          Definitions of Managed Objects for Routing Bridges (RBridges)

Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols. In particular, it defines
   objects for managing a Routing Bridge (RBridge), also known as a
   TRILL Switch, based on the IETF TRILL (Transparent Interconnection of
   Lots of Links) protocol.

Status of This Memo

   This is an Internet Standards Track document.

   This document is a product of the Internet Engineering Task Force
   (IETF). It represents the consensus of the IETF community. It has
   received public review and has been approved for publication by the
   Internet Engineering Steering Group (IESG). Further information on
   Internet Standards is available in Section 2 of RFC 5741.

   Information about the current status of this document, any errata,
   and how to provide feedback on it may be obtained at
   http://www.rfc-editor.org/info/rfc6850.

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1. Introduction

   This document describes a model for managing Routing Bridges
   (RBridges), also known as TRILL Switches, as defined in [RFC6325].
   RBridges provide optimal pair-wise forwarding without configuration
   using IS-IS routing and encapsulation of traffic. RBridges are
   compatible with previous IEEE 802.1 customer bridges as well as IPv4
   and IPv6 routers and end nodes. They are as invisible to current IP
   routers as bridges are and, like routers, they terminate the bridge
   spanning tree protocol. In creating an RBridge management model, the
   device is viewed primarily as a customer bridge. For a discussion of
   the problem addressed by TRILL (Transparent Interconnection of Lots
   of Links), see [RFC5556].

RBridges support features specified for transparent bridges in
IEEE 802.1, and the corresponding MIB modules are used to manage
those features. For IS-IS purposes, the corresponding MIB module is
used to manage the protocol. This MIB module specifies those objects
that are TRILL-specific and hence not available in other MIB modules.

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 RBridge MIB module is intended as an overall framework for
   managing RBridges, also known as TRILL Switches. Where possible, the
   MIB references existing MIB definitions in order to maximize reuse.
   This results in a considerable emphasis on the relationship with
   other MIB modules.

   Starting with the physical interfaces, there are requirements for
   certain elements of the IF-MIB to be implemented. These elements are
   required in order to connect the per-port parameters to higher-level
   functions of the physical device.

   Transparent bridging, VLANs, traffic classes, and multicast filtering
   are supported by the TRILL protocol, and the corresponding management
   is expected to conform to the BRIDGE-MIB module [RFC4188] and to the
   P-BRIDGE-MIB and Q-BRIDGE-MIB modules [RFC4363].

   The IS-IS routing protocol is used in order to determine the optimum
   pair-wise forwarding path. This protocol is managed using the IS-IS
   MIB module defined in [RFC4444]. Since the TRILL protocol specifies
   the use of a single level and a fixed area address of zero, some
   IS-IS MIB objects are not applicable. Some IS-IS MIB objects are
   used in the TRILL protocol.

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].

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. These are supplemented with required elements of the
   IF-MIB, ISIS-MIB, BRIDGE-MIB, P-BRIDGE-MIB, Q-BRIDGE-MIB, and IEEE
   Bridge MIB modules.

5.1. Textual Conventions

   Textual conventions are defined to represent object types relevant to
   TRILL.

5.2. The rbridgeBase Subtree

   This subtree contains system- and port-specific objects applicable to
   all RBridges.

5.3. The rbridgeFdb Subtree

   This subtree contains objects applicable to the forwarding database
   used by the RBridge in making packet-forwarding decisions. Because
   it contains additional information used by the TRILL protocol not
   applicable to 802.1D/Q bridges, it is a superset of the corresponding
   subtrees defined in the BRIDGE-MIB and Q-BRIDGE-MIB.

5.4. The rbridgeVlan Subtree

   This subtree describes objects applicable to VLANs configured on the
   RBridge.

5.5. The rbridgeEsadi Subtree

   This subtree describes objects relevant to RBridges that support the
   optional End-Station Address Distribution Information (ESADI)
   protocol.

5.6. The rbridgeCounters Subtree

   This subtree contains statistics maintained by RBridges that can aid
   in monitoring and troubleshooting networks connected by them.

5.7. The rbridgeSnooping Subtree

   This subtree describes objects applicable to RBridges capable of
   snooping IPv4 and/or IPv6 multicast control frames and pruning IP
   multicast traffic based on detection of IP multicast routers and
   listeners.

5.8. The rbridgeDtree Subtree

   This subtree contains objects relevant to distribution trees computed
   by RBridges for the forwarding of multi-destination frames.

5.9. The rbridgeTrill Subtree

   This subtree contains objects applicable to the TRILL IS-IS protocol,
   beyond what is available in the ISIS-MIB.

5.10. The Notifications Subtree

   The defined notifications are focused on the TRILL protocol
   functionality. Notifications are defined for changes in the
   Designated RBridge status and the topology.

6. Relationship to Other MIB Modules

   The IF-MIB, BRIDGE-MIB, P-BRIDGE-MIB, Q-BRIDGE-MIB,
   IEEE8021-BRIDGE-MIB, IEEE8021-Q-BRIDGE-MIB, and ISIS-MIB modules all
   contain objects relevant to the RBridge MIB. Management objects
   contained in these modules are not duplicated here, to reduce overlap
   to the extent possible.

   The Bridge MIB modules were originally written in the IETF and
   implemented by many vendors. Per [RFC4663], this has recently been
   transferred to the IEEE 802.1 working group. As vendors may have
   implemented either the IETF or IEEE Bridge MIB modules, this RBridge
   MIB module is designed to work with either one.

6.1. Relationship to IF-MIB

   The port identification elements MUST be implemented in order to
   allow them to be cross-referenced. The Interfaces MIB [RFC2863]
   requires that any MIB module that is an adjunct of the Interfaces MIB
   clarify specific areas within the Interfaces MIB module. These areas
   were intentionally left vague in the Interfaces MIB module to avoid
   over-constraining the MIB, thereby precluding management of certain
   media types. Section 4 of [RFC2863] enumerates several areas that a

media-specific MIB module must clarify. The implementor is referred
to [RFC2863] in order to understand the general intent of these
areas.

6.2. Relationship to BRIDGE-MIB

The following subtrees in the BRIDGE-MIB [RFC4188] contain
information relevant to RBridges when the corresponding functionality
is implemented.

   o dot1dBase

   o dot1dTp

   o dot1dStatic

6.3. Relationship to P-BRIDGE-MIB

The following subtrees in the P-BRIDGE-MIB [RFC4363] contain
information relevant to RBridges when the corresponding functionality
is implemented.

   o dot1dExtBase

   o dot1dPriority

   o dot1dGarp

   o dot1dGmrp

   o dot1dTpHCPortTable

   o dot1dTpPortOverflowTable

6.4. Relationship to Q-BRIDGE-MIB

The following groups in the Q-BRIDGE-MIB [RFC4363] contain
information relevant to RBridges when the corresponding functionality
is implemented. This functionality is also contained in the
IEEE8021-Q-BRIDGE-MIB.

   o dot1qBase

   o dot1qTp

   o dot1qStatic

   o dot1qVlan

   o dot1vProtocol

6.5. Relationship to IEEE8021-BRIDGE-MIB

   The following subtrees in the IEEE8021-BRIDGE-MIB contain information
   relevant to RBridges when the corresponding functionality is
   implemented.

   o ieee8021BridgeBase

   o ieee8021BridgeTp

   o ieee8021BridgePriority

   o ieee8021BridgeMrp

   o ieee8021BridgeMmrp

   o ieee8021BridgeInternalLan

   o ieee8021BridgeDot1d

6.6. Relationship to IEEE8021-Q-BRIDGE-MIB

   The following subtrees in the IEEE8021-Q-BRIDGE-MIB contain
   information relevant to RBridges when the corresponding functionality
   is implemented.

   o ieee8021QBridgeBase

   o ieee8021QBridgeTp

   o ieee8021QBridgeStatic

   o ieee8021QBridgeVlan

   o ieee8021QBridgeProtocol

6.7. Relationship to ISIS-MIB

   "Management Information Base for Intermediate System to Intermediate
   System (IS-IS)" [RFC4444] defines a MIB module for the IS-IS routing
   protocol when it is used to construct routing tables for IP networks.
   While most of these objects are applicable to the TRILL layer 2
   implementation, note the IS-IS constraints for the current version of
   TRILL [RFC6325]:

   o The TRILL IS-IS instance uses a single Level 1 IS-IS area.

   o The TRILL Level 1 IS-IS area uses the fixed area address zero.

   o The TRILL IS-IS instance is not used for IP address advertisement.

   o The TRILL IS-IS instance is used for only a single protocol:
      TRILL.

   Accordingly, tables that report IP address reachability and tables
   that allow configuration or reporting of multiple IS-IS areas,
   multiple IS-IS levels, or multiple protocols will be empty in the
   ISIS-MIB module for the current version of TRILL.

   Note also that when more than one instance of the IS-IS protocol is
   running on a device, as in the case of a device performing both
   RBridge and IS-IS IP router functions, multiple instances of the
   ISIS-MIB module can be distinguished by the use of SNMPv3 contexts or
   SNMPv1 communities.

6.8. MIB Modules Required for IMPORTS

   The following MIB module imports objects from the SNMPv2-SMI
   [RFC2578], SNMPv2-TC [RFC2579], SNMPv2-CONF [RFC2580], IF-MIB
   [RFC2863], INET-ADDRESS-MIB [RFC4001], BRIDGE-MIB [RFC4188],
   and Q-BRIDGE-MIB [RFC4363]. (The IEEE Bridge MIB modules import
   similar TCs.)

7. Definition of the RBridge MIB Module

    RBRIDGE-MIB DEFINITIONS ::= BEGIN

    -- -- --
    -- MIB for RBRIDGE devices, also known as TRILL Switches
    -- -- --
    IMPORTS
        MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
        Counter32, Counter64, Unsigned32, mib-2
            FROM SNMPv2-SMI   -- RFC2578
        TEXTUAL-CONVENTION, TruthValue, MacAddress, RowStatus
            FROM SNMPv2-TC   -- RFC2579
        MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
            FROM SNMPv2-CONF   -- RFC2580
        VlanId, PortList
            FROM Q-BRIDGE-MIB   -- RFC4363
        InetAddress, InetAddressType
            FROM INET-ADDRESS-MIB   -- RFC4001
        BridgeId
            FROM BRIDGE-MIB   -- RFC4188
        InterfaceIndex
            FROM IF-MIB   -- RFC2863
        ;

    rbridgeMIB MODULE-IDENTITY
    LAST-UPDATED "201301070000Z"
    ORGANIZATION "IETF TRILL Working Group"
    CONTACT-INFO
          "http://datatracker.ietf.org/wg/trill/charter/
          Email: trill@ietf.org

               Anil Rijhsinghani
               Hewlett-Packard
           Tel: +1 508 323 1251
         Email: anil@charter.net

               Kate Zebrose
               HW Embedded
           Tel: +1 617 840 9673
         Email: zebrose@alum.mit.edu"

        DESCRIPTION
            "The RBridge MIB module for managing switches that support
            the TRILL protocol."

    REVISION   "201301070000Z"

        DESCRIPTION
            "Initial version, published as RFC 6850.

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            (http://trustee.ietf.org/license-info)."

            ::= { mib-2 214 }

    -- --- --
    -- Subtrees in the RBridge MIB
    -- --- --

    rbridgeNotifications   OBJECT IDENTIFIER ::= { rbridgeMIB 0 }
    rbridgeObjects   OBJECT IDENTIFIER ::= { rbridgeMIB 1 }
    rbridgeConformance   OBJECT IDENTIFIER ::= { rbridgeMIB 2 }

    rbridgeBase   OBJECT IDENTIFIER ::= { rbridgeObjects 1 }
    rbridgeFdb   OBJECT IDENTIFIER ::= { rbridgeObjects 2 }
    rbridgeVlan   OBJECT IDENTIFIER ::= { rbridgeObjects 3 }
    rbridgeEsadi   OBJECT IDENTIFIER ::= { rbridgeObjects 4 }
    rbridgeCounter   OBJECT IDENTIFIER ::= { rbridgeObjects 5 }
    rbridgeSnooping   OBJECT IDENTIFIER ::= { rbridgeObjects 6 }
    rbridgeDtree   OBJECT IDENTIFIER ::= { rbridgeObjects 7 }
    rbridgeTrill   OBJECT IDENTIFIER ::= { rbridgeObjects 8 }

    -- --- --
    -- Type Definitions
    -- --- --

    RbridgeAddress ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "1x:"
        STATUS current
        DESCRIPTION
            "The Media Access Control (MAC) address used by an RBridge
            port. This may match the RBridge IS-IS SystemID."
        SYNTAX OCTET STRING (SIZE (6))

```
    RbridgeNickname ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "The 16-bit identifier used in TRILL as an
            abbreviation for the RBridge's 48-bit IS-IS System ID.
            The value 0 means a nickname is not specified, the values
            0xFFC0 through 0xFFFE are reserved for future allocation,
            and the value 0xFFFF is permanently reserved."
        REFERENCE
            "RFC 6325, Section 3.7"
        SYNTAX Unsigned32 (0..65471)

    --
    -- the rbridgeBase subtree
    --
    -- Implementation of the rbridgeBase subtree is mandatory for all
    -- RBridges.
    --

    rbridgeBaseTrillVersion OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The maximum TRILL version number that this RBridge
            supports."
        REFERENCE
            "RFC 6325, Section 3.2"
        ::= { rbridgeBase 1 }

    rbridgeBaseNumPorts OBJECT-TYPE
        SYNTAX      Unsigned32
        UNITS       "ports"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of ports controlled by this RBridge."
        REFERENCE
            "RFC 6325, Section 2.6.1"
        ::= { rbridgeBase 2 }

    rbridgeBaseForwardDelay OBJECT-TYPE
        SYNTAX      Unsigned32 (4..30)
        UNITS       "seconds"
        MAX-ACCESS  read-write
        STATUS      current
```

        DESCRIPTION
            "Modified aging time for address entries after an appointed
            forwarder change.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.8.3"
        ::= { rbridgeBase 3 }

    rbridgeBaseUniMultipathEnable OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "The enabled status of unicast TRILL multipathing.
            It is enabled when true.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Appendix C"
        ::= { rbridgeBase 4 }

    rbridgeBaseMultiMultipathEnable OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "The enabled status of multi-destination TRILL multipathing.
            It is enabled when true.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Appendix C"
        ::= { rbridgeBase 5 }

    rbridgeBaseAcceptEncapNonadj OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "Accept TRILL-encapsulated frames from a neighbor with which
            this RBridge does not have an IS-IS adjacency, when the value
            of this object is 'true'.

          The value of this object MUST be retained across
          re-initializations of the management system."
      REFERENCE
          "RFC 6325, Section 4.6.2"
      ::= { rbridgeBase 6 }

   rbridgeBaseNicknameNumber OBJECT-TYPE
      SYNTAX   Unsigned32 (1..256)
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
          "The number of nicknames this RBridge should acquire.
          These can be acquired dynamically or configured
          statically. This value represents the maximum
          number of entries in rbridgeBaseNicknameTable.

          The value of this object MUST be retained across
          re-initializations of the management system."
      REFERENCE
          "RFC 6325, Section 3.7.3"
      ::= { rbridgeBase 7 }

   -- -- --
   -- The RBridge Base Nickname Table
   -- -- --

   rbridgeBaseNicknameTable OBJECT-TYPE
      SYNTAX   SEQUENCE OF RbridgeBaseNicknameEntry
      MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
          "A table that contains information about nicknames
          configured by an operator or learned dynamically
          by this RBridge."
      REFERENCE
          "RFC 6325, Section 3.7"
      ::= { rbridgeBase 8 }

   rbridgeBaseNicknameEntry OBJECT-TYPE
      SYNTAX   RbridgeBaseNicknameEntry
      MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
          "A list of information for each nickname of the RBridge."
      REFERENCE
          "RFC 6325, Section 3.7"
      INDEX { rbridgeBaseNicknameName }
      ::= { rbridgeBaseNicknameTable 1 }

```
    RbridgeBaseNicknameEntry ::=
        SEQUENCE {
            rbridgeBaseNicknameName
                RbridgeNickname,
            rbridgeBaseNicknamePriority
                Unsigned32,
            rbridgeBaseNicknameDtrPriority
                Unsigned32,
            rbridgeBaseNicknameType
                INTEGER,
            rbridgeBaseNicknameRowStatus
                RowStatus
        }

    rbridgeBaseNicknameName OBJECT-TYPE
        SYNTAX       RbridgeNickname
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "Nicknames are 16-bit quantities that act as
            abbreviations for RBridge's 48-bit IS-IS System ID to
            achieve a more compact encoding."
        REFERENCE
            "RFC 6325, Section 3.7"
        ::= { rbridgeBaseNicknameEntry 1 }

    rbridgeBaseNicknamePriority OBJECT-TYPE
        SYNTAX       Unsigned32 (0..255)
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This RBridge's priority to hold this nickname.  When
            the nickname is configured, the default value of this
            object is 192.  When the nickname is configured, the most
            significant bit (0x80) must be set and the bottom 7 bits
            have the default value of 0x40, so 0x80 + 0x40 == 0xC0,
            which is 192 decimal.  Additionally, the bottom 7 bits
            could be configured to a value other than 0x40.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 3.7"
        DEFVAL       { 192 }
        ::= { rbridgeBaseNicknameEntry 2 }
```

```
   rbridgeBaseNicknameDtrPriority OBJECT-TYPE
       SYNTAX       Unsigned32 (1..65535)
       MAX-ACCESS   read-create
       STATUS       current
       DESCRIPTION
           "The distribution tree root priority for this nickname.
           The default value of this object is 32768.

           The value of this object MUST be retained across
           re-initializations of the management system."
       REFERENCE
           "RFC 6325, Section 4.5"
       DEFVAL       { 32768 }
       ::= { rbridgeBaseNicknameEntry 3 }

   rbridgeBaseNicknameType OBJECT-TYPE
       SYNTAX       INTEGER {
                       static(1),
                       dynamic(2)
                   }
       MAX-ACCESS   read-only
       STATUS       current
       DESCRIPTION
           "This object indicates the status of the entry.  The
           default value is static(1).
               static(1) - this entry has been configured and
                   will remain after the next reset of the RBridge.
               dynamic(2) - this entry has been acquired by the
                   RBridge nickname acquisition protocol."
       REFERENCE
           "RFC 6325, Section 3.7"
       DEFVAL       { static }
       ::= { rbridgeBaseNicknameEntry 4 }

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

```
-- ---------------------------------------------------------- --
-- The RBridge Port Table
-- ---------------------------------------------------------- --

rbridgeBasePortTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF RbridgeBasePortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains generic information about every
        port that is associated with this RBridge."
    REFERENCE
        "RFC 6325, Section 5.3"
    ::= { rbridgeBase 9 }

rbridgeBasePortEntry OBJECT-TYPE
    SYNTAX      RbridgeBasePortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of information for each port of the bridge."
    REFERENCE
        "RFC 6325, Section 5.3"
    INDEX  { rbridgeBasePort }
    ::= { rbridgeBasePortTable 1 }

RbridgeBasePortEntry ::=
    SEQUENCE {
        rbridgeBasePort
            Unsigned32,
        rbridgeBasePortIfIndex
            InterfaceIndex,
        rbridgeBasePortDisable
            TruthValue,
        rbridgeBasePortTrunkPort
            TruthValue,
        rbridgeBasePortAccessPort
            TruthValue,
        rbridgeBasePortP2pHellos
            TruthValue,
        rbridgeBasePortState
            INTEGER,
        rbridgeBasePortInhibitionTime
            Unsigned32,
        rbridgeBasePortDisableLearning
            TruthValue,
        rbridgeBasePortDesiredDesigVlan
            VlanId,
```

```
        rbridgeBasePortDesigVlan
            VlanId,
        rbridgeBasePortStpRoot
            BridgeId,
        rbridgeBasePortStpRootChanges
            Counter32,
        rbridgeBasePortStpWiringCloset
            BridgeId
}

rbridgeBasePort OBJECT-TYPE
    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The port number of the port for which this entry
        contains RBridge management information."
    REFERENCE
        "RFC 6325, Section 5.3"
    ::= { rbridgeBasePortEntry 1 }

rbridgeBasePortIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the instance of the ifIndex object,
        defined in the IF-MIB, for the interface corresponding
        to this port.  The RBridge port sits on top of
        this interface."
    ::= { rbridgeBasePortEntry 2 }

rbridgeBasePortDisable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Disable port bit.  When this bit is set (true), all frames
        received or to be transmitted are discarded, with the
        possible exception of some layer 2 control frames that may
        be generated and transmitted or received and processed
        locally.  Default value is 'false'.

        The value of this object MUST be retained across
        re-initializations of the management system."
```

```
        REFERENCE
            "RFC 6325, Section 4.9.1"
        DEFVAL      { false }
        ::= { rbridgeBasePortEntry 3 }

    rbridgeBasePortTrunkPort OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "End-station service disable (trunk port) bit.  When this bit
            is set (true), all native frames received on the port and all
            native frames that would have been sent on the port are
            discarded.  Default value is 'false'.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.9.1"
        DEFVAL      { false }
        ::= { rbridgeBasePortEntry 4 }

    rbridgeBasePortAccessPort OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "TRILL traffic disable (access port) bit.  If this bit is
            set, the goal is to avoid sending any TRILL frames, except
            TRILL-Hello frames, on the port, since it is intended only
            for native end-station traffic.  This ensures that the link
            is not on the shortest path for any destination.  Default
            value is 'false'.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.9.1"
        DEFVAL      { false }
        ::= { rbridgeBasePortEntry 5 }

    rbridgeBasePortP2pHellos OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "Use point-to-point (P2P) Hellos bit.  If this bit is set,
            Hellos sent on this port are IS-IS P2P Hellos, not the
```

         default TRILL-Hellos. In addition, the IS-IS P2P three-way
         handshake is used on P2P RBridge links. Default value is
         'false'.

         The value of this object MUST be retained across
         re-initializations of the management system."
     REFERENCE
         "RFC 6325, Section 4.9.1"
     DEFVAL   { false }
     ::= { rbridgeBasePortEntry 6 }

  rbridgeBasePortState OBJECT-TYPE
     SYNTAX   INTEGER {
                       uninhibited(1),
                       portInhibited(2),
                       vlanInhibited(3),
                       disabled(4),
                       broken(5)
                   }
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
         "The port's current state. If the entire port is
         inhibited, its state is portInhibited(2). If specific VLANs
         are inhibited, the state is vlanInhibited(3), and
         rbridgeVlanPortTable will tell which VLANs are inhibited.
         For ports that are disabled (see rbridgeBasePortDisable),
         this object will have a value of disabled(4). If the
         RBridge has detected a port that is malfunctioning, it will
         place that port into the broken(5) state."
     REFERENCE
         "RFC 6325, Section 4.2.4.3"
     ::= { rbridgeBasePortEntry 7 }

  rbridgeBasePortInhibitionTime OBJECT-TYPE
     SYNTAX   Unsigned32
     UNITS   "seconds"
     MAX-ACCESS read-write
     STATUS   current
     DESCRIPTION
         "Time in seconds that this RBridge will inhibit forwarding
         on this port after it observes a spanning tree root bridge
         change on a link or receives conflicting VLAN forwarder
         information. The default value is 30.

         The value of this object MUST be retained across
         re-initializations of the management system."

```
        REFERENCE
            "RFC 6325, Section 4.2.4.3"
        DEFVAL      { 30 }
        ::= { rbridgeBasePortEntry 8 }

    rbridgeBasePortDisableLearning OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "Disable learning of MAC addresses seen on this port.
            To disable learning, the value of this object must be
            set to 'true'.  The default is 'false'.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.8"
        DEFVAL      { false }
        ::= { rbridgeBasePortEntry 9 }

    rbridgeBasePortDesiredDesigVlan OBJECT-TYPE
        SYNTAX      VlanId
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
            "The VLAN that a Designated RBridge (DRB) will specify in
            its TRILL-Hellos as the VLAN to be used by all RBridges on
            the link for TRILL frames.  This VLAN must be enabled on
            this port.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.4.3"
        ::= { rbridgeBasePortEntry 10 }

    rbridgeBasePortDesigVlan OBJECT-TYPE
        SYNTAX      VlanId
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The VLAN being used on this link for TRILL frames."
        REFERENCE
            "RFC 6325, Section 4.4.3"
        ::= { rbridgeBasePortEntry 11 }
```

```
rbridgeBasePortStpRoot OBJECT-TYPE
    SYNTAX       BridgeId
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The bridge identifier of the root of the spanning tree,
        as learned from a Bridge PDU (BPDU) received on this port.
        For the Multiple Spanning Tree Protocol (MSTP), this is
        the root bridge of the Common and Internal Spanning Tree
        (CIST).  If no BPDU has been heard, the value returned
        is a string of zeros."
    REFERENCE
        "RFC 6325, Section 4.2.4.3"
    ::= { rbridgeBasePortEntry 12 }

rbridgeBasePortStpRootChanges OBJECT-TYPE
    SYNTAX       Counter32
    UNITS        "changes"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of times a change in the root bridge is seen from
        spanning tree BPDUs received on this port, indicating a
        change in bridged LAN topology.  Each such change may cause
        the port to be inhibited for a period of time.  This counter
        should be synchronized with ifCounterDiscontinuityTime.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system."
    REFERENCE
        "RFC 6325, Section 4.9.3.2"
    ::= { rbridgeBasePortEntry 13 }

rbridgeBasePortStpWiringCloset OBJECT-TYPE
    SYNTAX       BridgeId
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
        "The Bridge ID to be used as the spanning tree root in BPDUs
        sent for the Wiring Closet topology solution described in
        [RFC6325].  Note that the same value of this object must be
        set on all RBridge ports participating in this solution.
        The default value is all 0s.  A non-zero value configured
        into this object indicates that this solution is in use.

        The value of this object MUST be retained across
        re-initializations of the management system."
```

```
    REFERENCE
        "RFC 6325, Appendix A.3.3"
    ::= { rbridgeBasePortEntry 14 }


-- ----------------------------------------------------------------
-- RBridge Forwarding Database
-- ----------------------------------------------------------------


rbridgeConfidenceNative OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The confidence level associated with MAC addresses
        learned from native frames.  This is applicable to
        all RBridge ports.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.8.1"
    ::= { rbridgeFdb 1 }

rbridgeConfidenceDecap OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The confidence level associated with inner MAC addresses
        learned after decapsulation of a TRILL data frame.
        This is applicable to all RBridge ports.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.8.1"
    ::= { rbridgeFdb 2 }

rbridgeConfidenceStatic OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The confidence level associated with MAC addresses that
        are statically configured.  The default value is 255.

        The value of this object MUST be retained across
        re-initializations of the management system."
```

```
      REFERENCE
          "RFC 6325, Section 4.8.2"
      DEFVAL      { 255 }
      ::= { rbridgeFdb 3 }


   -- ----------------------------------------------------------------
   -- Multiple Forwarding Databases for RBridges
   --
   -- This allows for an instance per FdbId, as defined in the
   -- Bridge MIB.
   --
   -- Each VLAN may have an independent FDB, or multiple VLANs may
   -- share one.
   -- ----------------------------------------------------------------

   rbridgeUniFdbTable OBJECT-TYPE
       SYNTAX      SEQUENCE OF RbridgeUniFdbEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
           "A table that contains information about unicast entries
           for which the device has forwarding and/or filtering
           information.  This information is used by the
           transparent bridging function in determining how to
           propagate a received frame."
       REFERENCE
           "RFC 6325, Section 4.8"
       ::= { rbridgeFdb 4 }

   rbridgeUniFdbEntry OBJECT-TYPE
       SYNTAX      RbridgeUniFdbEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
           "Information about a specific unicast MAC address for
           which the RBridge has some forwarding and/or filtering
           information."
       INDEX   { rbridgeFdbId, rbridgeUniFdbAddr }
       ::= { rbridgeUniFdbTable 1 }

   RbridgeUniFdbEntry ::=
       SEQUENCE {
           rbridgeFdbId
               Unsigned32,
           rbridgeUniFdbAddr
               MacAddress,
```

```
            rbridgeUniFdbPort
                Unsigned32,
            rbridgeUniFdbNickname
                RbridgeNickname,
            rbridgeUniFdbConfidence
                Unsigned32,
            rbridgeUniFdbStatus
                INTEGER
        }

    rbridgeFdbId OBJECT-TYPE
        SYNTAX      Unsigned32 (0..4294967295)
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "The identity of this Filtering Database."
        ::= { rbridgeUniFdbEntry 1 }

    rbridgeUniFdbAddr OBJECT-TYPE
        SYNTAX      MacAddress
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "A unicast MAC address for which the device has
            forwarding information."
        ::= { rbridgeUniFdbEntry 2 }

    rbridgeUniFdbPort OBJECT-TYPE
        SYNTAX      Unsigned32 (0..65535)
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "Either the value '0', or the RBridge port number of the
            port on which a frame having a source address equal to the
            value of the corresponding instance of rbridgeUniFdbAddr
            has been seen.  A value of '0' indicates that the port
            number has not been learned but that the device does have
            some information about this MAC address.

            Implementors are encouraged to assign the port value to
            this object whenever it is available, even for addresses
            for which the corresponding value of rbridgeUniFdbStatus is
            not learned(3)."
        ::= { rbridgeUniFdbEntry 3 }

    rbridgeUniFdbNickname OBJECT-TYPE
        SYNTAX      RbridgeNickname
        MAX-ACCESS  read-only
```

```
       STATUS        current
       DESCRIPTION
           "The RBridge nickname that is placed in the egress
           nickname field of a TRILL frame sent to this
           rbridgeFdbAddress in this rbridgeFdbId."
       REFERENCE
           "RFC 6325, Section 4.8.1"
       ::= { rbridgeUniFdbEntry 4 }

   rbridgeUniFdbConfidence OBJECT-TYPE
       SYNTAX        Unsigned32 (0..255)
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The confidence level associated with this entry."
       REFERENCE
           "RFC 6325, Section 4.8.1"
       ::= { rbridgeUniFdbEntry 5 }

   rbridgeUniFdbStatus OBJECT-TYPE
       SYNTAX        INTEGER {
                       other(1),
                       invalid(2),
                       learned(3),
                       self(4),
                       mgmt(5),
                       esadi(6)
                   }
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The status of this entry.  The meanings of the values
           are:
               other(1) - none of the following.
               invalid(2) - this entry is no longer valid (e.g., it
                   was learned but has since aged out) but has not
                   yet been flushed from the table.
               learned(3) - the information in this entry was learned
                   and is being used.
               self(4) - the value of the corresponding instance of
                   rbridgeFdbAddress represents one of the device's
                   addresses.  The corresponding instance of
                   rbridgeFdbPort indicates which of the device's
                   ports has this address.
```

```
            mgmt(5) - the value of the corresponding instance of
                rbridgeFdbAddress was configured by management.
            esadi(6) - the value of the corresponding instance of
                rbridgeFdbAddress was learned from ESADI."
      ::= { rbridgeUniFdbEntry 6 }

   -- ----------------------------------------------------------------
   -- RBridge Forwarding Information Base (FIB)
   -- ----------------------------------------------------------------

   rbridgeUniFibTable OBJECT-TYPE
       SYNTAX       SEQUENCE OF RbridgeUniFibEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A table that contains information about nicknames known by
           the RBridge.  If Equal-Cost Multipath (ECMP) is implemented,
           there are as many entries for a nickname as there are ECMP
           paths available for it."
       ::= { rbridgeFdb 5 }

   rbridgeUniFibEntry OBJECT-TYPE
       SYNTAX       RbridgeUniFibEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A list of information about nicknames known by the RBridge.
           If ECMP is implemented, there are as many entries as there
           are ECMP paths available for a given nickname."
       INDEX   { rbridgeUniFibNickname, rbridgeUniFibPort,
                 rbridgeUniFibNextHop }
       ::= { rbridgeUniFibTable 1 }

   RbridgeUniFibEntry ::=
       SEQUENCE {
           rbridgeUniFibNickname
               RbridgeNickname,
           rbridgeUniFibPort
               Unsigned32,
           rbridgeUniFibNextHop
               RbridgeNickname,
           rbridgeUniFibHopCount
               Unsigned32
       }

   rbridgeUniFibNickname OBJECT-TYPE
       SYNTAX       RbridgeNickname
       MAX-ACCESS   not-accessible
```

```
        STATUS        current
        DESCRIPTION
            "An RBridge nickname for which this RBridge has
            forwarding information."
        ::= { rbridgeUniFibEntry 1 }

    rbridgeUniFibPort OBJECT-TYPE
        SYNTAX        Unsigned32 (0..65535)
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The RBridge port number of the port attached to the
            next-hop RBridge for the path towards the RBridge whose
            nickname is specified in this entry."
        ::= { rbridgeUniFibEntry 2 }

    rbridgeUniFibNextHop OBJECT-TYPE
        SYNTAX        RbridgeNickname
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The nickname of the next-hop RBridge for the path
            towards the RBridge whose nickname is specified in this
            entry."
        ::= { rbridgeUniFibEntry 3 }

    rbridgeUniFibHopCount OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The hop count from this ingress RBridge to the egress
            RBridge whose nickname is specified in
            rbridgeUniFibNickname."
        ::= { rbridgeUniFibEntry 4 }

    rbridgeMultiFibTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF RbridgeMultiFibEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "A table that contains information about egress nicknames
            used for multi-destination frame forwarding by this
            RBridge."
        ::= { rbridgeFdb 6 }
```

```
rbridgeMultiFibEntry OBJECT-TYPE
    SYNTAX       RbridgeMultiFibEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "A list of information about egress nicknames used for
        multi-destination frame forwarding by this RBridge."
    INDEX   { rbridgeMultiFibNickname }
    ::= { rbridgeMultiFibTable 1 }

RbridgeMultiFibEntry ::=
    SEQUENCE {
        rbridgeMultiFibNickname
            RbridgeNickname,
        rbridgeMultiFibPorts
            PortList
    }

rbridgeMultiFibNickname OBJECT-TYPE
    SYNTAX       RbridgeNickname
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The nickname of the multicast distribution tree."
    ::= { rbridgeMultiFibEntry 1 }

rbridgeMultiFibPorts OBJECT-TYPE
    SYNTAX       PortList
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The list of ports to which a frame destined to this
        multicast distribution tree is flooded.  This may be pruned
        further based on other forwarding information."
    ::= { rbridgeMultiFibEntry 2 }
```

```
   -- ------------------------------------------------------- --
   -- The RBridge VLAN Table
   -- ------------------------------------------------------- --

   rbridgeVlanTable  OBJECT-TYPE
       SYNTAX       SEQUENCE OF RbridgeVlanEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A table that contains information about VLANs on the
           RBridge."
       ::= { rbridgeVlan 1 }

   rbridgeVlanEntry OBJECT-TYPE
       SYNTAX       RbridgeVlanEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A list of information about VLANs on the RBridge."
       INDEX   { rbridgeVlanIndex }
       ::= { rbridgeVlanTable 1 }

   RbridgeVlanEntry ::=
       SEQUENCE {
           rbridgeVlanIndex
               Unsigned32,
           rbridgeVlanForwarderLosts
               Counter32,
           rbridgeVlanDisableLearning
               TruthValue,
           rbridgeVlanSnooping
               INTEGER
       }

   rbridgeVlanIndex OBJECT-TYPE
       SYNTAX       Unsigned32 (1..4094|4096..4294967295)
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "The VLAN-ID referring to this VLAN."
       ::= { rbridgeVlanEntry 1 }

   rbridgeVlanForwarderLosts OBJECT-TYPE
       SYNTAX       Counter32
       UNITS        "times"
       MAX-ACCESS   read-only
       STATUS       current
```

```
      DESCRIPTION
          "The number of times this RBridge has lost appointed
          forwarder status for this VLAN on any of its ports.

          Discontinuities in the value of this counter can occur
          at re-initialization of the management system."
      REFERENCE
          "RFC 6325, Section 4.8.3"
      ::= { rbridgeVlanEntry 2 }

   rbridgeVlanDisableLearning OBJECT-TYPE
      SYNTAX        TruthValue
      MAX-ACCESS  read-write
      STATUS        current
      DESCRIPTION
          "Disable learning of MAC addresses seen in this VLAN.
          One application of this may be to restrict learning to
          ESADI.  To disable learning, the value of this object
          should be set to 'true'.  The default is 'false'.

          The value of this object MUST be retained across
          re-initializations of the management system."
      REFERENCE
          "RFC 6325, Section 4.8"
      DEFVAL        { false }
      ::= { rbridgeVlanEntry 3 }

   rbridgeVlanSnooping OBJECT-TYPE
      SYNTAX        INTEGER {
                      notSupported(1),
                      ipv4(2),
                      ipv6(3),
                      ipv4v6(4)
                    }
      MAX-ACCESS  read-only
      STATUS        current
      DESCRIPTION
          "IP Multicast Snooping on this VLAN.  For RBridges
          performing both IPv4 and IPv6 IP Multicast Snooping, the
          value returned is ipv4v6(4)."
      REFERENCE
          "RFC 6325, Section 4.7"
      ::= { rbridgeVlanEntry 4 }
```

```
   -- --------------------------------------------------------- --
   -- The RBridge VLAN Port Table
   -- --------------------------------------------------------- --

   rbridgeVlanPortTable  OBJECT-TYPE
       SYNTAX       SEQUENCE OF RbridgeVlanPortEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A table that contains information about VLANs on an RBridge
           port."
       ::= { rbridgeVlan 2 }

   rbridgeVlanPortEntry OBJECT-TYPE
       SYNTAX       RbridgeVlanPortEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "A list of information about VLANs on the RBridge port."
       INDEX   { rbridgeBasePort, rbridgeVlanIndex }
       ::= { rbridgeVlanPortTable 1 }

   RbridgeVlanPortEntry ::=
       SEQUENCE {
           rbridgeVlanPortInhibited
               TruthValue,
           rbridgeVlanPortForwarder
               TruthValue,
           rbridgeVlanPortAnnouncing
               TruthValue,
           rbridgeVlanPortDetectedVlanMapping
               TruthValue
       }

   rbridgeVlanPortInhibited OBJECT-TYPE
       SYNTAX       TruthValue
       MAX-ACCESS   read-only
       STATUS       current
       DESCRIPTION
           "This VLAN has been inhibited by the RBridge due to
           conflicting forwarder information received from another
           RBridge, when the value of this object is 'true'."
       REFERENCE
           "RFC 6325, Section 4.2.4.3"
       ::= { rbridgeVlanPortEntry 1 }

   rbridgeVlanPortForwarder OBJECT-TYPE
       SYNTAX       TruthValue
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This RBridge is an appointed forwarder for this VLAN
        on this port, when the value of this object is 'true'."
    REFERENCE
        "RFC 6325, Section 4.2.4.3"
    ::= { rbridgeVlanPortEntry 2 }

rbridgeVlanPortAnnouncing OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "TRILL-Hellos tagged with this VLAN can be sent by this
        RBridge on this port, when the value of this object
        is 'true'.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.4.3"
    DEFVAL      { true }
    ::= { rbridgeVlanPortEntry 3 }

rbridgeVlanPortDetectedVlanMapping OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "VLAN mapping has been detected on the link attached
        to this port, when the value of this object is 'true'."
    REFERENCE
        "RFC 6325, Section 4.4.5"
    ::= { rbridgeVlanPortEntry 4 }


-- ----------------------------------------------------------- --
-- The RBridge Port Counter Table
--
-- These counters supplement counters in the Bridge MIB.
--
-- For example, total frames received by a bridge port and total
-- frames transmitted by a bridge port are reported in the
-- Port In Frames and Port Out Frames counters of the Bridge MIB.
-- These total bridge frame counters include native as well as
-- encapsulated frames.
--
```

```
   -- As another example, frames discarded due to excessive frame
   -- size are reported in the port counter MTU Exceeded Discards
   -- in the Bridge MIB.
   -- ----------------------------------------------------------- --

   rbridgePortCounterTable  OBJECT-TYPE
       SYNTAX      SEQUENCE OF RbridgePortCounterEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
           "A table that contains per-port counters for this RBridge."
       ::= { rbridgeCounter 1 }

   rbridgePortCounterEntry OBJECT-TYPE
       SYNTAX      RbridgePortCounterEntry
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
           "Counters for a port on this RBridge."
       INDEX   { rbridgeBasePort }
       ::= { rbridgePortCounterTable 1 }

   RbridgePortCounterEntry ::=
       SEQUENCE {
           rbridgePortRpfCheckFails
               Counter32,
           rbridgePortHopCountExceeds
               Counter32,
           rbridgePortOptionDrops
               Counter32,
           rbridgePortTrillInFrames
               Counter64,
           rbridgePortTrillOutFrames
               Counter64
       }

   rbridgePortRpfCheckFails OBJECT-TYPE
       SYNTAX      Counter32
       UNITS       "frames"
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           "The number of times a multi-destination frame was
           dropped on this port because the Reverse Path Forwarding
           (RPF) check failed.

           Discontinuities in the value of this counter can occur
           at re-initialization of the management system, and at
```

```
        other times as indicated by the value of the
        ifCounterDiscontinuityTime object of the associated
        interface."
    REFERENCE
        "RFC 6325, Section 4.5.2"
    ::= { rbridgePortCounterEntry 1 }

rbridgePortHopCountExceeds OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times a frame was dropped on this port
        because its hop count was zero.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of the
        ifCounterDiscontinuityTime object of the associated
        interface."
    REFERENCE
        "RFC 6325, Section 3.6"
    ::= { rbridgePortCounterEntry 2 }

rbridgePortOptionDrops OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times a frame was dropped on this port
        because it contained unsupported options.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of the
        ifCounterDiscontinuityTime object of the associated
        interface."
    REFERENCE
        "RFC 6325, Section 3.5"
    ::= { rbridgePortCounterEntry 3 }

rbridgePortTrillInFrames OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        "The number of TRILL-encapsulated frames that have been
        received by this port from its attached link, including
        management frames.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of the
        ifCounterDiscontinuityTime object of the associated
        interface."
    REFERENCE
        "RFC 6325, Section 2.3"
    ::= { rbridgePortCounterEntry 4 }

rbridgePortTrillOutFrames OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "frames"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of TRILL-encapsulated frames that have been
        transmitted by this port to its attached link, including
        management frames.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of the
        ifCounterDiscontinuityTime object of the associated
        interface."
    REFERENCE
        "RFC 6325, Section 2.3"
    ::= { rbridgePortCounterEntry 5 }

-- ----------------------------------------------------------- --
-- The RBridge VLAN ESADI Table
-- ----------------------------------------------------------- --

rbridgeEsadiTable  OBJECT-TYPE
    SYNTAX      SEQUENCE OF RbridgeEsadiEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table that contains information about ESADI instances on
        VLANs, if available."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    ::= { rbridgeEsadi 1 }
```

```
rbridgeEsadiEntry OBJECT-TYPE
    SYNTAX      RbridgeEsadiEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Information about an ESADI instance on a VLAN."
    INDEX   { rbridgeVlanIndex }
    ::= { rbridgeEsadiTable 1 }

RbridgeEsadiEntry ::=
    SEQUENCE {
        rbridgeEsadiEnable
            TruthValue,
        rbridgeEsadiConfidence
            Unsigned32,
        rbridgeEsadiDrbPriority
            Unsigned32,
        rbridgeEsadiDrb
            RbridgeAddress,
        rbridgeEsadiDrbHoldingTime
            Unsigned32,
        rbridgeEsadiRowStatus
            RowStatus
    }

rbridgeEsadiEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "If the RBridge is participating in an ESADI instance for
        this VLAN, the value of this object is 'true'.  To disable
        participation, set it to 'false'.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    DEFVAL      { true }
    ::= { rbridgeEsadiEntry 1 }

rbridgeEsadiConfidence OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Confidence level of address entries sent by this
        ESADI instance.  The default is 16.
```

```
        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    DEFVAL      { 16 }
    ::= { rbridgeEsadiEntry 2 }

rbridgeEsadiDrbPriority OBJECT-TYPE
    SYNTAX      Unsigned32 (0..127)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The priority of this RBridge for being selected as the
        DRB for this ESADI instance.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    ::= { rbridgeEsadiEntry 3 }

rbridgeEsadiDrb OBJECT-TYPE
    SYNTAX      RbridgeAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The DRB on this ESADI instance's virtual link."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    ::= { rbridgeEsadiEntry 4 }

rbridgeEsadiDrbHoldingTime OBJECT-TYPE
    SYNTAX      Unsigned32 (0..127)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The holding time for this ESADI instance.

        The value of this object MUST be retained across
        re-initializations of the management system."
    REFERENCE
        "RFC 6325, Section 4.2.5"
    ::= { rbridgeEsadiEntry 5 }

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

```
      DESCRIPTION
          "This object indicates the status of the entry."
      ::= { rbridgeEsadiEntry 6 }


   -- ------------------------------------------------------------ --
   -- The RBridge IP Multicast Snooping Port Table
   -- ------------------------------------------------------------ --

   rbridgeSnoopingPortTable OBJECT-TYPE
       SYNTAX       SEQUENCE OF RbridgeSnoopingPortEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "For RBridges implementing IP Multicast Snooping,
           information about ports on which the presence of IPv4
           or IPv6 multicast routers has been detected."
       REFERENCE
           "RFC 6325, Section 4.7"
       ::= { rbridgeSnooping 1 }

   rbridgeSnoopingPortEntry OBJECT-TYPE
       SYNTAX       RbridgeSnoopingPortEntry
       MAX-ACCESS   not-accessible
       STATUS       current
       DESCRIPTION
           "Information about ports on which the presence of IPv4
           or IPv6 multicast routers has been detected for a
           VLAN."
       INDEX   { rbridgeBasePort, rbridgeVlanIndex }
       ::= { rbridgeSnoopingPortTable 1 }

   RbridgeSnoopingPortEntry ::=
       SEQUENCE {
           rbridgeSnoopingPortAddrType
               INTEGER
       }

   rbridgeSnoopingPortAddrType OBJECT-TYPE
       SYNTAX       INTEGER {
                       ipv4(1),
                       ipv6(2),
                       ipv4v6(3)
                   }
       MAX-ACCESS   read-only
       STATUS       current
       DESCRIPTION
           "The IP address type of an IP multicast router detected
```

```
        on this port and VLAN.  If only IPv4 router(s)
        are detected, the value returned is 'ipv4'.  If only
        IPv6 routers are detected, the value returned is
        'ipv6'.  If both IPv4 and IPv6 routers are detected on
        this port and VLAN, the value returned is 'ipv4v6'."
     REFERENCE
        "RFC 6325, Section 4.7"
     ::= { rbridgeSnoopingPortEntry 1 }


  -- ------------------------------------------------------------ --
  -- The RBridge IP Multicast Snooping Address Table
  -- ------------------------------------------------------------ --

  rbridgeSnoopingAddrTable OBJECT-TYPE
     SYNTAX       SEQUENCE OF RbridgeSnoopingAddrEntry
     MAX-ACCESS   not-accessible
     STATUS       current
     DESCRIPTION
        "For RBridges implementing IP Multicast Snooping,
        information about IP multicast addresses being
        snooped."
     REFERENCE
        "RFC 6325, Section 4.8"
     ::= { rbridgeSnooping 2 }

  rbridgeSnoopingAddrEntry OBJECT-TYPE
     SYNTAX       RbridgeSnoopingAddrEntry
     MAX-ACCESS   not-accessible
     STATUS       current
     DESCRIPTION
        "Information about IP multicast addresses being
        snooped."
     INDEX  { rbridgeVlanIndex, rbridgeSnoopingAddrType,
              rbridgeSnoopingAddr }
     ::= { rbridgeSnoopingAddrTable 1 }

  RbridgeSnoopingAddrEntry ::=
     SEQUENCE {
        rbridgeSnoopingAddrType
           InetAddressType,
        rbridgeSnoopingAddr
           InetAddress,
        rbridgeSnoopingAddrPorts
           PortList
     }

  rbridgeSnoopingAddrType OBJECT-TYPE
     SYNTAX       InetAddressType
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP multicast address type for which a listener has been
        detected by this RBridge.  This MIB requires support for only
        IPv4 and IPv6 address types."
    REFERENCE
        "RFC 6325, Section 4.7"
    ::= { rbridgeSnoopingAddrEntry 1 }

rbridgeSnoopingAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP multicast address for which a listener has been
        detected by this RBridge.  The address type of this object
        is specified in rbridgeSnoopingAddrType.  This MIB requires
        support for only global IPv4 and IPv6 addresses, so the
        length of the object can be either 4 or 16 bytes.  Hence,
        the index will not exceed the OID size limit."
    REFERENCE
        "RFC 6325, Section 4.7"
    ::= { rbridgeSnoopingAddrEntry 2 }

rbridgeSnoopingAddrPorts OBJECT-TYPE
    SYNTAX      PortList
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The set of ports on which a listener has been detected
        for this IP multicast address."
    REFERENCE
        "RFC 6325, Section 4.7"
    ::= { rbridgeSnoopingAddrEntry 3 }


-- ---------------------------------------------------------- --
-- Distribution Trees
-- ---------------------------------------------------------- --

rbridgeDtreePriority OBJECT-TYPE

    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The distribution tree root priority for this RBridge.
```

          The default value of this object is 32768.

          The value of this object MUST be retained across
          re-initializations of the management system."
      REFERENCE
          "RFC 6325, Section 4.5"
      ::= { rbridgeDtree 1 }

   rbridgeDtreeActiveTrees OBJECT-TYPE
      SYNTAX   Unsigned32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
          "The total number of trees being computed by all RBridges
          in the campus."
      REFERENCE
          "RFC 6325, Section 4.5"
      ::= { rbridgeDtree 2 }

   rbridgeDtreeMaxTrees OBJECT-TYPE
      SYNTAX   Unsigned32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
          "The maximum number of trees this RBridge can compute."
      REFERENCE
          "RFC 6325, Section 4.5"
      ::= { rbridgeDtree 3 }

   rbridgeDtreeDesiredUseTrees OBJECT-TYPE
      SYNTAX   Unsigned32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
          "The maximum number of trees this RBridge would like to
          use for transmission of ingress multi-destination frames."
      REFERENCE
          "RFC 6325, Section 4.5"
      ::= { rbridgeDtree 4 }

   rbridgeDtreeTable OBJECT-TYPE
      SYNTAX   SEQUENCE OF RbridgeDtreeEntry
      MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
          "Information about distribution trees being computed
          by this RBridge."

```
    REFERENCE
        "RFC 6325, Section 4.5"
    ::= { rbridgeDtree 5 }

rbridgeDtreeEntry OBJECT-TYPE
    SYNTAX      RbridgeDtreeEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "List of information about distribution trees being computed
        by this RBridge."
    INDEX  { rbridgeDtreeNumber }
    ::= { rbridgeDtreeTable 1 }

RbridgeDtreeEntry ::=
    SEQUENCE {
        rbridgeDtreeNumber
            Unsigned32,
        rbridgeDtreeNickname
            RbridgeNickname,
        rbridgeDtreeIngress
            TruthValue
    }

rbridgeDtreeNumber OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The tree number of a distribution tree being computed by
        this RBridge."
    REFERENCE
        "RFC 6325, Section 4.5"
    ::= { rbridgeDtreeEntry 1 }

rbridgeDtreeNickname OBJECT-TYPE
    SYNTAX      RbridgeNickname
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The nickname of the distribution tree."
    REFERENCE
        "RFC 6325, Section 4.5"
    ::= { rbridgeDtreeEntry 2 }

rbridgeDtreeIngress OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
```

```
        STATUS       current
        DESCRIPTION
            "Indicates whether this RBridge might choose this
            distribution tree to ingress a multi-destination frame."
        REFERENCE
            "RFC 6325, Section 4.5"
        ::= { rbridgeDtreeEntry 3 }


    -- ------------------------------------------------------------- --
    -- TRILL Neighbor List
    -- ------------------------------------------------------------- --

    rbridgeTrillMinMtuDesired OBJECT-TYPE
        SYNTAX       Unsigned32
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The desired minimum acceptable inter-RBridge link MTU for
            the campus, that is, originatingLSPBufferSize.

            The value of this object MUST be retained across
            re-initializations of the management system."
        REFERENCE
            "RFC 6325, Section 4.3"
        ::= { rbridgeTrill 1 }

    rbridgeTrillSz OBJECT-TYPE
        SYNTAX       Unsigned32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The minimum acceptable inter-RBridge link size for the
            campus for the proper operation of TRILL IS-IS."
        REFERENCE
            "RFC 6325, Section 4.3"
        ::= { rbridgeTrill 2 }

    rbridgeTrillMaxMtuProbes OBJECT-TYPE
        SYNTAX       Unsigned32 (1..255)
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The number of failed MTU-probes before the RBridge
            concludes that a particular MTU is not supported by
            a neighbor.
```

```
          The value of this object MUST be retained across
          re-initializations of the management system."
      REFERENCE
          "RFC 6325, Section 4.3"
      ::= { rbridgeTrill 3 }

   rbridgeTrillNbrTable OBJECT-TYPE
      SYNTAX       SEQUENCE OF RbridgeTrillNbrEntry
      MAX-ACCESS   not-accessible
      STATUS       current
      DESCRIPTION
          "Information about this RBridge's TRILL neighbors."
      REFERENCE
          "RFC 6325, Section 4.4.2.1"
      ::= { rbridgeTrill 4 }

   rbridgeTrillNbrEntry OBJECT-TYPE
      SYNTAX       RbridgeTrillNbrEntry
      MAX-ACCESS   not-accessible
      STATUS       current
      DESCRIPTION
          "List of information about this RBridge's TRILL neighbors."
      INDEX  { rbridgeTrillNbrMacAddr }
      ::= { rbridgeTrillNbrTable 1 }

   RbridgeTrillNbrEntry ::=
      SEQUENCE {
          rbridgeTrillNbrMacAddr
             MacAddress,
          rbridgeTrillNbrMtu
             Unsigned32,
          rbridgeTrillNbrFailedMtuTest
             TruthValue
      }

   rbridgeTrillNbrMacAddr OBJECT-TYPE
      SYNTAX       MacAddress
      MAX-ACCESS   not-accessible
      STATUS       current
      DESCRIPTION
          "The MAC address of a neighbor of this RBridge."
      REFERENCE
          "RFC 6325, Section 4.4.2.1"
      ::= { rbridgeTrillNbrEntry 1 }

   rbridgeTrillNbrMtu OBJECT-TYPE
      SYNTAX       Unsigned32
      MAX-ACCESS   read-only
```

```
      STATUS        current
      DESCRIPTION
          "MTU size for this neighbor for IS-IS communication
          purposes."
      REFERENCE
          "RFC 6325, Section 4.3.2"
      ::= { rbridgeTrillNbrEntry 2 }

   rbridgeTrillNbrFailedMtuTest OBJECT-TYPE
      SYNTAX        TruthValue
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
          "If true, indicates that the neighbor's tested MTU is less
          than the minimum acceptable inter-bridge link MTU for the
          campus (1470)."
      REFERENCE
          "RFC 6325, Section 4.3.1"
      ::= { rbridgeTrillNbrEntry 3 }


   -- ---------------------------------------------------------- --
   -- Notifications for use by RBridges
   -- ---------------------------------------------------------- --

   rbridgeBaseNewDrb NOTIFICATION-TYPE
      -- OBJECTS       { }
      STATUS        current
      DESCRIPTION
          "The rbridgeBaseNewDrb notification indicates that the
          sending agent has become the new Designated RBridge; the
          notification is sent by an RBridge soon after its election
          as the new DRB root, e.g., upon expiration of the Topology
          Change Timer, immediately subsequent to its election."
      ::= { rbridgeNotifications 1 }

   rbridgeBaseTopologyChange NOTIFICATION-TYPE
      -- OBJECTS       { }
      STATUS        current
      DESCRIPTION
          "The rbridgeBaseTopologyChange notification is sent by an
          RBridge when any of its configured ports transition to/from
          the VLAN-x designated forwarder.  The notification is not
          sent if an rbridgeBaseNewDrb notification is sent for the
          same transition."
      ::= { rbridgeNotifications 2 }
```

```
   -- Compliance and Group sections

   rbridgeCompliances     OBJECT IDENTIFIER ::= { rbridgeConformance 1 }

   rbridgeGroup           OBJECT IDENTIFIER ::= { rbridgeConformance 2 }


   -- ------------------------------------------------------------ --
   -- Units of Conformance
   -- ------------------------------------------------------------ --

   rbridgeBaseGroup OBJECT-GROUP
       OBJECTS {
           rbridgeBaseTrillVersion,
           rbridgeBaseNumPorts,
           rbridgeBaseForwardDelay,
           rbridgeBaseUniMultipathEnable,
           rbridgeBaseMultiMultipathEnable,
           rbridgeBaseAcceptEncapNonadj,
           rbridgeBaseNicknameNumber
       }
       STATUS       current
       DESCRIPTION
           "A collection of objects providing basic control
           and status information for the RBridge."
       ::= { rbridgeGroup 1 }

   rbridgeBaseNicknameGroup OBJECT-GROUP
       OBJECTS {
           rbridgeBaseNicknamePriority,
           rbridgeBaseNicknameDtrPriority,
           rbridgeBaseNicknameType,
           rbridgeBaseNicknameRowStatus
       }
       STATUS       current
       DESCRIPTION
           "A collection of objects providing basic control
           and status information for RBridge nicknames."
       ::= { rbridgeGroup 2 }

   rbridgeBasePortGroup OBJECT-GROUP
       OBJECTS {
           rbridgeBasePortIfIndex,
           rbridgeBasePortDisable,
           rbridgeBasePortTrunkPort,
           rbridgeBasePortAccessPort,
           rbridgeBasePortP2pHellos,
           rbridgeBasePortState,
```

```
            rbridgeBasePortDesiredDesigVlan,
            rbridgeBasePortDesigVlan,
            rbridgeBasePortInhibitionTime,
            rbridgeBasePortDisableLearning,
            rbridgeBasePortStpRoot,
            rbridgeBasePortStpRootChanges,
            rbridgeBasePortStpWiringCloset
        }
        STATUS       current
        DESCRIPTION
            "A collection of objects providing basic control
            and status information for RBridge ports."
        ::= { rbridgeGroup 3 }

    rbridgeFdbGroup OBJECT-GROUP
        OBJECTS {
            rbridgeConfidenceNative,
            rbridgeConfidenceDecap,
            rbridgeConfidenceStatic,
            rbridgeUniFdbPort,
            rbridgeUniFdbNickname,
            rbridgeUniFdbConfidence,
            rbridgeUniFdbStatus
        }
        STATUS       current
        DESCRIPTION
            "A collection of objects providing information
            about the Unicast Address Database."
        ::= { rbridgeGroup 4 }

    rbridgeFibGroup OBJECT-GROUP
        OBJECTS {
            rbridgeUniFibHopCount,
            rbridgeMultiFibPorts
        }
        STATUS       current
        DESCRIPTION
            "A collection of objects providing information
            about the Unicast and Multicast FIBs."
        ::= { rbridgeGroup 5 }

    rbridgeVlanGroup OBJECT-GROUP
        OBJECTS {
            rbridgeVlanForwarderLosts,
            rbridgeVlanDisableLearning,
            rbridgeVlanSnooping,
            rbridgeVlanPortInhibited,
            rbridgeVlanPortForwarder,
```

```
          rbridgeVlanPortAnnouncing,
          rbridgeVlanPortDetectedVlanMapping
      }
      STATUS        current
      DESCRIPTION
          "A collection of objects providing information
          about VLANs on the RBridge."
      ::= { rbridgeGroup 6 }

  rbridgePortCounterGroup OBJECT-GROUP
      OBJECTS {
          rbridgePortRpfCheckFails,
          rbridgePortHopCountExceeds,
          rbridgePortOptionDrops,
          rbridgePortTrillInFrames,
          rbridgePortTrillOutFrames
      }
      STATUS        current
      DESCRIPTION
          "A collection of objects providing per-port
          counters for the RBridge."
      ::= { rbridgeGroup 7 }

  rbridgeEsadiGroup OBJECT-GROUP
      OBJECTS {
          rbridgeEsadiEnable,
          rbridgeEsadiConfidence,
          rbridgeEsadiDrbPriority,
          rbridgeEsadiDrb,
          rbridgeEsadiDrbHoldingTime,
          rbridgeEsadiRowStatus
      }
      STATUS        current
      DESCRIPTION
          "A collection of objects providing information
          about ESADI instances on the RBridge."
      ::= { rbridgeGroup 8 }

  rbridgeSnoopingGroup OBJECT-GROUP
      OBJECTS {
          rbridgeSnoopingPortAddrType,
          rbridgeSnoopingAddrPorts
      }
      STATUS        current
      DESCRIPTION
          "A collection of objects providing information about
          IP Multicast Snooping.  This MIB requires support for
          only global IPv4 and IPv6 address types in
```

```
        rbridgeSnoopingPortAddrType and rbridgeSnoopingAddrType,
        so the length of rbridgeSnoopingAddr can be either 4 or
        16 bytes."
    ::= { rbridgeGroup 9 }

rbridgeDtreeGroup OBJECT-GROUP
    OBJECTS {
        rbridgeDtreePriority,
        rbridgeDtreeActiveTrees,
        rbridgeDtreeMaxTrees,
        rbridgeDtreeDesiredUseTrees,
        rbridgeDtreeNickname,
        rbridgeDtreeIngress
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information
        about distribution trees."
    ::= { rbridgeGroup 10 }

rbridgeTrillGroup OBJECT-GROUP
    OBJECTS {
        rbridgeTrillMinMtuDesired,
        rbridgeTrillSz,
        rbridgeTrillMaxMtuProbes,
        rbridgeTrillNbrMtu,
        rbridgeTrillNbrFailedMtuTest
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information
        about TRILL neighbors."
    ::= { rbridgeGroup 11 }

rbridgeNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        rbridgeBaseNewDrb,
        rbridgeBaseTopologyChange
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects describing notifications (traps)."
    ::= { rbridgeGroup 12 }
```

```
   -- ---------------------------------------------------------- --
   -- Compliance Statement
   -- ---------------------------------------------------------- --

   rbridgeCompliance MODULE-COMPLIANCE
         STATUS        current
         DESCRIPTION
             "The compliance statement for support of RBridge
             services."

         MODULE
             MANDATORY-GROUPS {
                 rbridgeBaseGroup,
                 rbridgeBaseNicknameGroup,
                 rbridgeBasePortGroup,
                 rbridgeFdbGroup,
                 rbridgeFibGroup,
                 rbridgeVlanGroup,
                 rbridgeDtreeGroup,
                 rbridgeTrillGroup,
                 rbridgeNotificationGroup
             }

         GROUP    rbridgePortCounterGroup
         DESCRIPTION
             "Implementation of this group is optional."

         GROUP    rbridgeEsadiGroup
         DESCRIPTION
             "Implementation of this group is optional."

         GROUP    rbridgeSnoopingGroup
         DESCRIPTION
             "Implementation of this group is optional."

         ::= { rbridgeCompliances 1 }

   rbridgeReadOnlyCompliance MODULE-COMPLIANCE
         STATUS        current
         DESCRIPTION
             "When this MIB is implemented in read-only mode, then
             the implementation can claim read-only compliance.
             In that case, RBridge objects can be monitored but
             cannot be configured with this implementation."
```

```
            MODULE
                MANDATORY-GROUPS {
                    rbridgeBaseGroup,
                    rbridgeBaseNicknameGroup,
                    rbridgeBasePortGroup,
                    rbridgeFdbGroup,
                    rbridgeFibGroup,
                    rbridgeVlanGroup,
                    rbridgeDtreeGroup,
                    rbridgeTrillGroup,
                    rbridgeNotificationGroup
                }

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

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

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

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

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

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

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

```
        OBJECT   rbridgeBaseNicknameRowStatus
        SYNTAX   INTEGER { active(1) }
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required, and 'active' is the only
            status that needs to be supported."

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

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

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

        OBJECT   rbridgeBasePortP2pHellos
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required."

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

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

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

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

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

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

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

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

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

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

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

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

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

        OBJECT   rbridgeEsadiRowStatus
        SYNTAX   INTEGER { active(1) }
        MIN-ACCESS   read-only
```

             DESCRIPTION
                 "Write access is not required, and 'active' is the only
                 status that needs to be supported."

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

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

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

             GROUP   rbridgePortCounterGroup
             DESCRIPTION
                 "Implementation of this group is optional."

             GROUP   rbridgeEsadiGroup
             DESCRIPTION
                 "Implementation of this group is optional."

             GROUP   rbridgeSnoopingGroup
             DESCRIPTION
                 "Implementation of this group is optional."

             ::= { rbridgeCompliances 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 a number of management objects defined in this MIB module
   with a MAX-ACCESS clause of read-write and/or read-create. Such
   objects may be considered sensitive or vulnerable in some network
   environments. The support for SET operations in a non-secure
   environment without proper protection can have a negative effect on
   network operations. These are the tables and objects and their
   sensitivity/vulnerability:

   The following tables and objects in the RBRIDGE-MIB can be
   manipulated to interfere with the operation of RBridges:

   o rbridgeBaseUniMultipathEnable affects the ability of the RBridge
      to route unicast traffic over multiple paths, and
      rbridgeBaseMultiMultipathEnable affects the ability of the RBridge
      to route multi-destination traffic over multiple paths.

   o rbridgeBasePortTable contains a number of objects that may affect
      network connectivity. Actions that may be triggered by
      manipulating objects in this table include disabling of an RBridge
      port, discarding of native packets, disabling learning, and
      others.

   o rbridgeEsadiTable contains objects that affect the operation of
      the ESADI protocol used for learning, and manipulation of the
      objects contained therein can be used to confuse the learning
      ability of RBridges.

   o rbridgeDtreePriority can affect computation of distribution trees
      within an RBridge campus, thereby affecting the forwarding of
      multi-destination traffic.

   o rbridgeTrillMinMtuDesired can affect the size of packets being
      used to exchange information between RBridges.

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

the network via SNMP. For example, access to network topology and
RBridge attributes can reveal information that should not be
available to all users of the network.

SNMP versions prior to SNMPv3 did not include adequate security.
Even if the network itself is secure (for example by using IPsec),
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.

Implementations SHOULD provide the security features described by the
SNMPv3 framework (see [RFC3410]), and implementations claiming
compliance to the SNMPv3 standard MUST include full support for
authentication and privacy via the User-based Security Model (USM)
[RFC3414] with the AES cipher algorithm [RFC3826]. Implementations
MAY also provide support for the Transport Security Model (TSM)
[RFC5591] in combination with a secure transport such as SSH
[RFC5592] or TLS/DTLS [RFC6353].

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

For other RBridge security considerations, see [RFC6325].

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

    rbridgeMIB   { mib-2 214 }

10. Contributors

The authors would like to acknowledge the contributions of Donald
Eastlake, Radia Perlman, Anoop Ghanwani, Dan Romascanu, Mahesh Akula,
Sue Hares, and Joan Cucchiara.

11. References

11.1. Normative References

   [RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
               Requirement Levels", BCP 14, RFC 2119, March 1997.

   [RFC2578]   McCloghrie, K., Ed., Perkins, D., Ed., and J.
               Schoenwaelder, Ed., "Structure of Management Information
               Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.

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

   [RFC2580]   McCloghrie, K., Ed., Perkins, D., Ed., and J.
               Schoenwaelder, Ed., "Conformance Statements for SMIv2",
               STD 58, RFC 2580, April 1999.

   [RFC2863]   McCloghrie, K. and F. Kastenholz, "The Interfaces Group
               MIB", RFC 2863, June 2000.

   [RFC3414]   Blumenthal, U. and B. Wijnen, "User-based Security Model
               (USM) for version 3 of the Simple Network Management
               Protocol (SNMPv3)", STD 62, RFC 3414, December 2002.

   [RFC3826]   Blumenthal, U., Maino, F., and K. McCloghrie, "The
               Advanced Encryption Standard (AES) Cipher Algorithm in
               the SNMP User-based Security Model", RFC 3826, June 2004.

   [RFC4001]   Daniele, M., Haberman, B., Routhier, S., and J.
               Schoenwaelder, "Textual Conventions for Internet Network
               Addresses", RFC 4001, February 2005.

   [RFC4188]   Norseth, K., Ed., and E. Bell, Ed., "Definitions of
               Managed Objects for Bridges", RFC 4188, September 2005.

   [RFC4363]   Levi, D. and D. Harrington, "Definitions of Managed
               Objects for Bridges with Traffic Classes, Multicast
               Filtering, and Virtual LAN Extensions", RFC 4363,
               January 2006.

   [RFC4444]   Parker, J., Ed., "Management Information Base for
               Intermediate System to Intermediate System (IS-IS)",
               RFC 4444, April 2006.

   [RFC5591]   Harrington, D. and W. Hardaker, "Transport Security Model
               for the Simple Network Management Protocol (SNMP)",
               RFC 5591, June 2009.

   [RFC5592]   Harrington, D., Salowey, J., and W. Hardaker, "Secure
               Shell Transport Model for the Simple Network Management
               Protocol (SNMP)", RFC 5592, June 2009.

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

   [RFC6353]   Hardaker, W., "Transport Layer Security (TLS) Transport
               Model for the Simple Network Management Protocol (SNMP)",
               RFC 6353, July 2011.

11.2. Informative References

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

   [RFC4663]   Harrington, D., "Transferring MIB Work from IETF Bridge
               MIB WG to IEEE 802.1 WG", RFC 4663, September 2006.

   [RFC5556]   Touch, J. and R. Perlman, "Transparent Interconnection of
               Lots of Links (TRILL): Problem and Applicability
               Statement", RFC 5556, May 2009.

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