAX Unsigned32(0..65471)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Remote MEP Rbridge Nickname."
REFERENCE ["RFC 7455 RFC 6325 section 3"](#)
::= {trillOamMepDbEntry 5 }

trillOamMepDbLastGoodSeqNum OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Last Sequence Number received."

REFERENCE "RFC 7455 13.1"

::= {trillOamMepDbEntry 6}

```
-- *****
```

```
-- TRILL OAM MIB NOTIFICATIONS (TRAPS)
```

```
-- This notification is sent to management entity whenever a
```

```
-- MEP loses/restores
```

```
-- 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 "RFC 7455"

::= { 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,
            trillOamMepMtmrIn,
            trillOamMepMtmrInOutOfOrder,
            trillOamMepMtmrOut,
            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 }

trillOamMtvrTableGroup OBJECT-GROUP
    OBJECTS
        {
            trillOamMepMtvrFlag,
```



```

        trillOamMepMtvrErrorCode,
        trillOamMepMtvrLastEgressId,
        trillOamMepMtvrIngress,
        trillOamMepMtvrIngressMac,
        trillOamMepMtvrIngressPortIdSubtype,
        trillOamMepMtvrIngressPortId,
        trillOamMepMtvrEgress,
        trillOamMepMtvrEgressMac,
        trillOamMepMtvrEgressPortIdSubtype,
        trillOamMepMtvrEgressPortId,
        trillOamMepMtvrChassisIdSubtype,
        trillOamMepMtvrChassisId,
        trillOamMepMtvrOrganizationSpecificTlv,
        trillOamMepMtvrNextHopNicknames,
        trillOamMepMtvrReceiverAvailability,
        trillOamMepMtvrReceiverCount
    }
STATUS      current
DESCRIPTION
    "Trill OAM MEP MTVR 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
        "A collection of objects describing notifications(traps)."
    ::= { 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,
        trillOamMtvrTableGroup,
        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,
        trillOamMtvrTableGroup,
        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 trillOamMepTxMtvMTree
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

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

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

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

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

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

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

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


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

OBJECT trillOamMepTxMtvMScopeList
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 that 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 (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 GET and/or NOTIFY access to these objects and possibly to 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, deployment of SNMPv3 with cryptographic security enabled is RECOMMENDED. 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 only those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them access to the objects.

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. References

10.1. Normative References

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[RFC2579] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.

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[RFC6325] Perlman, R., Eastlake 3rd, D., Dutt, D., Gai, S., and A. Ghanwani, "Routing Bridges (R Bridges): Base Protocol Specification", [RFC 6325](#), July 2011.

[RFC7172] Eastlake 3rd, D., Zhang, M., Agarwal, P., Perlman, R., and D. Dutt, "Transparent Interconnection of Lots of Links (TRILL): Fine-Grained Labeling", [RFC 7172](#), May 2014.

[RFC7455] Senevirathne, T., et.al., "Transparent Interconnection of Lots of Links (TRILL): Fault Management", March 2015.

10.2. Informative References

[802.1Q] IEEE, "IEEE Standard for Local and metropolitan area networks - Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks", IEEE Std 802.1Q-2011, 31 August 2011.

[RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.

[RFC6905] Senevirathne, T., Bond, D., Aldrin, S., Li, Y., and R. Watve, "Requirements for Operations,

Administration, and Maintenance (OAM) in Transparent Interconnection of Lots of Links (TRILL)", [RFC 6905](#), March 2013.

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11. Acknowledgments

We wish to thank members of the IETF TRILL WG for their comments and suggestions. Detailed comments were provided by Sam Aldrin, and Donald Eastlake.

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