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Virtual Private LAN Service (VPLS) Management Information Base

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects to configure and/or monitor Virtual Private LAN services. It needs to be used in conjunction with the Pseudowire (PW) Management Information Base (PW-STD-MIB from RFC 5601).

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines three MIB modules that can be used to manage VPLS (Virtual Private LAN Service) for transmission over a Packet Switched Network (PSN) using LDP [RFC4762] or BGP [RFC4761] signaling. This MIB module provides generic management of VPLS services as defined by the IETF L2VPN Working Group. Additional MIB modules are also defined for management of LDP VPLS and BGP VPLS services by the IETF L2VPN Working Group.

2. Terminology

This document adopts the definitions, acronyms, and mechanisms described in [RFC3985]. Unless otherwise stated, the mechanisms of [RFC3985] apply and will not be described again here.

2.1. Conventions Used in This Document

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

3. 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 MIB modules that are compliant to the SMIV2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

4. VPLS MIB Module Architecture

The MIB structure for defining a VPLS service is composed from three MIB modules. (They are referred to as "VPLS MIB" in the figure below.)

The first is the VPLS-GENERIC-MIB module, which configures general parameters of the VPLS service that are common to all types of VPLS services.

The second is the VPLS-LDP-MIB module, which configures VPLS-LDP [RFC4762] specific parameters of the VPLS service.

The third is the VPLS-BGP-MIB module, which configures VPLS-BGP [RFC4761] specific parameters of the VPLS service.

The arrows in Figure 1 indicate whether we can map data from one module into another.

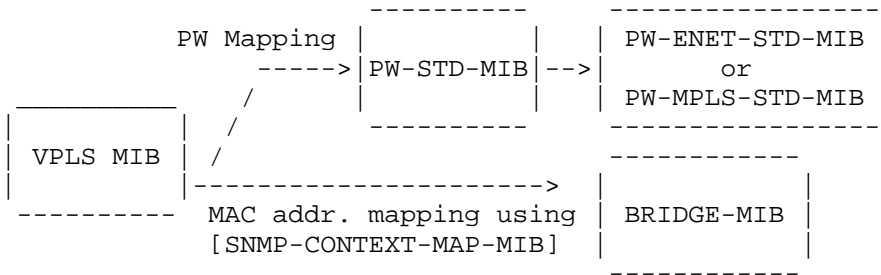


Figure 1

Additionally, service-specific modules may be defined in other documents.

4.1. VPLS-GENERIC-MIB Module Usage

An entry in the `vplsConfigTable` MUST exist for every VPLS service. This table holds generic parameters that apply to a VPLS service which can be signaled via LDP or BGP.

A conceptual row can be created in the `vplsConfigTable` in one of the following ways:

- 1) A Network Management System (NMS) creates a row in the `vplsConfigTable` using Simple Network Management Protocol (SNMP) Set requests, which causes the node to create and start a new VPLS service. The agent MUST support the creation of VPLS services in this way.
- 2) The agent MAY create a row in the `vplsConfigTable` automatically due to some auto discovery application, or based on configuration that is done through non-SNMP applications. This mode is OPTIONAL.

At least one entry in the `vplsPwBindTable` MUST exist for each VPLS service.

This Binding table links one VPLS service with one or many pseudowires (defined in [RFC5601]). Each pseudowire may be used as a spoke or as part of a mesh based on the parameters defined in this table.

For each VPLS service, an entry in the `vplsBgpAdConfigTable` MUST exist if Auto-discovery has been enabled for that service. This table stores the information required for auto-discovery.

For each VPLS service, at least one entry in the `vplsBgpRteTargetTable` MUST exist if auto-discovery has been configured for that service. One service can import and export multiple Route Targets.

4.2. VPLS-LDP-MIB Module Usage

An entry in the `vplsLdpConfigTable` MUST be created by the agent for a VPLS service signaled using LDP.

4.3. VPLS-BGP-MIB Module Usage

An entry in the `vplsBgpConfigTable` MUST be created by the agent for a VPLS service signaled using BGP.

4.4. Relations to Other MIB Modules

- The `vplsPwBindTable` links the VPLS entry to the `pwTable` in [RFC5601].
- The association of Media Access Control (MAC) addresses to VPLS entries is possible by adding a turnstile function to interpret the entries in [SNMP-CONTEXT-MAP-MIB]. In [SNMP-CONTEXT-MAP-MIB], there is a mapping from the `vacmContextName` [RFC3415] to `dotldBasePort` [RFC4188] and `vplsConfigIndex`. This mapping can be used to map the `vplsConfigIndex` to a `dotldBasePort` in the BRIDGE-MIB. This resulting value of `dotldBasePort` can be used to access corresponding MAC addresses that belong to a particular `vplsConfigIndex`.
- Unless all the necessary entries in the applicable tables have been created and all the parameters have been consistently configured in those tables, signaling cannot be performed from the local node, and the `vplsConfigRowStatus` should report 'notReady'.
- Statistics can be gathered from the PW Performance tables in [RFC5601].

5. Example of the VPLS MIB Modules Usage

In this section, we provide an example of the use of the MIB objects described in Section 6 to set up a VPLS service over MPLS. While this example is not meant to illustrate every permutation of the MIB, it is intended as an aid to understanding some of the key concepts. It is meant to be read after going through the MIB itself.

In this example, a VPLS service (VPLS-A) is set up using LDP for signaling the pseudowire. The Binding between the VPLS service and the pseudowire is reflected in the VplsPwBindTable. The pseudowire configuration is defined in RFC 5601.

In the VPLS-GENERIC-MIB module:

Row in vplsConfigTable:

```
{
    vplsConfigIndex          10,
    vplsConfigName           "VPLS-A"
    vplsConfigAdminStatus    1(up),
    vplsConfigMacLearning    1(true),
    vplsConfigDiscardUnknownDest 2(false),
    vplsConfigMacAging       1(true),
    vplsConfigVpnId          "100:10"
    vplsConfigRowStatus      1(active)
}
```

Row in vplsStatusTable:

```
{
    vplsStatusOperStatus    1(up),
    vplsStatusPeerCount     1
}
```

Row in VplsPwBindTable :

```
{
    vplsPwBindConfigType    manual,
    vplsPwBindType          spoke,
    vplsPwBindRowStatus     1(active),
    vplsPwBindStorageType   volatile
}
```

In the VPLS-LDP-MIB module:

Row in vplsLdpConfigTable:

```
{
    vplsLdpConfigMacAddrWithdraw 1(true),
}
```

Row in vplsLdpPwBindTable:

```
{
    vplsLdpPwBindType        1(mesh),
    vplsLdpPwBindMacAddressLimit 100
}
```

6. Object Definitions

6.1. VPLS-GENERIC-MIB Object Definitions

This MIB module mentions the following documents: [RFC2578], [RFC2579], [RFC2580], [RFC3411], [RFC5601], [RFC4265], [RFC4364], [RFC4761], [RFC4762], [RFC6074], and [RFC3413].

```
VPLS-GENERIC-MIB DEFINITIONS ::= BEGIN

IMPORTS

NOTIFICATION-TYPE, MODULE-IDENTITY, OBJECT-TYPE,
Unsigned32, Counter32, transmission
    FROM SNMPv2-SMI                -- RFC 2578

MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
    FROM SNMPv2-CONF                -- RFC 2580

TruthValue, RowStatus, StorageType, TEXTUAL-CONVENTION
    FROM SNMPv2-TC                -- RFC 2579

SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB        -- RFC 3411

pwIndex
    FROM PW-STD-MIB                -- RFC 5601

VPNIdOrZero
    FROM VPN-TC-STD-MIB           -- RFC 4265

;

vplsGenericMIB MODULE-IDENTITY
    LAST-UPDATED "201405191200Z" -- 19 May 2014 12:00:00 GMT
    ORGANIZATION "Layer 2 Virtual Private Networks (L2VPN)
                  Working Group"
    CONTACT-INFO
        "
        Thomas D. Nadeau
        Email: tnadeau@lucidvison.com

        The L2VPN Working Group (email distribution l2vpn@ietf.org,
        http://www.ietf.org/wg/l2vpn/charter)
        "
```


DESCRIPTION

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The initial version of this MIB module was published in RFC 7257; for full legal notices see the RFC itself.

This MIB module contains generic managed object definitions for Virtual Private LAN Service as defined in RFC 4761 and RFC 4762.

This MIB module enables the use of any underlying pseudowire network."

-- Revision history.

REVISION

"201405191200Z" -- 19 May 2014 12:00:00 GMT

DESCRIPTION "Initial version published as part of RFC 7257."

::= { transmission 274 }

VplsBgpRouteDistinguisher ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Syntax for a route distinguisher that matches the definition in RFC 4364. For a complete definition of a route distinguisher, see RFC 4364. For more details on use of a route distinguisher for a VPLS service, see RFC 4761."

REFERENCE

"RFC 4364"

SYNTAX OCTET STRING(SIZE (0..256))

VplsBgpRouteTarget ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Syntax for a Route Target that matches the definition in RFC 4364. For a complete definition of a Route Target, see RFC 4364."

REFERENCE

"RFC 4364"

SYNTAX OCTET STRING(SIZE (0..256))

VplsBgpRouteTargetType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Used to define the type of a Route Target usage. Route Targets can be specified to be imported, exported, or both. For a complete definition of a Route Target, see RFC 4364."

REFERENCE

"RFC 4364"

SYNTAX INTEGER { import(1), export(2), both(3) }

-- Top-level components of this MIB.

-- Notifications

vplsNotifications OBJECT IDENTIFIER
::= { vplsGenericMIB 0 }

-- Tables, Scalars

vplsObjects OBJECT IDENTIFIER
::= { vplsGenericMIB 1 }

-- Conformance

vplsConformance OBJECT IDENTIFIER
::= { vplsGenericMIB 2 }

-- PW Virtual Connection Table

vplsConfigIndexNext OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains an appropriate value to be used for vplsConfigIndex when creating entries in the vplsConfigTable. The value 0 indicates that no unassigned entries are available. To obtain the value of vplsConfigIndex for a new entry in the vplsConfigTable, the manager issues a management protocol retrieval operation to obtain the current value of vplsConfigIndex. After each retrieval operation, the agent should modify the value to reflect the next unassigned index. After a manager retrieves a value the agent will determine through its local policy when this index value will be made available for reuse."

::= { vplsObjects 1 }

vplsConfigTable OBJECT-TYPE

```

SYNTAX          SEQUENCE OF VplsConfigEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "This table specifies information for configuring
    and monitoring Virtual Private LAN Service (VPLS).
    "
 ::= { vplsObjects 2 }

```

vplsConfigEntry OBJECT-TYPE

```

SYNTAX          VplsConfigEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "A row in this table represents a Virtual Private LAN
    Service (VPLS) in a packet network. It is indexed by
    vplsConfigIndex, which uniquely identifies a single VPLS.

    A row is created via SNMP or by the agent if a
    VPLS service is created by a non-SNMP application or
    due to the Auto-Discovery process.

    All of the read-create objects values except
    vplsConfigSignalingType can be changed when
    vplsConfigRowStatus is in the active(1)
    state. Changes for vplsConfigSignalingType are only
    allowed when the vplsConfigRowStatus is in
    notInService(2) or notReady(3) states.
    "
INDEX           { vplsConfigIndex }
 ::= { vplsConfigTable 1 }

```

VplsConfigEntry ::=

```

SEQUENCE {
    vplsConfigIndex          Unsigned32,
    vplsConfigName          SnmpAdminString,
    vplsConfigDescr         SnmpAdminString,
    vplsConfigAdminStatus   INTEGER,
    vplsConfigMacLearning   TruthValue,
    vplsConfigDiscardUnknownDest TruthValue,
    vplsConfigMacAging      TruthValue,
    vplsConfigFwdFullHighWatermark Unsigned32,
    vplsConfigFwdFullLowWatermark Unsigned32,
    vplsConfigRowStatus     RowStatus,
    vplsConfigMtu           Unsigned32,
    vplsConfigVpnId         VPNIIdOrZero,
    vplsConfigStorageType   StorageType,
    vplsConfigSignalingType INTEGER
}

```

```

    }

vplsConfigIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..2147483647)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Unique index for the conceptual row identifying
         a VPLS service."
    ::= { vplsConfigEntry 1 }

vplsConfigName OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "A textual name of the VPLS.
         If there is no local name, or this object is
         otherwise not applicable, then this object MUST
         contain a zero-length octet string."
    DEFVAL      { "" }
    ::= { vplsConfigEntry 2 }

vplsConfigDescr OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "A textual string containing information about the
         VPLS service.  If there is no information for this VPLS
         service, then this object MUST contain a zero-length
         octet string."
    DEFVAL      { "" }
    ::= { vplsConfigEntry 3 }

vplsConfigAdminStatus OBJECT-TYPE
    SYNTAX      INTEGER {
        up(1),
        down(2),
        testing(3)  -- in some test mode
    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The desired administrative state of the VPLS
         service.  If the administrative status of the
         VPLS service is changed to enabled, then this

```

service is able to utilize pseudowires to perform the tasks of a VPLS service. The testing(3) state indicates that no operational packets can be passed."

```
DEFVAL          { down }
::= { vplsConfigEntry 4 }
```

vplsConfigMacLearning OBJECT-TYPE

```
SYNTAX          TruthValue
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
```

"This object specifies if MAC Learning is enabled in this service. If this object is true then MAC Learning is enabled. If false, then MAC Learning is disabled."

```
DEFVAL          { true }
::= { vplsConfigEntry 6 }
```

vplsConfigDiscardUnknownDest OBJECT-TYPE

```
SYNTAX          TruthValue
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
```

"If the value of this object is 'true', then frames received with an unknown destination MAC are discarded in this VPLS. If 'false', then the packets are processed."

```
DEFVAL          { false }
::= { vplsConfigEntry 7 }
```

vplsConfigMacAging OBJECT-TYPE

```
SYNTAX          TruthValue
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
```

"If the value of this object is 'true', then the MAC aging process is enabled in this VPLS. If 'false', then the MAC aging process is disabled."

```
DEFVAL          { true }
::= { vplsConfigEntry 8 }
```

vplsConfigFwdFullHighWatermark OBJECT-TYPE

```
SYNTAX          Unsigned32 (0..100)
UNITS           "percentage"
MAX-ACCESS      read-create
STATUS          current
```

DESCRIPTION

"This object specifies the utilization of the forwarding database for this VPLS instance at which the vplsFwdFullAlarmRaised notification will be sent. The value of this object must be higher than vplsConfigFwdFullLowWatermark."

DEFVAL { 95 }
 ::= { vplsConfigEntry 10 }

vplsConfigFwdFullLowWatermark OBJECT-TYPE

SYNTAX Unsigned32 (0..99)
 UNITS "percentage"
 MAX-ACCESS read-create
 STATUS current

DESCRIPTION

"This object specifies the utilization of the forwarding database for this VPLS instance at which the vplsFwdFullAlarmCleared notification will be sent. The value of this object must be less than vplsConfigFwdFullHighWatermark."

DEFVAL { 90 }
 ::= { vplsConfigEntry 11 }

vplsConfigRowStatus OBJECT-TYPE

SYNTAX RowStatus
 MAX-ACCESS read-create
 STATUS current

DESCRIPTION

"For creating, modifying, and deleting this row.

All other objects in this row must be set to valid values before this object can be set to active(1).

None of the read-create objects in the conceptual rows may be changed when this object is in the active(1) state.

If this object is set to destroy(6) or deleted by the agent, all associated entries in the vplsPwBindTable, vplsBgpRteTargetTable, and vplsBgpVETable shall be deleted."

::= { vplsConfigEntry 12 }

vplsConfigMtu OBJECT-TYPE

SYNTAX Unsigned32 (64..9192)
 MAX-ACCESS read-create

```

STATUS          current
DESCRIPTION
    "The value of this object specifies the MTU of this
    VPLS instance. This can be used to limit the MTU to a
    value lower than the MTU supported by the associated
    pseudowires."
DEFVAL          { 1518 }
::= { vplsConfigEntry 13 }

vplsConfigVpnId OBJECT-TYPE
SYNTAX          VPNIIdOrZero
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "This objects indicates the IEEE 802-1990
    VPN ID of the associated VPLS service."
::= { vplsConfigEntry 14 }

vplsConfigStorageType OBJECT-TYPE
SYNTAX          StorageType
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "This variable indicates the storage type for this row."
DEFVAL { nonVolatile }
::= { vplsConfigEntry 15 }

vplsConfigSignalingType OBJECT-TYPE
SYNTAX          INTEGER {
                    ldp(1),
                    bgp(2),
                    none(3)
                }
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "Desired signaling type of the VPLS service.

    If the value of this object is ldp(1), then a
    corresponding entry in vplsLdpConfigTable is required.

    If the value of this object is bgp(2), then a
    corresponding entry in vplsBgpConfigTable is required.

    If the value of this object is none(3), then it
    indicates a static configuration of PW labels."
DEFVAL          { none }

```

```
 ::= { vplsConfigEntry 16 }
```

```
-- VPLS Status table
```

```
vplsStatusTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF VplsStatusEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This table provides information for monitoring  
Virtual Private LAN Service (VPLS)."
```

```
"
```

```
 ::= { vplsObjects 3 }
```

```
vplsStatusEntry OBJECT-TYPE
```

```
SYNTAX VplsStatusEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A row in this table represents a Virtual Private LAN  
Service (VPLS) in a packet network. It is indexed by  
vplsConfigIndex, which uniquely identifies a single VPLS."
```

```
A row in this table is automatically created by the agent  
when a VPLS service is first set to active."
```

```
"
```

```
AUGMENTS { vplsConfigEntry }
```

```
 ::= { vplsStatusTable 1 }
```

```
VplsStatusEntry ::=
```

```
SEQUENCE {
```

```
vplsStatusOperStatus
```

```
INTEGER,
```

```
vplsStatusPeerCount
```

```
Counter32
```

```
}
```

```
vplsStatusOperStatus OBJECT-TYPE
```

```
SYNTAX INTEGER {  
other(0),  
up(1),  
down(2)
```

```
}
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"The current operational state of this VPLS service."
```

```
 ::= { vplsStatusEntry 1 }
```

```
vplsStatusPeerCount OBJECT-TYPE
```



```

SYNTAX          Counter32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "This objects specifies the number of peers
    (pseudowires) present in this VPLS instance."
 ::= { vplsStatusEntry 2 }

```

-- VPLS PW Binding Table

```

vplsPwBindTable OBJECT-TYPE
SYNTAX          SEQUENCE OF VplsPwBindEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "This table provides an association between a
    VPLS service and the corresponding pseudowires.
    A service can have more than one pseudowire
    association. Pseudowires are defined in
    the pwTable"
 ::= { vplsObjects 4 }

```

```

vplsPwBindEntry OBJECT-TYPE
SYNTAX          VplsPwBindEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "Each row represents an association between a
    VPLS instance and a pseudowire
    defined in the pwTable. Each index is unique
    in describing an entry in this table. However,
    both indexes are required to define the one
    to many association of service to
    pseudowire.

    Entries in this table may be created or deleted
    through SNMP, as side effects of console or other
    non-SNMP management commands, or upon learning via
    autodiscovery.

    It is optional for the agent to allow entries to be
    created that point to nonexistent entries in
    vplsConfigTable."
INDEX { vplsConfigIndex, pwIndex }
 ::= { vplsPwBindTable 1 }

```

```

VplsPwBindEntry ::=
SEQUENCE {

```

```

    vplsPwBindConfigType      INTEGER,
    vplsPwBindType            INTEGER,
    vplsPwBindRowStatus      RowStatus,
    vplsPwBindStorageType    StorageType
}

```

```

vplsPwBindConfigType  OBJECT-TYPE
  SYNTAX               INTEGER {
                        manual      (1),
                        autodiscovery (2)
                        }
  MAX-ACCESS           read-create
  STATUS               current
  DESCRIPTION
    "The value of this object indicates
    whether the pseudowire Binding was created
    via SNMP/Console or via Auto-Discovery.

    The value of this object must be
    specified when the row is created and cannot
    be changed while the row status is active(1)"
 ::= { vplsPwBindEntry 1 }

```

```

vplsPwBindType        OBJECT-TYPE
  SYNTAX               INTEGER {
                        mesh      (1),
                        spoke     (2)
                        }
  MAX-ACCESS           read-create
  STATUS               current
  DESCRIPTION
    "The value of this object indicates
    whether the pseudowire Binding is of
    type mesh or spoke.

    The value of this object must be
    specified when the row is created and cannot
    be changed while the row status is active(1)"
 ::= { vplsPwBindEntry 2 }

```

```

vplsPwBindRowStatus  OBJECT-TYPE
  SYNTAX               RowStatus
  MAX-ACCESS           read-create
  STATUS               current
  DESCRIPTION
    "For creating, modifying, and deleting this row.

    All other objects in this row must be set to valid

```

values before this object can be set to active(1).

None of the read-create objects in the conceptual rows may be changed when this object is in the active(1) state.

If autodiscovered entries are deleted they would likely re-appear in the next autodiscovery interval."

```
::= { vplsPwBindEntry 3 }
```

```
vplsPwBindStorageType OBJECT-TYPE
```

```
SYNTAX StorageType
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This variable indicates the storage type for this row."
```

```
DEFVAL { volatile }
```

```
::= { vplsPwBindEntry 4 }
```

```
-- vplsBgpADConfigTable
```

```
vplsBgpADConfigTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF VplsBgpADConfigEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This table specifies information for configuring BGP Auto-Discovery parameters for a given VPLS service."
```

```
"
```

```
::= { vplsObjects 5 }
```

```
vplsBgpADConfigEntry OBJECT-TYPE
```

```
SYNTAX VplsBgpADConfigEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A row in this table indicates that BGP based Auto-Discovery is in use for this instance of VPLS."
```

```
A row in this table is indexed by vplsConfigIndex, which uniquely identifies a single VPLS."
```

```
Entries in this table may be created or deleted through SNMP, as side effects of console or other non-SNMP management commands, or upon learning via autodiscovery.
```

```
All of the read-create objects can be changed when vplsBGPADConfigRowStatus is in active(1) state."
```

```

INDEX      { vplsConfigIndex }
 ::= { vplsBgpADConfigTable 1 }

```

```
VplsBgpADConfigEntry ::=
```

```

SEQUENCE {
  vplsBgpADConfigRouteDistinguisher VplsBgpRouteDistinguisher,
  vplsBgpADConfigPrefix              Unsigned32,
  vplsBgpADConfigVplsId             VplsBgpRouteDistinguisher,
  vplsBgpADConfigRowStatus          RowStatus,
  vplsBgpADConfigStorageType        StorageType
}

```

```
vplsBgpADConfigRouteDistinguisher OBJECT-TYPE
```

```

SYNTAX          VplsBgpRouteDistinguisher
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION     "The route distinguisher for this VPLS. See RFC 4364
for a complete definition of a route distinguisher.
For more details on use of a route distinguisher
for a VPLS service, see RFC 4761. When not configured, the
value is derived from the lower 6 bytes of
vplsBgpADConfigVplsId.
"
 ::= { vplsBgpADConfigEntry 1 }

```

```
vplsBgpADConfigPrefix OBJECT-TYPE
```

```

SYNTAX          Unsigned32
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION     "In case of auto-discovery, the default prefix advertised
is the IP address of the loopback. In case the user wants
to override the loopback address, vplsBgpADConfigPrefix
should be set. When this value is non-zero, this value is
used along with vplsBgpADConfigRouteDistinguisher in the
Network Layer Reachability Information (NLRI), see RFC 6074.
"
DEFVAL { 0 }
 ::= { vplsBgpADConfigEntry 2 }

```

```
vplsBgpADConfigVplsId OBJECT-TYPE
```

```

SYNTAX          VplsBgpRouteDistinguisher
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION     "VplsId is a unique identifier for all Virtual Switch
Instances (VSIs) belonging to the same VPLS. It is

```

advertised as an extended community.

```
"
 ::= { vplsBgpADConfigEntry 3 }
```

vplsBgpADConfigRowStatus OBJECT-TYPE

```
SYNTAX          RowStatus
MAX-ACCESS      read-create
STATUS          current
```

DESCRIPTION

"For creating, modifying, and deleting this row.

All other objects in this row must be set to valid values before this object can be set to active(1).

None of the read-create objects in the conceptual rows may be changed when this object is in the active(1) state."

```
::= { vplsBgpADConfigEntry 4 }
```

vplsBgpADConfigStorageType OBJECT-TYPE

```
SYNTAX          StorageType
MAX-ACCESS      read-create
STATUS          current
```

DESCRIPTION

"This variable indicates the storage type for this row."

```
DEFVAL { nonVolatile }
```

```
::= { vplsBgpADConfigEntry 5 }
```

-- vplsBgpRteTargetTable

vplsBgpRteTargetTable OBJECT-TYPE

```
SYNTAX          SEQUENCE OF VplsBgpRteTargetEntry
MAX-ACCESS      not-accessible
STATUS          current
```

DESCRIPTION

"This table specifies the list of Route Targets imported or exported by BGP during auto-discovery of VPLS.

"

```
::= { vplsObjects 6 }
```

vplsBgpRteTargetEntry OBJECT-TYPE

```
SYNTAX          VplsBgpRteTargetEntry
MAX-ACCESS      not-accessible
STATUS          current
```

DESCRIPTION

"An entry in this table specifies the value of the Route Target being used by BGP. Depending on the value

of `vplsBgpRteTargetType`, a Route Target might be exported, imported, or both. Every VPLS that uses auto-discovery for finding peer nodes can import and export multiple Route Targets. This representation allows support for hierarchical VPLS.

Entries in this table may be created or deleted through SNMP, as side effects of console or other non-SNMP management commands, or upon learning via autodiscovery.

It is optional for the agent to allow entries to be created that point to nonexistent entries in `vplsConfigTable`.

```
INDEX      { vplsConfigIndex, vplsBgpRteTargetIndex }
 ::= { vplsBgpRteTargetTable 1 }
```

```
VplsBgpRteTargetEntry ::=
SEQUENCE {
    vplsBgpRteTargetIndex      Unsigned32,
    vplsBgpRteTargetRTType    VplsBgpRouteTargetType,
    vplsBgpRteTargetRT        VplsBgpRouteTarget,
    vplsBgpRteTargetRowStatus RowStatus,
    vplsBgpRteTargetStorageType StorageType
}
```

```
vplsBgpRteTargetIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This index, along with vplsConfigIndex, identifies one
        entry in the vplsBgpRteTargetTable. By keeping
        vplsConfigIndex constant and using a new value of
        vplsBgpRteTargetIndex, users can configure multiple
        Route Targets for the same VPLS."
    ::= { vplsBgpRteTargetEntry 1 }
```

```
vplsBgpRteTargetRTType OBJECT-TYPE
    SYNTAX      VplsBgpRouteTargetType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "Used to define the type of a Route Target usage.
        Route Targets can be specified to be imported,
        exported, or both. For a complete definition of a
        Route Target, see RFC 4364."
```

```
::= { vplsBgpRteTargetEntry 2 }
```

```
vplsBgpRteTargetRT      OBJECT-TYPE
    SYNTAX                VplsBgpRouteTarget
    MAX-ACCESS            read-create
    STATUS                 current
    DESCRIPTION
        "The Route Target associated with the VPLS service.
        For more details on use of Route Targets
        for a VPLS service, see RFC 4761.
        "
    ::= { vplsBgpRteTargetEntry 3 }
```

```
vplsBgpRteTargetRowStatus  OBJECT-TYPE
    SYNTAX                RowStatus
    MAX-ACCESS            read-create
    STATUS                 current
    DESCRIPTION
        "This variable is used to create, modify, and/or
        delete a row in this table.

        All other objects in this row must be set to valid
        values before this object can be set to active(1).

        When a row in this table is in active(1) state, no
        objects in that row can be modified.

        If autodiscovered entries are deleted they would
        likely re-appear in the next autodiscovery interval."
    ::= { vplsBgpRteTargetEntry 4 }
```

```
vplsBgpRteTargetStorageType OBJECT-TYPE
    SYNTAX                StorageType
    MAX-ACCESS            read-create
    STATUS                 current
    DESCRIPTION
        "This variable indicates the storage type for this row."
    DEFVAL { volatile }
    ::= { vplsBgpRteTargetEntry 5 }
```

```
vplsStatusNotifEnable  OBJECT-TYPE
    SYNTAX                TruthValue
    MAX-ACCESS            read-write
    STATUS                 current
    DESCRIPTION
        "If this object is set to true(1), then it enables
        the emission of a vplsStatusChanged
        notification; otherwise, this notification is not
```

```

    emitted."
REFERENCE
    "See also RFC 3413 for explanation that
    notifications are under the ultimate control of the
    MIB module in this document."
DEFVAL { false }
 ::= { vplsObjects 7 }

vplsNotificationMaxRate OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "This object indicates the maximum number of
    notifications issued per second.  If events occur
    more rapidly, the implementation may simply fail to
    emit these notifications during that period, or it may
    queue them until an appropriate time.  A value of 0
    means no throttling is applied and events may be
    notified at the rate at which they occur."
DEFVAL      { 0 }
 ::= { vplsObjects 8 }
-- VPLS Service Notifications

vplsStatusChanged NOTIFICATION-TYPE
OBJECTS {
    vplsConfigVpnId,
    vplsConfigAdminStatus,
    vplsStatusOperStatus
}
STATUS      current
DESCRIPTION
    "The vplsStatusChanged notification is generated
    when there is a change in the administrative or
    operating status of a VPLS service.

    The object instances included in the notification
    are the ones associated with the VPLS service
    whose status has changed."
 ::= { vplsNotifications 1 }

vplsFwdFullAlarmRaised NOTIFICATION-TYPE
OBJECTS {
    vplsConfigVpnId,
    vplsConfigFwdFullHighWatermark,
    vplsConfigFwdFullLowWatermark
}
STATUS      current

```


DESCRIPTION

"The vplsFwdFullAlarmRaised notification is generated when the utilization of the Forwarding database is above the value specified by vplsConfigFwdFullHighWatermark.

The object instances included in the notification are the ones associated with the VPLS service that has exceeded the threshold."

```
::= { vplsNotifications 2 }
```

```
vplsFwdFullAlarmCleared NOTIFICATION-TYPE
```

```
OBJECTS {
```

```
    vplsConfigVpnId,
    vplsConfigFwdFullHighWatermark,
    vplsConfigFwdFullLowWatermark
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

"The vplsFwdFullAlarmCleared notification is generated when the utilization of the Forwarding database is below the value specified by vplsConfigFwdFullLowWatermark.

The object instances included in the notification are the ones associated with the VPLS service that has fallen below the threshold."

```
::= { vplsNotifications 3 }
```

```
-- Conformance Section
```

```
vplsCompliances
```

```
    OBJECT IDENTIFIER ::= { vplsConformance 1 }
```

```
-- Compliance requirement for fully compliant implementations
```

```
vplsModuleFullCompliance MODULE-COMPLIANCE
```

```
STATUS current
```

```
DESCRIPTION
```

"Compliance requirement for implementations that provide full support for VPLS-GENERIC-MIB. Such devices can then be monitored and configured using this MIB module."

```
MODULE -- this module
```

```
MANDATORY-GROUPS {
```

```
    vplsGroup,
    vplsPwBindGroup,
    vplsNotificationGroup
```

```

    }

    ::= { vplsCompliances 1 }

-- Compliance requirement for read-only implementations.

vplsModuleReadOnlyCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Compliance requirement for implementations that only
        provide read-only support for VPLS-GENERIC-MIB.
        Such devices can then be monitored but cannot be
        configured using this MIB modules."

    MODULE -- this module

    MANDATORY-GROUPS {
        vplsGroup,
        vplsPwBindGroup,
        vplsNotificationGroup
    }

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

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

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

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

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

```

```

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

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

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

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

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

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

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

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

```

```
 ::= { vplsCompliances 2 }
```

```
-- Units of conformance.
```

```
vplsGroups
```

```
  OBJECT IDENTIFIER ::= { vplsConformance 2 }
```

```

vplsGroup OBJECT-GROUP
  OBJECTS {
    vplsConfigName,
    vplsBgpADConfigRouteDistinguisher,
    vplsBgpRteTargetRTType,
    vplsBgpRteTargetRT,
    vplsBgpRteTargetRowStatus,
    vplsBgpRteTargetStorageType,
    vplsBgpADConfigPrefix,
    vplsBgpADConfigVplsId,
    vplsBgpADConfigRowStatus,
    vplsBgpADConfigStorageType,
    vplsConfigDescr,
    vplsConfigAdminStatus,
    vplsConfigMacLearning,
    vplsConfigDiscardUnknownDest,
    vplsConfigMacAging,
    vplsConfigVpnId,
    vplsConfigFwdFullHighWatermark,
    vplsConfigFwdFullLowWatermark,
    vplsConfigRowStatus,
    vplsConfigIndexNext,
    vplsConfigMtu,
    vplsConfigStorageType,
    vplsConfigSignalingType,
    vplsStatusOperStatus,
    vplsStatusPeerCount,
    vplsStatusNotifEnable,
    vplsNotificationMaxRate
  }
  STATUS current
  DESCRIPTION
    "The group of objects supporting
    management of L2VPN VPLS services"
  ::= { vplsGroups 1 }

```

```

vplsPwBindGroup OBJECT-GROUP
  OBJECTS {
    vplsPwBindConfigType,
    vplsPwBindType,
    vplsPwBindRowStatus,
    vplsPwBindStorageType
  }
  STATUS current
  DESCRIPTION
    "The group of objects supporting
    management of
    pseudowire (PW) Binding to VPLS."

```

```

 ::= { vplsGroups 2 }

vplsNotificationGroup NOTIFICATION-GROUP
  NOTIFICATIONS {
    vplsStatusChanged,
    vplsFwdFullAlarmRaised,
    vplsFwdFullAlarmCleared
  }
  STATUS current
  DESCRIPTION
    "The group of notifications supporting
    the Notifications generated for
    VPLS services."
 ::= { vplsGroups 3 }

END

```

6.2. VPLS-LDP-MIB Object Definitions

This MIB module mentions the following documents:
[RFC2578], [RFC2579], [RFC2580], [RFC5601], and [RFC4762].

```
VPLS-LDP-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
Unsigned32, transmission
FROM SNMPv2-SMI -- RFC 2578
```

```
MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
FROM SNMPv2-CONF -- RFC 2580
```

```
TruthValue
FROM SNMPv2-TC -- RFC 2579
```

```
pwIndex, pwID
FROM PW-STD-MIB -- RFC 5601
```

```
vplsConfigIndex, vplsConfigName
FROM VPLS-GENERIC-MIB;
```

```
vplsLdpMIB MODULE-IDENTITY
  LAST-UPDATED "201405191200Z" -- 19 May 2014 12:00:00 GMT
  ORGANIZATION "Layer 2 Virtual Private Networks (L2VPN)
  Working Group"
```

CONTACT-INFO

"
 Rohit Mediratta
 Email: romedira@cisco.com

The L2VPN Working Group
 (email distribution l2vpn@ietf.org,
 http://www.ietf.org/wg/l2vpn/charter/)
 "

DESCRIPTION

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

The initial version of this MIB module was published in
 RFC 7257; for full legal notices see the RFC itself.

This MIB module contains managed object definitions for
 LDP-signaled Virtual Private LAN Services as in
 RFC 4762.

This MIB module enables the use of any
 underlying pseudowire network."

-- Revision history.

REVISION

"201405191200Z" -- 19 May 2014 12:00:00 GMT

DESCRIPTION "Initial version published as part of RFC 7257."

::= { transmission 275 }

-- Top-level components of this MIB.

-- Notifications

vplsLdpNotifications OBJECT IDENTIFIER
 ::= { vplsLdpMIB 0 }

-- Tables, Scalars
 vplsLdpObjects OBJECT IDENTIFIER
 ::= { vplsLdpMIB 1 }

-- Conformance

```

vplsLdpConformance OBJECT IDENTIFIER
    ::= { vplsLdpMIB 2 }

vplsLdpConfigTable OBJECT-TYPE
    SYNTAX SEQUENCE OF VplsLdpConfigEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table specifies information for configuring
        and monitoring LDP-specific parameters for
        Virtual Private LAN Service (VPLS)."
    ::= { vplsLdpObjects 1 }

vplsLdpConfigEntry OBJECT-TYPE
    SYNTAX VplsLdpConfigEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A row in this table represents LDP-specific information
        for Virtual Private LAN Service (VPLS) in a packet
        network. It is indexed by vplsConfigIndex, which uniquely
        identifies a single VPLS.

        A row is automatically created when a VPLS service is
        configured using LDP signaling.

        All of the writable objects values can be
        changed when vplsConfigRowStatus is in the active(1)
        state.
        "
    INDEX { vplsConfigIndex }
    ::= { vplsLdpConfigTable 1 }

VplsLdpConfigEntry ::=
    SEQUENCE {
        vplsLdpConfigMacAddrWithdraw TruthValue
    }

vplsLdpConfigMacAddrWithdraw OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "This object specifies if MAC address withdrawal
        is enabled in this service. If this object is 'true',
        then MAC address withdrawal is enabled. If 'false',
        then MAC address withdrawal is disabled."
    DEFVAL { true }

```

```

 ::= { vplsLdpConfigEntry 1 }

-- VPLS LDP PW Binding Table

vplsLdpPwBindTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF VplsLdpPwBindEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This table provides LDP-specific information for
        an association between a VPLS service and the
        corresponding pseudowires. A service can have more
        than one pseudowire association. Pseudowires are
        defined in the pwTable."
 ::= { vplsLdpObjects 2 }

vplsLdpPwBindEntry OBJECT-TYPE
    SYNTAX          VplsLdpPwBindEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Each row represents an association between a
        VPLS instance and one or more pseudowires
        defined in the pwTable. Each index is unique
        in describing an entry in this table. However,
        both indexes are required to define the
        one-to-many association of service to pseudowire.

        An entry in this table is instantiated only when
        LDP signaling is used to configure VPLS service.

        Each entry in this table provides LDP-specific
        information for the VPLS represented by
        vplsConfigIndex."
    INDEX { vplsConfigIndex, pwIndex }
 ::= { vplsLdpPwBindTable 1 }

VplsLdpPwBindEntry ::=
    SEQUENCE {
        vplsLdpPwBindMacAddressLimit      Unsigned32
    }

vplsLdpPwBindMacAddressLimit OBJECT-TYPE
    SYNTAX          Unsigned32 (0..4294967295)
    MAX-ACCESS      read-write
    STATUS          current
    DESCRIPTION
        "The value of this object specifies the maximum

```



```

        number of learned and static entries allowed in the
        Forwarding database for this PW Binding. The value 0
        means there is no limit for this PW Binding."
DEFVAL          { 0 }
 ::= { vplsLdpPwBindEntry 1 }

-- VPLS LDP Service Notifications

vplsLdpPwBindMacTableFull NOTIFICATION-TYPE
  OBJECTS {
    vplsConfigName,
    pwID
  }
  STATUS          current
  DESCRIPTION
    "The vplsLdpPwBindMacTableFull notification is generated
    when the number of learned MAC addresses increases to
    the value specified in vplsLdpPwBindMacAddressLimit."
 ::= { vplsLdpNotifications 1 }

-- Conformance Section

vplsLdpCompliances
  OBJECT IDENTIFIER ::= { vplsLdpConformance 1 }

-- Compliance requirement for fully compliant implementations

vplsLdpModuleFullCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
    "Compliance requirement for implementations that
    provide full support for VPLS-LDP-MIB.

    Such devices can then be monitored and configured using
    this MIB module."

  MODULE -- this module

    MANDATORY-GROUPS {
      vplsLdpGroup,
      vplsLdpNotificationGroup
    }

 ::= { vplsLdpCompliances 1 }

-- Compliance requirement for read-only implementations.

vplsLdpModuleReadOnlyCompliance MODULE-COMPLIANCE

```

```

STATUS current
DESCRIPTION
    "Compliance requirement for implementations that only
    provide read-only support for VPLS-LDP-MIB.

```

```

    Such devices can then be monitored but cannot be
    configured using this MIB modules."

```

```

MODULE -- this module

```

```

MANDATORY-GROUPS {
    vplsLdpGroup,
    vplsLdpNotificationGroup
}

```

```

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

```

```

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

```

```

 ::= { vplsLdpCompliances 2 }

```

```

-- Units of conformance.

```

```

vplsLdpGroups
    OBJECT IDENTIFIER ::= { vplsLdpConformance 2 }

```

```

vplsLdpGroup OBJECT-GROUP
    OBJECTS {
        vplsLdpConfigMacAddrWithdraw,
        vplsLdpPwBindMacAddressLimit
    }
    STATUS          current
    DESCRIPTION
        "The group of objects supporting
        management of L2VPN VPLS services using LDP."
    ::= { vplsLdpGroups 1 }

```

```

vplsLdpNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        vplsLdpPwBindMacTableFull
    }

```

```

STATUS          current
DESCRIPTION
  "The group of notifications supporting
  the Notifications generated for
  VPLS LDP Service."
 ::= { vplsLdpGroups 2 }

```

END

6.3. VPLS-BGP-MIB Object Definitions

This MIB module mentions the following documents:
[RFC2578], [RFC2579], [RFC2580], [RFC3411],
[RFC5601], and [RFC4761].

```
VPLS-BGP-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
MODULE-IDENTITY, OBJECT-TYPE,
Unsigned32, transmission
  FROM SNMPv2-SMI                -- RFC 2578
```

```
MODULE-COMPLIANCE, OBJECT-GROUP
  FROM SNMPv2-CONF              -- RFC 2580
```

```
RowStatus, StorageType
  FROM SNMPv2-TC                -- RFC 2579
```

```
SnmpAdminString
  FROM SNMP-FRAMEWORK-MIB      -- RFC 3411
```

```
pwIndex
  FROM PW-STD-MIB              -- RFC 5601
```

```
vplsConfigIndex
  FROM VPLS-GENERIC-MIB
;
```

```
vplsBgpMIB MODULE-IDENTITY
  LAST-UPDATED "201405191200Z" -- 19 May 2014 12:00:00 GMT
```

```
  ORGANIZATION "Layer 2 Virtual Private Networks (L2VPN)
                Working Group"
```

```
  CONTACT-INFO
```

```
  "
  V. J. Shah
  Email: vshah@juniper.net
```

The L2VPN Working Group (email distribution l2vpn@ietf.org,
<http://www.ietf.org/wg/l2vpn/charter/>)

"

DESCRIPTION

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

The initial version of this MIB module was published in
 RFC 7257; for full legal notices see the RFC itself.

This MIB module contains managed object definitions for
 BGP signaled Virtual Private LAN Service as in
 RFC 4761.

This MIB module enables the use of any underlying
 pseudowire network."

-- Revision history.

REVISION

"201405191200Z" -- 19 May 2014 12:00:00 GMT

DESCRIPTION "Initial version published as part of RFC 7257."

::= { transmission 276 }

-- Top-level components of this MIB.

-- Tables, Scalars

vplsBgpObjects OBJECT IDENTIFIER
 ::= { vplsBgpMIB 1 }

-- Conformance

vplsBgpConformance OBJECT IDENTIFIER
 ::= { vplsBgpMIB 2 }

-- Vpls Bgp Config Table

vplsBgpConfigTable OBJECT-TYPE
 SYNTAX SEQUENCE OF VplsBgpConfigEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION

"This table specifies information for configuring and monitoring BGP-specific parameters for Virtual Private LAN Service (VPLS)."

```
 ::= { vplsBgpObjects 1 }
```

vplsBgpConfigEntry OBJECT-TYPE

SYNTAX VplsBgpConfigEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A row in this table represents BGP-specific information for Virtual Private LAN Service (VPLS) in a packet network. It is indexed by vplsConfigIndex, which uniquely identifies a single instance of a VPLS service.

A row is automatically created when a VPLS service is created that is configured to use BGP signaling.

All of the writable object values can be changed when vplsConfigRowStatus is in the active(1) state.

"

```
INDEX { vplsConfigIndex }
```

```
 ::= { vplsBgpConfigTable 1 }
```

VplsBgpConfigEntry ::=

```
SEQUENCE {
  vplsBgpConfigVERangeSize      Unsigned32
}
```

vplsBgpConfigVERangeSize OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Specifies the size of the range of VPLS Edge Identifier (VE ID) in this VPLS service. This number controls the size of the label block advertised for this VE by the PE. A value of 0 indicates that the range is not configured and the PE derives the range value from received advertisements from other PEs.

The VE ID takes 2 octets in VPLS BGP NLRI according to RFC 4761. Hence we have limited the range of this object to 65535."

```
DEFVAL { 0 }
```

```
::= { vplsBgpConfigEntry 1 }
```

```
-- Vpls Edge Device (VE) Identifier Table
```

```
vplsBgpVETable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF VplsBgpVEEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This table associates VPLS Edge devices to a VPLS service"
```

```
::= { vplsBgpObjects 2 }
```

```
vplsBgpVEEntry OBJECT-TYPE
```

```
SYNTAX VplsBgpVEEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"An entry in this table is created for each VE ID configured on a PE for a particular VPLS service instance.
```

```
Entries in this table may be created or deleted through SNMP, as side effects of console or other non-SNMP management commands, or upon learning via autodiscovery.
```

```
It is optional for the agent to allow entries to be created that point to nonexistent entries in vplsConfigTable."
```

```
INDEX { vplsConfigIndex, vplsBgpVEId }
```

```
::= { vplsBgpVETable 1 }
```

```
VplsBgpVEEntry ::= SEQUENCE {
```

```
    vplsBgpVEId Unsigned32,
```

```
    vplsBgpVEName SnmpAdminString,
```

```
    vplsBgpVEPreference Unsigned32,
```

```
    vplsBgpVERowStatus RowStatus,
```

```
    vplsBgpVEStorageType StorageType
```

```
}
```

```
vplsBgpVEId OBJECT-TYPE
```

```
SYNTAX Unsigned32 (1..65535)
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A secondary index identifying a VE within an instance of a VPLS service.
```

The VE ID takes 2 octets in VPLS BGP NLRI according to RFC 4761. Hence, we have limited the range of this object to 65535."

```
::= { vplsBgpVEEntry 1 }
```

```
vplsBgpVEName OBJECT-TYPE
```

```
SYNTAX SnmpAdminString
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Descriptive name for the site or user-facing PE
(U-PE) associated with this VE ID."
```

```
DEFVAL { "" }
```

```
::= { vplsBgpVEEntry 2 }
```

```
vplsBgpVEPreference OBJECT-TYPE
```

```
SYNTAX Unsigned32 (0..65535)
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Specifies the preference of the VE ID on this
Provider Edge (PE) if the site is multihomed
and VE ID is reused."
```

```
DEFVAL { 0 }
```

```
::= { vplsBgpVEEntry 3 }
```

```
vplsBgpVERowStatus OBJECT-TYPE
```

```
SYNTAX RowStatus
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This variable is used to create, modify, and/or
delete a row in this table.
```

```
All other objects in this row must be set to valid
values before this object can be set to active(1).
```

```
When a row in this table is in active(1) state, no
objects in that row can be modified except
vplsBgpSiteRowStatus."
```

```
::= { vplsBgpVEEntry 5 }
```

```
vplsBgpVEStorageType OBJECT-TYPE
```

```
SYNTAX StorageType
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This variable indicates the storage type for this
```

```

        row."
    DEFVAL { volatile }
    ::= { vplsBgpVEEntry 6 }

-- VPLS BGP PW Binding Table

vplsBgpPwBindTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF VplsBgpPwBindEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This table provides BGP-specific information for
        an association between a VPLS service and the
        corresponding pseudowires. A service can have more
        than one pseudowire association. Pseudowires are
        defined in the pwTable."
    ::= { vplsBgpObjects 3 }

vplsBgpPwBindEntry OBJECT-TYPE
    SYNTAX          VplsBgpPwBindEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Each row represents an association between a
        VPLS instance and one or more pseudowires
        defined in the pwTable. Each index is unique
        in describing an entry in this table. However,
        both indexes are required to define the one
        to many association of service to pseudowire.

        An entry in this table is instantiated only when
        BGP signaling is used to configure VPLS service.

        Each entry in this table provides BGP-specific
        information for the VPLS represented by
        vplsConfigIndex."
    INDEX { vplsConfigIndex, pwIndex }
    ::= { vplsBgpPwBindTable 1 }

VplsBgpPwBindEntry ::=
    SEQUENCE {
        vplsBgpPwBindLocalVEId      Unsigned32,
        vplsBgpPwBindRemoteVEId     Unsigned32
    }

vplsBgpPwBindLocalVEId OBJECT-TYPE
    SYNTAX          Unsigned32 (1..65535)
    MAX-ACCESS      read-only
    STATUS          current

```


DESCRIPTION

"Identifies the local VE with which this pseudowire is associated.

The VE ID takes 2 octets in VPLS BGP NLRI according to RFC 4761. Hence, we have limited the range of this object to 65535."

```
::= { vplsBgpPwBindEntry 1 }
```

```
vplsBgpPwBindRemoteVEId OBJECT-TYPE
    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  read-only
    STATUS      current
```

DESCRIPTION

"Identifies the remote VE with which this pseudowire is associated.

The VE ID takes 2 octets in VPLS BGP NLRI according to RFC 4761. Hence, we have limited the range of this object to 65535."

```
::= { vplsBgpPwBindEntry 2 }
```

```
-- Conformance Section
```

```
-- Compliance requirement for fully compliant implementations
```

vplsBgpCompliances

```
OBJECT IDENTIFIER ::= { vplsBgpConformance 1 }
```

vplsBgpModuleFullCompliance MODULE-COMPLIANCE

```
STATUS current
```

DESCRIPTION

"Compliance requirement for implementations that provide full support for VPLS-BGP-MIB.

Such devices can then be monitored and configured using this MIB module."

```
MODULE -- this module
```

```
MANDATORY-GROUPS {
    vplsBgpConfigGroup,
    vplsBgpVEGroup,
    vplsBgpPwBindGroup
}
```

```
::= { vplsBgpCompliances 1 }
```

```
-- Compliance requirement for read-only implementations.
```

vplsBgpModuleReadOnlyCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"Compliance requirement for implementations that only provide read-only support for VPLS-BGP-MIB. Such devices can then be monitored but cannot be configured using this MIB modules."

MODULE -- this module

```
MANDATORY-GROUPS {
    vplsBgpConfigGroup,
    vplsBgpVEGroup,
    vplsBgpPwBindGroup
}
```

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

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

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

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

```
::= { vplsBgpCompliances 2 }
```

-- Units of conformance.

vplsBgpGroups

```
OBJECT IDENTIFIER ::= { vplsBgpConformance 2 }
```

```
vplsBgpConfigGroup OBJECT-GROUP
OBJECTS {
    vplsBgpConfigVERangeSize
}
```

```
STATUS          current
DESCRIPTION
    "The group of objects supporting configuration
    of L2VPN VPLS services using BGP."
 ::= { vplsBgpGroups 1 }

vplsBgpVEGroup OBJECT-GROUP
OBJECTS {
    vplsBgpVEName,
    vplsBgpVEPreference,
    vplsBgpVERowStatus,
    vplsBgpVEStorageType
}
STATUS          current
DESCRIPTION
    "The group of objects supporting management of VPLS
    Edge devices for L2VPN VPLS services using BGP."
 ::= { vplsBgpGroups 2 }

vplsBgpPwBindGroup OBJECT-GROUP
OBJECTS {
    vplsBgpPwBindLocalVEId,
    vplsBgpPwBindRemoteVEId
}
STATUS          current
DESCRIPTION
    "The group of objects supporting management of
    pseudowires for L2VPN VPLS services using BGP."
 ::= { vplsBgpGroups 3 }
```

END

7. Security Considerations

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 their sensitivity/vulnerability:

- o vplsConfigTable:
- o vplsPwBindTable:
- o vplsBgpADConfigTable:
- o vplsBgpRteTargetTable:
- o vplsLdpPwBindTable:
- o vplsLdpConfigTable:
- o vplsBgpConfigTable:
- o vplsBgpVETable:

The tables listed above contain read-create/read-write objects that can be used to configure or modify a LDP/BGP VPLS service. Any improper configuration or modification of objects in these tables can disrupt VPLS services.

The use of stronger mechanisms such as SNMPv3 security should be considered where possible for configuring these objects. Specifically, SNMPv3 View-based Access Control Model (VACM) and User-based Security Model (USM) MUST be used with any v3 agent that provides SET access to these tables.

- o vplsNotificationMaxRate
Setting this object to a very high value can cause a notification storm that may disrupt network service.

Most 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. These readable objects are contained in the following tables:

- o vplsConfigTable
- o vplsStatusTable
- o vplsPwBindTable
- o vplsBgpADConfigTable
- o vplsBgpRteTargetTable
- o vplsLdpPwBindTable

- o vplsLdpConfigTable
- o vplsBgpConfigTable
- o vplsBgpVETable
- o vplsBgpPwBindTable

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.

8. IANA Considerations

The MIB modules in this document use the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry.

8.1. IANA Considerations for VPLS-GENERIC-MIB

The IANA has assigned { transmission 274 } to the VPLS-GENERIC-MIB module specified in this document.

8.2. IANA Considerations for VPLS-LDP-MIB

The IANA has assigned { transmission 275 } to the VPLS-LDP-MIB module specified in this document.

8.3. IANA Considerations for VPLS-BGP-MIB

The IANA has assigned { transmission 276 } to the VPLS-BGP-MIB module specified in this document.

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9.2. Informative References

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