

Pseudowire Edge-to-Edge Emulation
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January 9, 2008

Pseudowire (PW) Management Information Base (MIB)
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Abstract

This memo defines an experimental portion of the Management Information Base for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling of Pseudowire Edge-to-Edge services carried over a general Packet Switched Network.

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PW MIB

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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 a MIB module that can be used to manage pseudowire (PW) services for transmission over a packet Switched Network (PSN) [[RFC3931](#)] [[RFC4447](#)]. This MIB module provides generic management of PWs which is common to all types of PSN and PW services defined by the IETF PWE3 Working Group.

Comments should be made directly to the PWE3 mailing list at pwe3@ietf.org.

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. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[BCP14](#)].

This document adopts the definitions, acronyms and mechanisms described in [[RFC3985](#)] and [[RFC3916](#)]. Unless otherwise stated, the mechanisms of [[RFC3985](#)] apply and will not be re-described here.

[4.](#) Co-Authors

The individuals listed below are co-authors of this document.

Dave Danenberg - Litchfield Communications

Nadeau & Zelig

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Sharon Mantin - Corrigent Systems

[5.](#) Overview

The PWE3 MIB Modules architecture provides a layered modular model into which any supported emulated service can be connected to any supported PSN type. This specific MIB module provides the glue for mapping between the emulated service onto the native PSN service. As such the defining of a PW emulated service requires the use of at least three types of MIB modules.

Starting from the emulated service, the first type is service-specific module, which is emulated signal type dependent. These modules are defined in other documents.

The second type is this module, the PW-STD-MIB module, which configures general parameters of the PW that are common to all types of emulated services and PSN types.

The third type of modules is PSN-specific module. There is a different module for each type of PSN. These modules associate the PW with one or more "tunnels" that carry the service over the PSN. These modules are defined in other documents.

[6.](#) Structure of the MIB Module

The MIB Module consists of five tables;

- The generic configuration and status monitoring objects which are common to all service types and PSN types (pwTable).
- The PW Performance Current Table (pwPerfCurrentTable) contains PW statistics for the current 15-minute period.
- The PW Performance Interval Table (pwPerfIntervalTable) contains PW statistics for historical intervals (usually 96 15-minute entries to cover a 24 hour period).
- The PW Performance one day Interval Table (pwPerf1DayIntervalTable) contains PW statistics for historical intervals accumulated per day. Usually 30 1-Day entries to cover a monthly period.
- The mapping table (pwIndexMappingTable) enables the reverse mapping of unique Pwid parameters [peer IP, PW type and PW ID] and the pwIndex.

- The mapping table (pwGenFecIndexMappingTable) enables the reverse mapping of unique Pwid parameters used in genFecSignaling [pwGroupAttachmentID, pwLocalAttachmentID and pwPeerAttachmentID] and the pwIndex.

This MIB module uses TCs from [\[RFC2578\]](#), [\[RFC2579\]](#), [\[RFC2580\]](#), [\[RFC2863\]](#), [\[RFC3411\]](#), [\[RFC3593\]](#), [\[RFC3705\]](#), [\[RFC4001\]](#) and [\[PWTC\]](#), and references [\[RFC3413\]](#), [\[RFC4623\]](#) and [\[RFC4720\]](#).

[7.](#) PW-STD-MIB Module Usage

An entry in the PW table (pwTable) MUST exist for all PW types (ATM, FR, Ethernet, SONET, etc.). This table holds generic parameters related to the PW creation and monitoring.

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

- 1) The operator creates a row in the PwTable when configuring the node for a new service. This mode MUST be supported by the agent, and MUST be used when creating a non-signaled (manually assigned) PW.

2) The agent MAY create a row in the PwTable if a signaling message has been received from a peer node for a combination of signaling identifications parameters already unknown to the local node. This mode is OPTIONAL.

3) The agent MAY create a row in the PwTable automatically due to some auto discovery application, or based on configuration that is done through non-SNMP applications. This mode is OPTIONAL.

- The agent then creates the rows in the (locally supported) performance tables and reverse mapping tables in PW-STD-MIB module.

8. Relations to Other PWE3 MIB Modules

- Based on the PSN type defined for the PW, a row is created in PSN specific module (for example [[PW MPLS MIB](#)]) and associated to the PW table by the common pwIndex.

- Based on the PW type defined for the PW, a row is created in service-specific module (for example [[CEP MIB](#)]) and associated to the PW table by the common pwIndex.

- 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 pwVcOperStatus should report 'notPresent'.

9. Relations to the IF-MIB

The PW in general is not an ifIndex [[RFC2863](#)] on its own, for agent scalability reasons. The PW is typically associated via the PWE3 MIB modules to an ifIndex the PW is emulating. This ifIndex may represent a physical entity - for example a PW emulating a SONET path as in CEP: The PW itself is not an ifIndex, however the PW-STD-CEP-MIB module associates the PW to the ifIndex of the path to be emulated. In some cases, the PW will be associated to an ifIndex representing a virtual interface. An example is VPLS service where the PW emulates a logical interface of a (logical) bridge. The

physical ports association to the VPLS service instance is defined in non-PW MIB modules in this case.

Exception to the above MAY exist in some implementations, where it is convenient to manage the PW as an ifIndex in the ifTable. A special ifType to represent a PW virtual interface (exact number to be assigned by IANA) will be used in the ifTable in this case.

When the PW is managed as an ifIndex, by default it SHOULD NOT be stacked, i.e. this ifIndex SHOULD NOT be layered above the respective PSN tunnel ifIndex or the attachment circuit ifIndex or the interface carrying the attachment circuit.

Note that the ifIndex that carries the PW toward/from the PSN is in general not explicitly configured via PWE3 MIB modules except in rare cases. In most cases the PW is carried inside a PSN tunnel, and the interfaces carrying the tunnel are specified in the related MIB modules that control the PSN tunnels.

10. PW Notifications

This MIB module includes notifications for PW entering the up or down state, in accordance with the guidelines for interface notifications as described in [[RFC2863](#)]. Implementers should be aware that in many systems it is desired to correlate notifications, such that notifications will not be emitted if higher hierarchy (such as ports or tunnels) notifications are already in effect. Specifically for PWs, it is anticipated that most network's equipment failures turn into lowerLayerDown state at the PW level, where higher hierarchy level notification has already been emitted.

When a PW is represented as an ifIndex, it is RECOMMENDED that PW

notifications will be turned off, to avoid duplication with the ifIndex status change notifications.

11. Example of the PW MIB Modules Usage

In this section we provide an example of using the MIB objects described in [section 7](#) to set up a CEP PW over MPLS PSN. 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 PW service for CEP is configured over an MPLS PSN (MPLS-TE tunnel). It uses LDP as in [[RFC4447](#)] for service set-up.

For the operation in the service specific MIB modules and the PSN specific MIB modules, see the specific MIB module memo. This example is continued in the memo describing the PW-CEP-STD-MIB module (for example [[CEPMIB](#)]) and the PW-MPLS-STD-MIB module [[PWMPLSMIB](#)]).

In pwTable:

```
{
    pwIndex                5,

    pwType                  cep,
    pwOwner                  pwIdFecSignaling,
    pwPsnType                mpls,
    pwSetUpPriority          0, -- Highest
    pwHoldingPriority         0, -- Highest
    pwInboundMode            loose,

    pwPeerAddrType          ipv4,
    pwPeerAddr               192.0.2.5, -- In this case equal to the
                                -- peer LDP entity IP addr

    pwID                     10,
    pwLocalGroupID           12,
    ..

    pwCwPreference           true,    -- Actually ignored for CEP
    pwLocalIfMtu              0,      -- Do not send ifMtu parameter
    pwLocalIfString           false,  -- Do not send interface string
    pwCapabAdvert             0,      -- Does not support status
                                -- report to the peer.
    pwRemoteGroupID           0xFFFF, -- Will be received by
                                -- signaling protocol

    pwRemoteCwStatus          notKnownYet,
    pwRemoteIfMtu              0,
    pwRemoteIfString           "",
    pwRemoteCapabilities       notYetKnown,
    ..
    pwOutboundVcLabel         0xFFFF, -- Will be received by
                                -- signaling protocol
    pwInboundVcLabel          0xFFFF, -- Will be set by signaling
                                -- protocol
    pwName                    "Example of CEP PW",
    pwDescr                    "",
    ..

    pwAdminStatus             up,
    ..
}
```

12. IANA PWE3 MIB Module

This section contains the initial version of the IANA-PWE3-MIB. IANA is requested to update this MIB module based on expert review as defined in [\[RFC2434\]](#). Each new assignment of PW type or PW PSN type made by IANA based on the procedures described in [\[RFC4446\]](#) should be documented in the online version of IANA-PWE3-MIB. The current IANA-PWE3-MIB contains PW types as requested in [\[RFC4446\]](#) and [\[RFC4863\]](#).

```
IANA-PWE3-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, mib-2
    FROM SNMPv2-SMI -- \[RFC2578\]
```

```
TEXTUAL-CONVENTION
```

```
    FROM SNMPv2-TC; -- \[RFC2579\]
```

```
ianaPwe3MIB MODULE-IDENTITY
```

```
    LAST-UPDATED "200712091200Z" -- 9 December 2007 12:00:00 GMT
```

```
    ORGANIZATION "IANA"
```

```
    CONTACT-INFO
```

```
        "Internet Assigned Numbers Authority
        Internet Corporation for Assigned Names and Numbers
        4676 Admiralty Way, Suite 330
        Marina del Rey, CA 90292-6601
```

```
        Phone: +1 310 823 9358
```

```
        EMail: iana@iana.org"
```

```
DESCRIPTION
```

```
    "This MIB module defines the IANAPwTypeTC and
    IANAPwPsnTypeTC textual conventions for use in PWE3
    MIB modules.
```

```
    Any additions or changes to the contents of this MIB
    module require either publication of an RFC, Designated
    Expert Review as defined in RFC 2434, Guidelines for
    Writing an IANA Considerations Section in RFCs, and should
    be based on the procedures defined in \[RFC4446\]. The
    Designated Expert will be selected by the IESG Area
    Director(s) of the internet Area.
```

```
    Copyright (C) The IETF Trust (2008). The initial
    version of this MIB module was published in RFC yyyy;
```

for full legal notices see the RFC itself. Supplementary
information may be available at:

<http://www.ietf.org/copyrights/ianamib.html>."

-- RFC Ed.: replace yyyy with actual RFC number & remove this note

REVISION "200712091200Z" -- 9 December 2007 12:00:00 GMT

DESCRIPTION "Original version, published as part of RFC yyyy."

-- RFC Editor: please fill the yyyy and remove this note.

::= { mib-2 XXXX }

-- RFC Editor: please fill the XXXX based on the IANA allocation

-- and remove this note.

IANAPwTypeTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Indicates the PW type (i.e. the carried service). "

SYNTAX INTEGER {

other(0),

frameRelayDlciMartiniMode(1),

atmAal5SduVcc(2),

atmTransparent(3),

ethernetTagged(4),

ethernet(5),

hdlc(6),

ppp(7),

cem(8), -- Historic type

atmCellNto1Vcc(9),

atmCellNto1Vpc(10),

ipLayer2Transport(11),

atmCell1to1Vcc(12),

atmCell1to1Vpc(13),

atmAal5PduVcc(14),

frameRelayPortMode(15),

cep(16),

e1Satop(17),

t1Satop(18),

e3Satop(19),

t3Satop(20),

basicCesPsn(21),

basicTdmIp(22),

```

    tdmCasCesPsn(23),
    tdmCasTdmIp(24),
    frDlci(25),
    wildcard (32767)
}

```

```

IANAPwPsnTypeTC ::= TEXTUAL-CONVENTION
    STATUS          current
    DESCRIPTION

```

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```

    "Identifies the PSN type which the PW will use over the
    network."
SYNTAX  INTEGER {
    mpls          (1),
    l2tp          (2),
    udpOverIp     (3),
    mplsOverIp    (4),
    mplsOverGre   (5),
    other         (6)
}

```

```

IANAPwCapabilities ::= TEXTUAL-CONVENTION
    STATUS          current
    DESCRIPTION

```

```

    "This TC describes a collection of capabilities related to
    a specific PW.
    Values may be added in the future based on new capabilities
    introduced in IETF documents.
    "

```

```

SYNTAX  BITS {
    pwStatusIndication (0), -- Applicable only if maintenance
                           -- protocol is in use.
    pwVCCV              (1)
}

```

END

PW-STD-MIB DEFINITIONS ::= BEGIN

IMPORTS

NOTIFICATION-TYPE, MODULE-IDENTITY, OBJECT-TYPE,
Integer32, Unsigned32, Counter32, Counter64, TimeTicks,
transmission

FROM SNMPv2-SMI -- [[RFC2578](#)]

MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP

FROM SNMPv2-CONF -- [[RFC2580](#)]

TruthValue, RowStatus, StorageType,
TimeStamp

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FROM SNMPv2-TC -- [[RFC2579](#)]

SnmpAdminString

FROM SNMP-FRAMEWORK-MIB -- [[RFC3411](#)]

InterfaceIndexOrZero

FROM IF-MIB -- [[RFC2863](#)]

InetAddressType, InetAddress

FROM INET-ADDRESS-MIB -- [[RFC4001](#)]

PerfCurrentCount, PerfIntervalCount

FROM PerfHist-TC-MIB -- [[RFC3593](#)]

HCPperfCurrentCount, HCPperfIntervalCount, HCPperfTimeElapsed,
HCPperfValidIntervals

FROM HC-PerfHist-TC-MIB -- [[RFC3705](#)]

PwIndexType, PwIndexOrZeroType, PwGroupID, PwIDType,
PwOperStatusTC, PwAttachmentIdentifierType, PwCwStatusTC,
PwStatus, PwFragSize, PwFragStatus, PwGenIdType

FROM PW-TC-STD-MIB -- [[PWTC](#)]

-- RFC Editor: Please replace [[PWTC](#)] with RFC number and remove this
-- note.

IANAPwTypeTC, IANAPwPsnTypeTC, IANAPwCapabilities
FROM IANA-PWE3-MIB -- Reference will be added
-- When IANA will create the
-- MIB module

;

pwStdMIB MODULE-IDENTITY

LAST-UPDATED "200711121200Z" -- 12 November 2007 12:00:00 GMT
ORGANIZATION "Pseudowire Edge-to-Edge Emulation (PWE3) Working
Group"

CONTACT-INFO

"

David Zelig
E-mail: davidz@corrigent.com

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Email: thomas.nadeau@bt.com

The PWE3 Working Group (email distribution pwe3@ietf.org,
<http://www.ietf.org/html.charters/pwe3-charter.html>)

"

DESCRIPTION

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"This MIB module contains managed object definitions for pseudowire operation as in Bryant, S. and P. Pate, 'Pseudo Wire Emulation Edge-to-Edge (PWE3) Architecture' [[RFC3985](#)], Martini, L., et al, 'Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)' [[RFC4447](#)], and Townsley, M., et al, 'Layer Two Tunneling Protocol (Version 3)' [[RFC3931](#)].

This MIB module enables the use of any underlying packet switched network (PSN). MIB modules that will support PW operations over specific PSN types are defined in separate memos.

The indexes for this MIB module are also used to index the PSN-specific tables and the PW-specific tables. The PW Type dictates which PW-specific MIB module to use.

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```

    of this MIB module is part of RFC XXX;
    For full legal notices see the RFC itself or
    http://www.ietf.org/copyrights/ianamib.html
-- RFC Ed.: replace XXX with actual RFC number & remove this note
"

-- Revision history.

REVISION
    "200711121200Z" -- 12 November 2007 12:00:00 GMT
DESCRIPTION "Initial version published as part of RFC YYYY."
-- RFC Editor: please replace YYYY with IANA assigned value, and
-- delete this note.

    ::= { transmission ZZZZ }
-- RFC Editor: please replace ZZZZ with IANA assigned value, and
-- delete this note.

-- Top-level components of this MIB.

-- Notifications
pwNotifications OBJECT IDENTIFIER
    ::= { pwStdMIB 0 }
-- Tables, Scalars
pwObjects OBJECT IDENTIFIER
    ::= { pwStdMIB 1 }
-- Conformance
pwConformance OBJECT IDENTIFIER
    ::= { pwStdMIB 2 }

```

```

-- PW Virtual Connection Table

pwIndexNext OBJECT-TYPE
    SYNTAX          Unsigned32
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "This object contains an appropriate value to be used
        for pwIndex when creating entries in the
        pwTable. The value 0 indicates that no
        unassigned entries are available. To obtain the

```

value of pwIndex for a new entry in the pwTable, the manager issues a management protocol retrieval operation. The agent will determine through its local policy when this index value will be made available for reuse."

::= { pwObjects 1 }

pwTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table specifies information for configuring and status monitoring which are common to all service types and PSN types."

::= { pwObjects 2 }

pwEntry OBJECT-TYPE

SYNTAX PwEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A row in this table represents a pseudowire (PW) virtual connection across a packet network. It is indexed by pwIndex, which uniquely identifies a singular connection.

A row can be created by an operator command from a management plan of a PE, by signaling or due to autodiscovery process. Operator's command can be issued via non SNMP application; in such case a row will be created implicitly by the agent.

The read-create objects in this tables are divided into three categories:

1) Objects that MUST NOT be changed after row activation. These are objects that define basic properties of the PW (for example type, destination, etc.).

2) Objects that MAY be changed when the PW is

defined as not active. A change of these objects involves re-signaling of the PW or it might be traffic affecting. PW not active is defined as one of the following conditions:

- a) The pwRowStatus is notInService(2).
- b) The pwRowStatus is notReady(3).
- c) The pwAdminStatus is down(2).

If the operator needs to change one of the values for an active row, the operator can either set the pwRowStatus to notInService(2) or set pwAdminStatus to down(2).

Signaling (or traffic) is initiated again upon setting the pwRowStatus to active(1) or setting the pwAdminStatus to up(1) or testing(3) respectively.

3) Objects that MAY be changed at any time.

A PW MAY have an entry in the ifTable in addition to the entry in this table. In this case a special ifType for PW will be set in the ifTable, and the ifIndex in the ifTable of the PW will be set in the pwIfIndex object in this table.

By default, all the read-create objects MUST NOT be changed after row activation, unless specifically indicated in the individual object description.

Manual entries in this table SHOULD be preserved after a reboot, the agent MUST ensure the integrity of those entries. If the set of entries of a specific row are found to be non consistent after reboot, the PW pwOperStatus MUST be declared as notPresent(5).

"

INDEX { pwIndex }

::= { pwTable 1 }

```
PwEntry ::= SEQUENCE {
    pwIndex          PwIndexType,
    pwType           IANAPwTypeTC,
    pwOwner          INTEGER,
    pwPsnType        IANAPwPsnTypeTC,
    pwSetUpPriority   Integer32,
    pwHoldingPriority Integer32,
    pwPeerAddrType    InetAddressType,
    pwPeerAddr        InetAddress,
    pwAttachedPwIndex PwIndexOrZeroType,
    pwIfIndex         InterfaceIndexOrZero,

    pwID             PwIDType,
    pwLocalGroupID    PwGroupID,
```

pwGroupAttachmentID	PwAttachmentIdentifierType,
pwLocalAttachmentID	PwAttachmentIdentifierType,
pwRemoteAttachmentID	PwAttachmentIdentifierType,
pwCwPreference	TruthValue,
pwLocalIfMtu	Unsigned32,
pwLocalIfString	TruthValue,
pwLocalCapabAdvert	IANAPwCapabilities,
pwRemoteGroupID	PwGroupID,
pwCwStatus	PwCwStatusTC,
pwRemoteIfMtu	Unsigned32,
pwRemoteIfString	SnmpAdminString,
pwRemoteCapabilities	IANAPwCapabilities,
pwFragmentCfgSize	PwFragSize,
pwRmtFragCapability	PwFragStatus,
pwFcsRetentionCfg	INTEGER,
pwFcsRetentionStatus	BITS,
pwOutboundLabel	Unsigned32,
pwInboundLabel	Unsigned32,
pwName	SnmpAdminString,
pwDescr	SnmpAdminString,
pwCreateTime	TimeStamp,
pwUpTime	TimeTicks,
pwLastChange	TimeTicks,
pwAdminStatus	INTEGER,
pwOperStatus	PwOperStatusTC,
pwLocalStatus	PwStatus,
pwRemoteStatusCapable	INTEGER,
pwRemoteStatus	PwStatus,
pwTimeElapsed	HCPwTimeElapsed,
pwValidIntervals	HCPwValidIntervals,
pwRowStatus	RowStatus,
pwStorageType	StorageType,
pwOamEnable	TruthValue,
pwGenAGIType	PwGenIdType,
pwGenLocalAIIType	PwGenIdType,
pwGenRemoteAIIType	PwGenIdType

}

pwIndex OBJECT-TYPE

SYNTAX	PwIndexType
MAX-ACCESS	not-accessible

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DESCRIPTION

"A unique index for the conceptual row identifying a PW within this table."

::= { pwEntry 1 }

pwType OBJECT-TYPE

SYNTAX IANAPwTypeTC

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This value indicates the emulated service to be carried over this PW."

::= { pwEntry 2 }

pwOwner OBJECT-TYPE

SYNTAX INTEGER {

manual (1),

pwIdFecSignaling (2), -- PW signaling with PW ID FEC

genFecSignaling (3), -- Generalized attachment FEC

l2tpControlProtocol (4),

other (5)

}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object is set by the operator to indicate the protocol responsible for establishing this PW."

'manual' is used in all cases where no maintenance protocol (PW signaling) is used to set-up the PW, i.e. require configuration of entries in the PW tables including PW labels, etc.

'pwIdFecSignaling' is used in case of signaling with the PwId FEC element with LDP signaling.

'genFecSignaling' is used in case of LDP signaling with the generalized FEC.

'l2tpControlProtocol' indicates the use of L2TP control protocol.

'other' is used for other types of signaling."

::= { pwEntry 3 }

pwPsnType OBJECT-TYPE

SYNTAX IANAPwPsnTypeTC

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object is set by the operator to indicate the PSN type.

Based on this object, the relevant PSN table's entry is

created in the PSN specific MIB modules.

"

::= { pwEntry 4 }

pwSetUpPriority OBJECT-TYPE

SYNTAX Integer32 (0..7)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object defines the relative priority of the PW during set-up in a lowest-to-highest fashion, where 0 is the highest priority. PWs with the same priority are treated with equal priority. PW that have not yet succeeded to set-up will report 'dormant' in the pwOperStatus.

This value is significant if there are competing resources among PWs and the implementation support this feature.

Equal priority handling with competing resources is implementation specific.

This object MAY be changed at any time."

DEFVAL { 0 }

::= { pwEntry 5 }

pwHoldingPriority OBJECT-TYPE

SYNTAX Integer32 (0..7)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object defines the relative holding priority of the PW in a lowest-to-highest fashion, where 0 is the highest priority. PWs with the same priority are treated equally.

This value is significant if there are competing resources among PWs and the implementation support this feature.

Equal priority handling with competing resources is implementation specific.

This object MAY be changed only if the PW is not active."

DEFVAL { 0 }
 ::= { pwEntry 6 }

pwPeerAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Denotes the address type of the peer node. It should be set to 'unknown' if PE/PW maintenance protocol is not used and the address is unknown."

DEFVAL { ipv4 }

::= { pwEntry 8 }

pwPeerAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object contains the value of the peer node address of the PW/PE maintenance protocol entity. This object SHOULD contain a value of all zeroes if not applicable (pwPeerAddrType is 'unknown')."

::= { pwEntry 9 }

pwAttachedPwIndex OBJECT-TYPE

SYNTAX PwIndexOrZeroType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If the PW is attached to another PW instead of a local native service, this item indicates the pwIndex of the attached PW. Otherwise, this object MUST be set to zero. Attachment to another PW will have no PW specific entry in any of the service MIB modules. "

DEFVAL { 0 }
 ::= { pwEntry 10 }

pwIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object indicates the ifIndex of the PW if the PW is represented in the ifTable. Otherwise, it MUST be set to zero."

DEFVAL { 0 }

::= { pwEntry 11 }

pwID OBJECT-TYPE

SYNTAX PwIDType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Pseudowire identifier.

If the pwOwner object is 'pwIdFecSignaling' or 'l2tpControlProtocol', then this object is signaled in the outgoing PW ID field within the 'Virtual Circuit FEC Element'. For other values of pwOwner, this object is not

signaled and it MAY be set to zero.

For implementations that support the pwIndexMappingTable, a non-zero value is RECOMMENDED, even if this identifier is not signaled. This is so that reverse mappings can be provided by pwIndexMappingTable and pwPeerMappingTable. It is therefore RECOMMENDED that the value of this pwID be unique (or if pwPeerAddrType is not 'unknown', at least [pwType,pwID,pwPeerAddrType,pwPeerAddr] is unique.)"

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

::= { pwEntry 12 }

pwLocalGroupID OBJECT-TYPE

SYNTAX PwGroupID

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Used in the Group ID field sent to the peer PWES within the maintenance protocol used for PW setup. It SHOULD be set to zero if maintenance protocol is not used."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

::= { pwEntry 13 }

pwGroupAttachmentID OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object is an octet string representing the attachment group identifier (AGI) that this PW belongs too, which typically identifies the VPN ID.

Applicable if pwOwner equal 'genFecSignaling'."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

::= { pwEntry 14 }

pwLocalAttachmentID OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object is an octet string representing the local forwarder attachment individual identifier (AII) to be used by this PW. It is used as the SAI for outgoing signaling messages and the TAI in the incoming messages from the peer.

Applicable if pwOwner equal 'genFecSignaling'."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

::= { pwEntry 15 }

pwRemoteAttachmentID OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType
 MAX-ACCESS read-create
 STATUS current
 DESCRIPTION
 "This object is an octet string representing the remote forwarder attachment individual identifier (AII) to be used by this PW. It is used as the TAI for outgoing signaling messages and the SAI in the incoming messages from the peer.
 Applicable if pwOwner equal 'genFecSignaling'."
 REFERENCE
 "Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."
 ::= { pwEntry 16 }

pwCwPreference OBJECT-TYPE

SYNTAX TruthValue
 MAX-ACCESS read-create
 STATUS current
 DESCRIPTION
 "Defines if the control word will be sent with each packet by the local node. Some PW types mandate the use of a control word, and in such cases the value configured for this object has no effect on the existence of the control word.
 This object MAY be changed only if the PW is not active."
 REFERENCE
 "Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol.', [RFC 4447](#)."
 DEFVAL { false }
 ::= { pwEntry 17 }

pwLocalIfMtu OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)
 MAX-ACCESS read-create
 STATUS current

DESCRIPTION

"If not equal to zero, the optional IfMtu object in the signaling protocol will be sent with this value, which represents the locally-supported MTU size over the interface (or the virtual interface) associated with the

PW.

This object MAY be changed only if the PW is not active."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

DEFVAL { 0 }

::= { pwEntry 18 }

pwLocalIfString OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"A PW MAY be associated to an interface (or a virtual interface) in the ifTable of the node as part of the service configuration. This object defines if the maintenance protocol will send the interface's name (ifAlias) as appears in the ifTable. If set to false, the optional element will not be sent.

This object MAY be changed only if the PW is not active."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447, section 5.5](#)."

DEFVAL { false }

::= { pwEntry 19 }

pwLocalCapabAdvert OBJECT-TYPE

SYNTAX IANAPwCapabilities

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If maintenance protocol is used, it indicates the capabilities the local node will advertise to the peer. The operator MAY selectively assign partial set of capabilities. In case of manual configuration of the PW, the operator SHOULD set non conflicting options (for example only a single type of OAM) out of the available options in the implementation.

It is possible to change the value of this object when the PW is not active. The agent MUST reject any attempt to set a capability that is not supported.

The default value MUST be the full set of local node

capabilities."
REFERENCE
"Martini, et al, 'Pseudowire Setup and Maintenance using
the Label Distribution Protocol', [RFC 4447](#)."
::= { pwEntry 20 }

pwRemoteGroupID OBJECT-TYPE

SYNTAX PwGroupID
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"This object is obtained from the Group ID field as
received via the maintenance protocol used for PW setup.
Value zero will be reported if not used.
Value of 0xFFFFFFFF shall be used if the object is yet to be
defined by the PW maintenance protocol."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using
the Label Distribution Protocol', [RFC 4447](#)."
::= { pwEntry 21 }

pwCwStatus OBJECT-TYPE

SYNTAX PwCwStatusTC
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"If signaling is used for PW establishment, this object
indicates the status of the control word negotiation,
and in both; signaling or manual configuration it indicates
if CW is to be present for this PW."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using
the Label Distribution Protocol', [RFC 4447](#)."
::= { pwEntry 22 }

pwRemoteIfMtu OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The remote interface MTU as (optionally) received from the
remote node via the maintenance protocol. The object SHOULD
report zero if MTU is not available."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using
the Label Distribution Protocol', [RFC 4447](#)."
::= { pwEntry 23 }

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pwRemoteIfString OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0..80))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the interface description string as received by the maintenance protocol. It MUST be a NULL string if maintenance protocol is not used or the value is not known yet."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447, section 5.5](#)."

::= { pwEntry 24 }

pwRemoteCapabilities OBJECT-TYPE

SYNTAX IANAPwCapabilities

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the capabilities as received from the peer."

REFERENCE

"Martini, et al, 'Pseudowire Setup and Maintenance using the Label Distribution Protocol', [RFC 4447](#)."

::= { pwEntry 25 }

pwFragmentCfgSize OBJECT-TYPE

SYNTAX PwFragSize

UNITS "bytes"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If set to a value other than zero, indicates that fragmentation is desired for this PW.

This object MAY be changed only if the PW is not active."

REFERENCE

"Malis A., Townsley M., 'PWE3 Fragmentation and Reassembly', [RFC 4623](#)."

DEFVAL { 0 } -- i.e. fragmentation not desired

::= { pwEntry 26 }

pwRmtFragCapability OBJECT-TYPE

SYNTAX PwFragStatus

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The status of the fragmentation based on the local configuration and the peer capabilities as received from the peer when control protocol is used."

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REFERENCE

"Malis A., Townsley M., 'PWE3 Fragmentation and Reassembly',
[RFC 4623](#)."

::= { pwEntry 27 }

pwFcsRetentionCfg OBJECT-TYPE

SYNTAX INTEGER {
fcsRetentionDisable (1),
fcsRetentionEnable (2)
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The local configuration of FCS retention for this PW. FCS retention can be configured for PW types HDLC, PPP and Ethernet only. If the implementation does not support FCS retention, error MUST be reported in pwFcsRetentionStatus. This object MAY be changed only if the PW is not active."

REFERENCE

"Malis A., et al., 'PWE3 Frame Check Sequence Retention',
[RFC 4720](#)."

DEFVAL { fcsRetentionDisable }

::= { pwEntry 28 }

pwFcsRetentionStatus OBJECT-TYPE

SYNTAX BITS {
remoteIndicationUnknown (0),
remoteRequestFcsRetention (1),
fcsRetentionEnabled (2),
fcsRetentionDisabled (3),
localFcsRetentionCfgErr (4),
fcsRetentionFcsSizeMismatch (5)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The status of the FCS retention negotiation process based on local configuration and the remote advertisement.

remoteIndicationUnknown - set if a FEC has not been received from the remote.

remoteRequestFcsRetention - indicates that the peer has requested for FCS retention. FCS retention will be used if the local node is capable and configured to use it for this PW.

fcsRetentionEnabled - FCS retention is enabled (both peers

were configured for FCS retention for signaled PW, or the local node is configured and capable for FCS retention for manually assigned PW).

fcsRetentionDisabled - FCS retention is disabled (not configured locally or not advertised by the peer).

localFcsRetentionCfgErr - Set if the local node has been configured for FCS retention but is not capable to support it.

fcsRetentionFcsSizeMismatch - Set if there is an FCS size mismatch between the local and the peer node.

"

REFERENCE

"Malis A., et al., 'PWE3 Frame Check Sequence Retention', [RFC 4720](#)"

::= { pwEntry 29 }

pwOutboundLabel OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The PW label used in the outbound direction (i.e. toward the PSN). It might be set manually if pwOwner is 'manual', otherwise setting done automatically.

For MPLS, MPLS over IP or MPLS over GRE PSN, it represents

the 20 bits of PW tag, for L2TP it represents the 32 bits Session ID and for IP PSN it represents the destination UDP port number.

If the label is not yet known (signaling in process), the object SHOULD return a value of 0xFFFFFFFF.

For manual configuration, this object MAY be changed only if the PW is not active."

::= { pwEntry 30 }

pwInboundLabel OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The PW label used in the inbound direction (i.e. packets received from the PSN). It may be set manually if pwOwner is 'manual', otherwise setting done automatically.

For MPLS, MPLS over IP or MPLS over GRE PSN, it represents the 20 bits of PW tag, for L2TP it represents the 32 bits Session ID and for IP PSN it represents the source

UDP port number.

If the label is not yet known (signaling in process), the object SHOULD return a value of 0xFFFFFFFF.

For manual configuration, this object MAY be changed only if the PW is not active."

::= { pwEntry 31 }

pwName OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The canonical name assigned to the PW. This object MAY be changed at any time."

::= { pwEntry 32 }

pwDescr OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"A textual string containing information about the PW.
If there is no description this object contains a zero
length string. This object MAY be changed at any time."
::= { pwEntry 33 }

pwCreateTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time this PW was created."

::= { pwEntry 34 }

pwUpTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Specifies the time since last change of pwOperStatus to
Up(1)."

::= { pwEntry 35 }

pwLastChange OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time the PW entered
its current operational state. If the current state was
entered prior to the last re-initialization of the local
network management subsystem, then this object contains a
zero value."
::= { pwEntry 36 }

pwAdminStatus OBJECT-TYPE

SYNTAX INTEGER {

up(1), -- ready to pass packets

down(2),

testing(3) -- in a test mode

}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The desired operational status of this PW. This object MAY be set at any time."

::= { pwEntry 37 }

pwOperStatus OBJECT-TYPE

SYNTAX PwOperStatusTC

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the operational status of the PW, it does not reflect the status of the CE bound interface.

It is set to down only if pwNotForwarding, psnFacingPwRxFault, or psnFacingPwTxFault indications are set in pwLocalStatus or pwRemoteStatus.

It indicates 'lowerLayerDown' if the only reason for not being in the 'up' state is either outer tunnel or physical layer down of the network side is in the down state.

All other states are declared based on the description in the textual convention.

"

::= { pwEntry 38 }

pwLocalStatus OBJECT-TYPE

SYNTAX PwStatus

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the status of the PW in the local node.

The various indications in this object SHOULD be available independent of the ability of the local node to advertise them or the remote node to accept these status

indications through the control protocol.

"

::= { pwEntry 39 }

pwRemoteStatusCapable OBJECT-TYPE

SYNTAX INTEGER {
notApplicable (1),


```

        notYetKnown      (2),
        remoteCapable    (3),
        remoteNotCapable (4)
    }
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "Indicates the remote node capability to advertise the
        PW status notification.
        notApplicable SHOULD be reported for manually set PW, or
        if the local node is not capable of accepting the status
        notification object.
        notYetKnown SHOULD be reported if the signaling protocol
        has not yet finished the process of capability
        determination.
        remoteCapable and remoteNotcapable SHOULD be reported
        based on the initial signaling exchange that has
        determined the remote node capability.
        "
    ::= { pwEntry 40 }

pwRemoteStatus OBJECT-TYPE
    SYNTAX      PwStatus
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates the status of the PW as was advertised by the
        remote. If the remote is not capable of advertising the
        status object, or the local node is not able to accept
        the status object through signaling, then the applicable
        bit is 'pwNotForwarding' which is set if the remote has
        sent label release or label withdraw for this PW.
        "
    ::= { pwEntry 41 }

pwTimeElapsed OBJECT-TYPE
    SYNTAX      HCPerfTimeElapsed
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of seconds, including partial seconds,

```

that have elapsed since the beginning of the current interval measurement period."
::= { pwEntry 42 }

pwValidIntervals OBJECT-TYPE
SYNTAX HCPperfValidIntervals
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of previous 15-minute intervals for which data was collected."
::= { pwEntry 43 }

pwRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"For creating, modifying, and deleting this row. This object MAY be changed at any time."
::= { pwEntry 44 }

pwStorageType OBJECT-TYPE
SYNTAX StorageType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This variable indicates the storage type for this object."
DEFVAL { nonVolatile }
::= { pwEntry 45 }

pwOamEnable OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This variable indicates if OAM is enabled for this PW. It MAY be changed at any time."
DEFVAL { true }
::= { pwEntry 46 }

pwGenAGIType OBJECT-TYPE
SYNTAX PwGenIdType
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This variable indicates the AGI type if generalized FEC

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(129) is used for PW signaling or configuration. It SHOULD return the value of zero otherwise."
DEFVAL { 0 }
::= { pwEntry 47 }

pwGenLocalAIIType OBJECT-TYPE

SYNTAX PwGenIdType
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"This object is the type of the local forwarder attachment individual identifier (AII) to be used by this PW if generalized FEC (129) is used for PW signaling or configuration."

DEFVAL { 0 }
::= { pwEntry 48 }

pwGenRemoteAIIType OBJECT-TYPE

SYNTAX PwGenIdType
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"This object is the type of the remote forwarder attachment individual identifier (AII) to be used by this PW if generalized FEC (129) is used for PW signaling or configuration."

DEFVAL { 0 }
::= { pwEntry 49 }

-- End of PW Virtual Connection Table

-- PW Performance Table.

pwPerfCurrentTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwPerfCurrentEntry
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"This table provides per-PW performance information for the current interval."

::= { pwObjects 3 }

pwPerfCurrentEntry OBJECT-TYPE
SYNTAX PwPerfCurrentEntry
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"An entry in this table is created by the agent for every PW."

INDEX { pwIndex }
 ::= { pwPerfCurrentTable 1 }

PwPerfCurrentEntry ::= SEQUENCE {
 pwPerfCurrentInHCPackets HCPerfCurrentCount,
 pwPerfCurrentInHCBytes HCPerfCurrentCount,
 pwPerfCurrentOutHCPackets HCPerfCurrentCount,
 pwPerfCurrentOutHCBytes HCPerfCurrentCount,
 pwPerfCurrentInPackets PerfCurrentCount,
 pwPerfCurrentInBytes PerfCurrentCount,
 pwPerfCurrentOutPackets PerfCurrentCount,
 pwPerfCurrentOutBytes PerfCurrentCount
}

pwPerfCurrentInHCPackets OBJECT-TYPE

SYNTAX HCPerfCurrentCount
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"High capacity counter for number of packets received by the PW (from the PSN) in the current 15-minute interval. This is the 64 bit version of pwPerfCurrentInPackets, if pwPerfCurrentInHCPackets is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfCurrentEntry 1 }

pwPerfCurrentInHCBytes OBJECT-TYPE

SYNTAX HCPerfCurrentCount
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"High capacity counter for number of bytes received by the PW (from the PSN) in the current 15-minute interval."

This is the 64 bit version of pwPerfCurrentInBytes, if
pwPerfCurrentInHCPackets is supported according to the
rules spelled out in [RFC2863](#)."
 ::= { pwPerfCurrentEntry 2 }

pwPerfCurrentOutHCPackets OBJECT-TYPE

SYNTAX HCPperfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of packets forwarded by
the PW (to the PSN) in the current 15-minute interval.

This is the 64 bit version of pwPerfCurrentOutPackets,
if pwPerfCurrentOutHCPackets is supported according to
the rules spelled out in [RFC2863](#)."
 ::= { pwPerfCurrentEntry 3 }

pwPerfCurrentOutHCPackets OBJECT-TYPE

SYNTAX HCPperfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of bytes forwarded by
the PW (to the PSN) in the current 15-minute interval.

This is the 64 bit version of pwPerfCurrentOutBytes,
if pwPerfCurrentOutHCPackets is supported according to
the rules spelled out in [RFC2863](#)."

::= { pwPerfCurrentEntry 4 }

pwPerfCurrentInPackets OBJECT-TYPE

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The counter for number of packets received by the PW (from
the PSN) in the current 15-minute interval.

This is the 32 bit version of pwPerfCurrentInHCPackets,
if pwPerfCurrentInHCPackets is supported according to
the rules spelled out in [RFC2863](#)."

::= { pwPerfCurrentEntry 5 }

pwPerfCurrentInBytes OBJECT-TYPE
 SYNTAX PerfCurrentCount
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The counter for number of bytes received by the
 PW (from the PSN) in the current 15-minute interval.
 It MUST be equal to the least significant 32 bits of
 pwPerfCurrentInHCBytes, if pwPerfCurrentInHCBytes is
 supported according to the rules spelled out in [RFC2863](#)."
 ::= { pwPerfCurrentEntry 6 }

pwPerfCurrentOutPackets OBJECT-TYPE
 SYNTAX PerfCurrentCount
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The counter for number of packets forwarded by
 the PW (to the PSN) in the current 15-minute interval.

It MUST be equal to the least significant 32 bits of
 pwPerfCurrentOutHCPackets, if
 pwPerfCurrentOutHCPackets is supported according to the
 rules spelled out in [RFC2863](#)."
 ::= { pwPerfCurrentEntry 7 }

pwPerfCurrentOutBytes OBJECT-TYPE
 SYNTAX PerfCurrentCount
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The counter for number of bytes forwarded by
 the PW (to the PSN) in the current 15-minute interval.
 It MUST be equal to the least significant 32 bits of
 pwPerfCurrentOutHCBytes, if pwPerfCurrentOutHCBytes is
 supported according to the rules spelled out in [RFC2863](#)."
 ::= { pwPerfCurrentEntry 8 }

-- End of PW Perf current Table

-- PW Performance Interval Table.

```

pwPerfIntervalTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PwPerfIntervalEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table provides per-PW performance information for
         each interval."
    ::= { pwObjects 4 }

```

```

pwPerfIntervalEntry OBJECT-TYPE
    SYNTAX      PwPerfIntervalEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in this table is created by the agent for every
         PW."
    INDEX { pwIndex, pwPerfIntervalNumber }
    ::= { pwPerfIntervalTable 1 }

```

```

PwPerfIntervalEntry ::= SEQUENCE {
    pwPerfIntervalNumber      Integer32,
    pwPerfIntervalValidData    TruthValue,
    pwPerfIntervalTimeElapsed  HCPerfTimeElapsed,
    pwPerfIntervalInHCPackets  HCPerfIntervalCount,
    pwPerfIntervalInHCBytes    HCPerfIntervalCount,
    pwPerfIntervalOutHCPackets HCPerfIntervalCount,
}

```

```

    pwPerfIntervalOutHCBytes    HCPerfIntervalCount,
    pwPerfIntervalInPackets     PerfIntervalCount,
    pwPerfIntervalInBytes       PerfIntervalCount,
    pwPerfIntervalOutPackets    PerfIntervalCount,
    pwPerfIntervalOutBytes      PerfIntervalCount
}

```

```

pwPerfIntervalNumber OBJECT-TYPE
    SYNTAX      Integer32 (1..96)
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "A number N, between 1 and 96, which identifies the
         interval for which the set of statistics is available.
         The interval identified by 1 is the most recently

```

completed 15 minute interval, and the interval identified by N is the interval immediately preceding the one identified by N-1.

The minimum range of N is 1 through 4. The default range is 1 to 32. The maximum range of N is 1 through 96. "

REFERENCE

"Tesink, K. 'Definitions of Managed Objects for the SONET/SDH Interface Type', [RFC 2558](#)"

::= { pwPerfIntervalEntry 1 }

pwPerfIntervalValidData OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This variable indicates if the data for this interval is valid."

::= { pwPerfIntervalEntry 2 }

pwPerfIntervalTimeElapsed OBJECT-TYPE

SYNTAX HCPperfTimeElapsed

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The duration of this interval in seconds."

::= { pwPerfIntervalEntry 3 }

pwPerfIntervalInHCPackets OBJECT-TYPE

SYNTAX HCPperfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of packets received by

the PW (from the PSN) during the interval. This is the 64 bit version of pwPerfIntervalInPackets, if pwPerfIntervalInHCPackets is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 4 }

pwPerfIntervalInHCBytes OBJECT-TYPE

SYNTAX HCPperfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of bytes received by the PW (from the PSN) during the interval.

This is the 64 bit version of pwPerfIntervalInBytes, if pwPerfIntervalInHCBytes is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 5 }

pwPerfIntervalOutHCPackets OBJECT-TYPE

SYNTAX HCPerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of packets forwarded by the PW (to the PSN) during the interval.

This is the 64 bit version of pwPerfIntervalOutPackets, if pwPerfIntervalOutHCPackets is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 6 }

pwPerfIntervalOutHCBytes OBJECT-TYPE

SYNTAX HCPerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for number of bytes forwarded by the PW (to the PSN) during the interval.

This is the 64 bit version of pwPerfIntervalOutBytes, if pwPerfIntervalOutHCBytes is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 7 }

pwPerfIntervalInPackets OBJECT-TYPE

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This value represents the number of packets received

It MUST be equal to the least significant 32 bits of pwPerfIntervalInHCPackets if pwPerfIntervalInHCPackets is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 8 }

pwPerfIntervalInBytes OBJECT-TYPE

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This value represents the number of bytes received by this PW during the interval.

It MUST be equal to the least significant 32 bits of if pwPerfIntervalInHCBytes is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 9 }

pwPerfIntervalOutPackets OBJECT-TYPE

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This value represents the number of packets sent by this PW during the interval.

It MUST be equal to the least significant 32 bits of pwPerfIntervalOutHCPackets if pwPerfIntervalOutHCPackets is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 10 }

pwPerfIntervalOutBytes OBJECT-TYPE

SYNTAX PerfIntervalCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This value represents the number of bytes sent by this PW during the interval.

It MUST be equal to the least significant 32 bits of pwPerfIntervalOutHCBytes if pwPerfIntervalOutHCBytes is supported according to the rules spelled out in [RFC2863](#)."

::= { pwPerfIntervalEntry 11 }

-- End of PW Performance Interval Table

-- PW Performance 1 Day Interval Table.

pwPerf1DayIntervalTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwPerf1DayIntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides per-PW Performance information for
the current day measurement and the previous days interval."

::= { pwObjects 5 }

pwPerf1DayIntervalEntry OBJECT-TYPE

SYNTAX PwPerf1DayIntervalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table is created by the agent for every
PW."

INDEX { pwIndex, pwPerf1DayIntervalNumber }

::= { pwPerf1DayIntervalTable 1 }

PwPerf1DayIntervalEntry ::= SEQUENCE {

pwPerf1DayIntervalNumber	Unsigned32,
pwPerf1DayIntervalValidData	TruthValue,
pwPerf1DayIntervalTimeElapsed	HCPperfTimeElapsed,
pwPerf1DayIntervalInHCPackets	Counter64,
pwPerf1DayIntervalInHCBytes	Counter64,
pwPerf1DayIntervalOutHCPackets	Counter64,
pwPerf1DayIntervalOutHCBytes	Counter64

}

pwPerf1DayIntervalNumber OBJECT-TYPE

SYNTAX Unsigned32(1..31)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"History Data Interval number. Interval 1 is the current day
measurement period, interval 2 is the most recent previous
day, and interval 30 is 31 days ago. Intervals 3..31 are
optional."

::= { pwPerf1DayIntervalEntry 1 }

pwPerf1DayIntervalValidData OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current
DESCRIPTION

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 "This variable indicates if the data for this interval
 is valid."

::= { pwPerf1DayIntervalEntry 2 }

pwPerf1DayIntervalTimeElapsed OBJECT-TYPE

SYNTAX HCPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "The number of seconds in the 1-day interval over which the
 performance monitoring information is actually counted.
 This value will be the same as the interval duration except
 in a situation where performance monitoring data could not
 be collected for any reason or agent clock adjustments."

::= { pwPerf1DayIntervalEntry 3 }

pwPerf1DayIntervalInHCPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "High capacity counter for the total number of packets
 received by the PW (from the PSN)."

::= { pwPerf1DayIntervalEntry 4 }

pwPerf1DayIntervalInHCBytes OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "High capacity counter for the total number of bytes
 received by the PW (from the PSN)."

::= { pwPerf1DayIntervalEntry 5 }

pwPerf1DayIntervalOutHCPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"High capacity counter for the total number of packets forwarded by the PW (to the PSN)."

::= { pwPerf1DayIntervalEntry 6 }

pwPerf1DayIntervalOutHCBytes OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

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DESCRIPTION

"High capacity counter for the total number of bytes forwarded by the PW (to the PSN)."

::= { pwPerf1DayIntervalEntry 7 }

-- End of PW Perf 1 Day Interval Table

-- Error counter scalar

pwPerfTotalErrorPackets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Counter for number of error at the PW processing level, for example packets received with unknown PW label."

::= { pwObjects 6 }

-- Reverse mapping tables

-- The PW ID mapping table

pwIndexMappingTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwIndexMappingEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table enables the reverse mapping the unique Pwid parameters [peer IP, PW type and PW ID] and the pwIndex. The table is not applicable for PW created manually or by using the generalized FEC."

::= { pwObjects 7 }

pwIndexMappingEntry OBJECT-TYPE

SYNTAX PwIndexMappingEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table MUST be created by the agent for every PW created by the pwTable for which pwOwner equals pwIdFecSignaling and pwID is not zero.

Implementers need to be aware that if the value of the pwIndexMappingPeerAddr (an OID) has more than 113 sub-identifiers, then OIDs of column instances in this table will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3."

INDEX { pwIndexMappingPwType, pwIndexMappingPwID,
pwIndexMappingPeerAddrType, pwIndexMappingPeerAddr

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}
 ::= { pwIndexMappingTable 1 }

PwIndexMappingEntry ::= SEQUENCE {
pwIndexMappingPwType IANAPwTypeTC,
pwIndexMappingPwID PwIDType,
pwIndexMappingPeerAddrType InetAddressType,
pwIndexMappingPeerAddr InetAddress,
pwIndexMappingPwIndex PwIndexType
}

pwIndexMappingPwType OBJECT-TYPE

SYNTAX IANAPwTypeTC

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The PW type (indicates the service) of this PW."

::= { pwIndexMappingEntry 1 }

pwIndexMappingPwID OBJECT-TYPE

SYNTAX PwIDType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The PW ID of this PW. Zero if the PW is configured

```

        manually."
 ::= { pwIndexMappingEntry 2 }

pwIndexMappingPeerAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "IP address type of the peer node."
 ::= { pwIndexMappingEntry 3 }

```

```

pwIndexMappingPeerAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "IP address of the peer node."
 ::= { pwIndexMappingEntry 4 }

```

```

pwIndexMappingPwIndex OBJECT-TYPE
    SYNTAX      PwIndexType
    MAX-ACCESS   read-only
    STATUS      current

```

```

    DESCRIPTION
        "The value that represents the PW in the pwTable."
 ::= { pwIndexMappingEntry 5 }

-- End of the PW ID mapping table

-- The peer mapping table

pwPeerMappingTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PwPeerMappingEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table provides reverse mapping of the existing PW
         based on PW type and PW ID ordering. This table is
         typically useful for EMS ordered query of existing PWs."
 ::= { pwObjects 8 }

```

pwPeerMappingEntry OBJECT-TYPE
 SYNTAX PwPeerMappingEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "An entry in this table is created by the agent for every
 PW entry in pwTable.

Implementers need to be aware that if the value of the
 pwPeerMappingPeerAddr (an OID) has more than 113
 sub-identifiers, then OIDs of column instances in this
 table will have more than 128 sub-identifiers and cannot
 be accessed using SNMPv1, SNMPv2c, or SNMPv3."

INDEX { pwPeerMappingPeerAddrType, pwPeerMappingPeerAddr,
 pwPeerMappingPwType, pwPeerMappingPwID }

::= { pwPeerMappingTable 1 }

PwPeerMappingEntry ::= SEQUENCE {
 pwPeerMappingPeerAddrType InetAddressType,
 pwPeerMappingPeerAddr InetAddress,
 pwPeerMappingPwType IANAPwTypeTC,
 pwPeerMappingPwID PwIDType,
 pwPeerMappingPwIndex PwIndexType
 }

pwPeerMappingPeerAddrType OBJECT-TYPE
 SYNTAX InetAddressType
 MAX-ACCESS not-accessible
 STATUS current

DESCRIPTION
 "IP address type of the peer node."
 ::= { pwPeerMappingEntry 1 }

pwPeerMappingPeerAddr OBJECT-TYPE
 SYNTAX InetAddress
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "IP address of the peer node."
 ::= { pwPeerMappingEntry 2 }

pwPeerMappingPwType OBJECT-TYPE
SYNTAX IANAPwTypeTC
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The PW type (indicates the emulated service) of this PW."
 ::= { pwPeerMappingEntry 3 }

pwPeerMappingPwID OBJECT-TYPE
SYNTAX PwIDType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The PW ID of this PW. Zero if the PW is configured manually."
 ::= { pwPeerMappingEntry 4 }

pwPeerMappingPwIndex OBJECT-TYPE
SYNTAX PwIndexType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The value that represents the PW in the pwTable."
 ::= { pwPeerMappingEntry 5 }

-- End of the peer mapping table

-- End of reverse mapping tables

pwUpDownNotifEnable 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 pwUp and pwDown

notifications; otherwise these notifications are not emitted."

REFERENCE

"See also [[RFC3413](#)] for explanation that

notifications are under the ultimate control of the
MIB module in this document."
DEFVAL { false }
::= { pwObjects 9 }

pwDeletedNotifEnable 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 pwDeleted notification; otherwise this
notification is not emitted."
REFERENCE
"See also [[RFC3413](#)] for explanation that
notifications are under the ultimate control of the
MIB module in this document."
DEFVAL { false }
::= { pwObjects 10 }

pwNotifRate OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object defines the maximum number of PW notifications
that can be emitted from the device per second."
::= { pwObjects 11 }

-- The Gen Fec PW ID mapping table

pwGenFecIndexMappingTable OBJECT-TYPE
SYNTAX SEQUENCE OF PwGenFecIndexMappingEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table enables the reverse mapping the unique Pwid
parameters [GroupAttachmentID, LocalAttachmentID and
PeerAttachmentID] and the pwIndex. The table is only
applicable for PW using the generalized FEC."
::= { pwObjects 12 }

pwGenFecIndexMappingEntry OBJECT-TYPE
SYNTAX PwGenFecIndexMappingEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table MUST be created by the agent for every PW created by the pwTable for which pwOwner equals genFecSignaling.

Implementors need to be aware that if the combined value of pwGenFecIndexMappingAGI, pwGenFecIndexMappingLocalAII, and pwGenFecIndexMappingRemoteAII (OIDs) has more than 113 sub-identifiers, then OIDs of column instances in this table will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3."

INDEX { pwGenFecIndexMappingAGIType,
pwGenFecIndexMappingAGI,
pwGenFecIndexMappingLocalAIIType,
pwGenFecIndexMappingLocalAII,
pwGenFecIndexMappingRemoteAIIType,
pwGenFecIndexMappingRemoteAII
}

::= { pwGenFecIndexMappingTable 1 }

PwGenFecIndexMappingEntry ::= SEQUENCE {
pwGenFecIndexMappingAGIType PwGenIdType,
pwGenFecIndexMappingAGI PwAttachmentIdentifierType,
pwGenFecIndexMappingLocalAIIType PwGenIdType,
pwGenFecIndexMappingLocalAII PwAttachmentIdentifierType,
pwGenFecIndexMappingRemoteAIIType PwGenIdType,
pwGenFecIndexMappingRemoteAII PwAttachmentIdentifierType,
pwGenFecIndexMappingPwIndex PwIndexType
}

pwGenFecIndexMappingAGIType OBJECT-TYPE

SYNTAX PwGenIdType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is the type of the attachment group identifier (AGI) that this PW belongs too."

::= { pwGenFecIndexMappingEntry 1 }

pwGenFecIndexMappingAGI OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is an octet string representing the attachment

group identifier (AGI) that this PW belongs too,

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which typically identifies the VPN ID."
 ::= { pwGenFecIndexMappingEntry 2 }

pwGenFecIndexMappingLocalAIIType OBJECT-TYPE

SYNTAX PwGenIdType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"this object is the type of the local forwarder
attachment individual identifier (AII) to be used
by this PW."

::= { pwGenFecIndexMappingEntry 3 }

pwGenFecIndexMappingLocalAII OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is an octet string representing the local
forwarder attachment individual identifier (AII) to be used
by this PW. It is used as the SAII for outgoing signaling
messages and the TAIID in the incoming messages from the
peer."

::= { pwGenFecIndexMappingEntry 4 }

pwGenFecIndexMappingRemoteAIIType OBJECT-TYPE

SYNTAX PwGenIdType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is the type of the the remote forwarder
attachment individual identifier (AII) to be used
by this PW."

::= { pwGenFecIndexMappingEntry 5 }

pwGenFecIndexMappingRemoteAII OBJECT-TYPE

SYNTAX PwAttachmentIdentifierType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object is an octet string representing the peer forwarder attachment individual identifier (AII) to be used by this PW. It is used as the TAI for outgoing signaling messages and the SAI in the incoming messages from the peer."

::= { pwGenFecIndexMappingEntry 6 }

pwGenFecIndexMappingPwIndex OBJECT-TYPE

SYNTAX PwIndexType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value that represents the PW in the pwTable."

::= { pwGenFecIndexMappingEntry 7 }

-- End of the Gen Fec PW ID mapping table

-- Notifications - PW

pwDown NOTIFICATION-TYPE

OBJECTS { pwOperStatus, --start of range

pwOperStatus --end of range

}

STATUS current

DESCRIPTION

"This notification is generated when the pwOperStatus object for one or more contiguous entries in pwTable are about to enter the down(2) or lowerLayerDown(6) state from any other state, except for transition from the notPresent(5) state. For the purpose of deciding when these notifications occur, the lowerLayerDown(6) state and the down(2) state are considered to be equivalent, i.e., there is no notification on transition from lowerLayerDown(6) into down(2), and there is a trap on transition from any other state except down(2) (and notPresent) into lowerLayerDown(6).

The included values of pwOperStatus MUST all equal to this down(2) or lowerLayerDown(6). The two instances of pwOperStatus in this notification indicate the range of indexes that are affected. Note that all the indexes of

the two ends of the range can be derived from the instance identifiers of these two objects. For cases where a contiguous range of cross-connects have transitioned into the down(2) and lowerLayerDown(6) state at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single cross-connect entry, then the instance identifier (and values) of the two pwOperStatus objects MUST be identical."

::= { pwNotifications 1 }

pwUp NOTIFICATION-TYPE

OBJECTS { pwOperStatus, --start of range

pwOperStatus --end of range
}

STATUS current

DESCRIPTION

"This notification is generated when the pwOperStatus object for one or more contiguous entries in pwTable are about to enter the up(1) state from some other state except the notPresent(5) state and given that the pwDown notification been issued for these entries. The included values of pwOperStatus MUST both be set equal to this new state (i.e: up(1)). The two instances of pwOperStatus in this notification indicate the range of indexes that are affected. Note that all the indexes of the two ends of the range can be derived from the instance identifiers of these two objects. For cases where a contiguous range of cross-connects have transitioned into the up(1) state at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single cross-connect entry, then the instance identifier (and values) of the two pwOperStatus objects MUST be the identical."

::= { pwNotifications 2 }

pwDeleted NOTIFICATION-TYPE

```

OBJECTS { pwType,
          pwID,
          pwPeerAddrType,
          pwPeerAddr
        }
STATUS   current
DESCRIPTION
    "This notification is generated when the PW has been
      deleted, i.e. when the pwRowStatus has been set to
      destroy(6), the PW has been deleted by a non-MIB
      application or due to auto-discovery process.
    "
    ::= { pwNotifications 3 }

-- End of notifications.

-- Conformance information

pwGroups      OBJECT IDENTIFIER ::= { pwConformance 1 }
pwCompliances OBJECT IDENTIFIER ::= { pwConformance 2 }

-- Compliance requirement for fully compliant implementations.

```

```

pwModuleFullCompliance MODULE-COMPLIANCE
STATUS   current
DESCRIPTION
    "The compliance statement for agents that provide full
      support for PW MIB Module. Such devices can
      then be monitored and configured using
      this MIB module."

MODULE  -- this module
MANDATORY-GROUPS { pwBasicGroup,
                   pwPerformanceGeneralGroup
                 }

GROUP pwNotificationGroup
DESCRIPTION "This group is only mandatory for implementations
            which can efficiently implement the notifications
            contained in this group.
          "

```

GROUP pwPwIdGroup
DESCRIPTION "This group is only mandatory for implementations
that support the PW ID FEC."
"

GROUP pwGeneralizedFecGroup
DESCRIPTION "This group is only mandatory for implementations
that support the generalized PW FEC."
"

GROUP pwFcsGroup
DESCRIPTION "This group is only mandatory for implementations
that support FCS retention."

GROUP pwFragGroup
DESCRIPTION "This group is only mandatory for implementations
that support PW fragmentation."
"

GROUP pwPwStatusGroup
DESCRIPTION "This group is only mandatory for implementations
that support PW status notification."
"

GROUP pwGetNextGroup
DESCRIPTION "This group is only mandatory for implementations
where the pwIndex may be any arbitrary value
and the EMS would require retrieval of the next
free index."

GROUP pwPriorityGroup
DESCRIPTION "This group is only mandatory for implementations
that support the controlling the PW setup and
holding priority."

GROUP pwAttachmentGroup
DESCRIPTION "This group is only mandatory for implementations
that support attachment of two PWs (PW stitching)."

GROUP pwPerformance1DayIntervalGroup
DESCRIPTION "This group is only mandatory for implementations
that support PW performance gathering in 1 day"

intervals."

GROUP pwPerformanceIntervalGeneralGroup
DESCRIPTION "This group is only mandatory for implementations that support PW performance gathering in 15 minute intervals."

GROUP pwPerformanceIntervalGroup
DESCRIPTION "This group is only mandatory for implementations that support PW performance gathering in 15 minute intervals."

GROUP pwHCPerformanceIntervalGroup
DESCRIPTION "This group is only mandatory for implementations where at least one of the interval performance counters wraps around too quickly based on the criteria specified in [RFC 2863](#) for high-capacity counters."

GROUP pwMappingTablesGroup
DESCRIPTION "This group is only mandatory for implementations that support reverse mapping of PW indexes to the pwIndex and the peer mapping table."

GROUP pwSignalingGroup
DESCRIPTION "This group is only mandatory for implementations that support the PW signaling."

GROUP pwNotificationControlGroup
DESCRIPTION "This group is only mandatory for implementations that support the PW notifications."

OBJECT pwAdminStatus
SYNTAX INTEGER { up(1), down(2) }
DESCRIPTION "The support of the value testing(3) is not required."

OBJECT pwOperStatus
SYNTAX INTEGER { up(1), down(2), notPresent(5), lowerLayerDown(6) }
DESCRIPTION "The support of the values testing(3) and dormant(4) is not required."

OBJECT pwRowStatus
 SYNTAX RowStatus { active(1), notInService(2),
 notReady(3) }
 WRITE-SYNTAX RowStatus { active(1), notInService(2),
 createAndGo(4), destroy(6)
 }
 DESCRIPTION "Support for createAndWait is not required. Support
 of notReady is not required for implementations
 that do not support signaling, or if it is
 guaranteed that the conceptual row has all the
 required information to create the PW when the
 row has been created by the agent or written by
 the operator."

OBJECT pwPeerAddrType
 SYNTAX InetAddressType { unknown(0), ipv4(1) }
 MIN-ACCESS read-only
 DESCRIPTION "Only unknown(0) and ipv4(1) is required.
 Implementation that support only IPv4 MAY support
 read-only access."

OBJECT pwPeerAddr
 SYNTAX InetAddress (SIZE(0|4))
 DESCRIPTION "An implementation is only required to support
 0, 4 address sizes."

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

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

::= { pwCompliances 1 }

-- Compliance requirement for read-only compliant implementations.

pwModuleReadOnlyCompliance MODULE-COMPLIANCE
 STATUS current
 DESCRIPTION
 "The compliance statement for agents that provide read-

only support for PW MIB Module. Such devices can then be monitored but cannot be configured using this MIB module."

```
MODULE -- this module
    MANDATORY-GROUPS { pwBasicGroup
    }
```

```
GROUP          pwNotificationGroup
DESCRIPTION    "This group is only mandatory for implementations
               which can efficiently implement the notifications
               contained in this group."
```

```
GROUP          pwPwIdGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support the PW ID FEC.
               "
```

```
GROUP          pwGeneralizedFecGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support the generalized PW FEC.
               "
```

```
GROUP          pwFcsGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support FCS retention."
```

```
GROUP          pwFragGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support PW fragmentation.
               "
```

```
GROUP          pwPwStatusGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support PW status notification.
               "
```

```
GROUP          pwGetNextGroup
DESCRIPTION    "This group is only mandatory for implementations
               where the pwIndex may be any arbitrary value
               and the EMS would require retrieval of the next
               free index."
```

```
GROUP          pwPriorityGroup
DESCRIPTION    "This group is only mandatory for implementations
               that support the controlling the PW setup and
               holding priority."
```

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GROUP pwAttachmentGroup
DESCRIPTION "This group is only mandatory for implementations that support attachment of two PWs (PW stitching)."

GROUP pwPerformance1DayIntervalGroup
DESCRIPTION "This group is only mandatory for implementations that support PW performance gathering in 1 Day intervals."

GROUP pwPerformanceIntervalGeneralGroup
DESCRIPTION "This group is only mandatory for implementations that support PW performance gathering in 15 minute intervals."

GROUP pwPerformanceIntervalGroup
DESCRIPTION "This group is only mandatory for implementations that support PW performance gathering in 15 minute intervals."

GROUP pwHCPeformanceIntervalGroup
DESCRIPTION "This group is only mandatory for implementations where at least one of the interval performance counters wraps around too quickly based on the criteria specified in [RFC 2863](#) for high-capacity counters."

GROUP pwMappingTablesGroup
DESCRIPTION "This group is only mandatory for implementations that support reverse mapping of PW indexes to the pwIndex and the peer mapping table."

GROUP pwSignalingGroup
DESCRIPTION "This group is only mandatory for implementations that support the PW signaling."

GROUP pwNotificationControlGroup
DESCRIPTION "This group is only mandatory for implementations that support the PW notifications."

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

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

OBJECT pwPsnType

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

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

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

OBJECT pwPeerAddrType
SYNTAX InetAddressType { unknown(0), ipv4(1) }
MIN-ACCESS read-only
DESCRIPTION "Write access is not required. Only unknown(0) and ipv4(1) is required."

OBJECT pwPeerAddr
SYNTAX InetAddress (SIZE(0|4))
MIN-ACCESS read-only
DESCRIPTION "Write access is not required. An implementation is only required to support 0, 4 address sizes."

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

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

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

OBJECT	pwLocalGroupID
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwGroupAttachmentID
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwLocalAttachmentID
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwRemoteAttachmentID

MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwCwPreference
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwLocalIfMtu
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwLocalIfString
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwLocalCapabAdvert
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwFragmentCfgSize
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwFcsRetentionCfg
MIN-ACCESS	read-only
DESCRIPTION	"Write access is not required."
OBJECT	pwOutboundLabel

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

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

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

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

OBJECT pwAdminStatus
 SYNTAX INTEGER { up(1), down(2) }
 MIN-ACCESS read-only
 DESCRIPTION "Write access is not required. The support of value testing(3) is not required."

OBJECT pwOperStatus
 SYNTAX INTEGER { up(1), down(2), notPresent(5), lowerLayerDown(6) }
 DESCRIPTION "The support of the values testing(3) and dormant(4) is not required."

OBJECT pwRowStatus
 SYNTAX RowStatus { active(1) }
 MIN-ACCESS read-only
 DESCRIPTION "Write access is not required."

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

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

OBJECT pwGenAGIType
 MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

OBJECT pwGenLocalAIIType

MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

OBJECT pwGenRemoteAIIType

MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

OBJECT pwUpDownNotifEnable

MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

OBJECT pwDeletedNotifEnable

MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

OBJECT pwNotifRate

MIN-ACCESS read-only

DESCRIPTION "Write access is not required."

::= { pwCompliances 2 }

-- Units of conformance.

pwBasicGroup OBJECT-GROUP

```
OBJECTS {
    pwType,
    pwOwner,
    pwPsnType,
    pwIfIndex,
    pwCwPreference,
    pwLocalIfMtu,
    pwOutboundLabel,
    pwInboundLabel,
    pwName,
    pwDescr,
    pwCreateTime,
    pwUpTime,
    pwLastChange,
```



```

        pwAdminStatus,
        pwOperStatus,
        pwLocalStatus,
        pwRowStatus,
        pwStorageType,
        pwOamEnable
    }

    STATUS current
    DESCRIPTION
        "Collection of objects that are required in all
        implementations that support the PW MIB module."
    ::= { pwGroups 1 }

pwPwIdGroup    OBJECT-GROUP
    OBJECTS {
        pwID
    }

    STATUS current
    DESCRIPTION
        "Collection of objects required for PW ID configuration
        and signaling."
    ::= { pwGroups 2 }

pwGeneralizedFecGroup    OBJECT-GROUP
    OBJECTS {
        pwGroupAttachmentID,
        pwLocalAttachmentID,
        pwRemoteAttachmentID,
        pwGenAGIType,
        pwGenLocalAIIType,
        pwGenRemoteAIIType
    }

```

```

    STATUS current
    DESCRIPTION
        "Collection of objects required for generalized FEC
        configuration and signaling."
    ::= { pwGroups 3 }

pwFcsGroup    OBJECT-GROUP

```

```

OBJECTS {
    pwFcsRetentionCfg,
    pwFcsRetentionStatus
}

STATUS current
DESCRIPTION
    "Collection of objects required for FCS retention
    configuration and signaling."
::= { pwGroups 4 }

pwFragGroup OBJECT-GROUP
OBJECTS {
    pwFragmentCfgSize,
    pwRmtFragCapability
}

STATUS current
DESCRIPTION
    "Collection of objects required for fragmentation
    configuration and signaling."
::= { pwGroups 5 }

pwPwStatusGroup OBJECT-GROUP
OBJECTS {
    pwRemoteCapabilities,
    pwRemoteStatusCapable,
    pwRemoteStatus
}

STATUS current
DESCRIPTION
    "Collection of objects required for PW status configuration
    and signaling."
::= { pwGroups 6 }

pwGetNextGroup OBJECT-GROUP
OBJECTS {
    pwIndexNext
}

```

```

STATUS    current
DESCRIPTION
    "Collection of objects for getting the next available
    index."
::= { pwGroups 7 }

pwPriorityGroup    OBJECT-GROUP
OBJECTS {
    pwSetUpPriority,
    pwHoldingPriority
}

STATUS    current
DESCRIPTION
    "Collection of objects for controlling the PW setup and
    holding priority."
::= { pwGroups 8 }

pwAttachmentGroup    OBJECT-GROUP
OBJECTS {
    pwAttachedPwIndex
}

STATUS    current
DESCRIPTION
    "Collection of objects for PW configuration as ifIndex"
::= { pwGroups 9 }

pwPerformanceGeneralGroup OBJECT-GROUP
OBJECTS {
    pwPerfTotalErrorPackets
}

STATUS    current
DESCRIPTION
    "Collection of general objects needed for managing the
    total running performance parameters."
::= { pwGroups 10 }

pwPerformance1DayIntervalGroup OBJECT-GROUP
OBJECTS {
    pwPerf1DayIntervalValidData,
    pwPerf1DayIntervalTimeElapsed,
    pwPerf1DayIntervalInHCPackets,
    pwPerf1DayIntervalInHCBytes,
    pwPerf1DayIntervalOutHCPackets,
    pwPerf1DayIntervalOutHCBytes
}

```

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STATUS current

DESCRIPTION

"Collection of objects needed for PW running 1 day interval
performance collection."

::= { pwGroups 11 }

pwPerformanceIntervalGeneralGroup OBJECT-GROUP

OBJECTS {

pwTimeElapsed,
pwValidIntervals,
pwPerfIntervalValidData,
pwPerfIntervalTimeElapsed

}

STATUS current

DESCRIPTION

"Collection of general objects needed for managing the
interval performance parameters."

::= { pwGroups 12 }

pwPerformanceIntervalGroup OBJECT-GROUP

OBJECTS {

pwPerfCurrentInPackets,
pwPerfCurrentInBytes,
pwPerfCurrentOutPackets,
pwPerfCurrentOutBytes,

pwPerfIntervalInPackets,
pwPerfIntervalInBytes,
pwPerfIntervalOutPackets,
pwPerfIntervalOutBytes

}

STATUS current

DESCRIPTION

"Collection of 32 bits objects needed for PW performance
collection in 15 minutes intervals."

::= { pwGroups 13 }

pwHCPeformanceIntervalGroup OBJECT-GROUP

OBJECTS {

pwPerfCurrentInHCPackets,
pwPerfCurrentInHCBytes,

pwPerfCurrentOutHCPackets,
pwPerfCurrentOutHCBytes,

pwPerfIntervalInHCPackets,
pwPerfIntervalInHCBytes,

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pwPerfIntervalOutHCPackets,
pwPerfIntervalOutHCBytes
}

STATUS current

DESCRIPTION

"Collection of HC objects needed for PW performance
collection in 15 minutes intervals."

::= { pwGroups 14 }

pwMappingTablesGroup OBJECT-GROUP

OBJECTS {
pwIndexMappingPwIndex,
pwPeerMappingPwIndex,
pwGenFecIndexMappingPwIndex
}

STATUS current

DESCRIPTION

"Collection of objects contained in the reverse
mapping tables."

::= { pwGroups 15 }

pwNotificationControlGroup OBJECT-GROUP

OBJECTS {
pwUpDownNotifEnable,
pwDeletedNotifEnable,
pwNotifRate
}

STATUS current

DESCRIPTION

"Collection of objects for controlling the PW
notifications."

::= { pwGroups 16 }

```

pwNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        pwUp,
        pwDown,
        pwDeleted
    }

    STATUS current
    DESCRIPTION
        "Collection PW notifications objects."
    ::= { pwGroups 17 }

```

```

pwSignalingGroup OBJECT-GROUP
    OBJECTS {
        pwPeerAddrType,
        pwPeerAddr,
        pwLocalGroupID,
        pwLocalIfString,
        pwLocalCapabAdvert,
        pwRemoteGroupID,
        pwCwStatus,
        pwRemoteIfMtu,
        pwRemoteIfString
    }

    STATUS current
    DESCRIPTION
        "Collection of objects for use in implementations that
        support the PW signaling."
    ::= { pwGroups 18 }

END

```

[14.](#) Security Considerations

It is clear that this MIB module is potentially useful for monitoring PW capable PEs. This MIB module can also be used for configuration

of certain objects, and anything that can be configured can be incorrectly configured, with potentially disastrous results.

There are 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:

- o the pwTable contains objects to configure PW parameters on a Provider Edge (PE) device. Unauthorized access to objects in this table, could result in disruption of traffic on the network. The objects pwUpDownNotifEnable and pwNotifRate control the reports from the network element to the EMS. Unauthorized access to these objects could result in disruption of configuration and status change reporting, resulting mis-view of the network conditions. The use of stronger mechanisms such as SNMPv3 security should be

considered where possible. Specifically, SNMPv3 VACM and USM MUST be used with any v3 agent which implements this MIB module. Administrators should consider whether read access to these objects should be allowed, since read access may be undesirable under certain circumstances.

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. These are the tables and objects and their sensitivity/vulnerability:

- o the pwTable, pwPerfCurrentTable, pwPerfIntervalTable, pwPerf1DayIntervalTable, pwIndexMappingTable, pwPeerMappingTable and pwGenFecIndexMappingTable collectively show the pseudowire connectivity topology and its performance characteristics. If an Administrator does not want to reveal this information, then these tables should be considered sensitive/vulnerable.

SNMP versions prior to SNMPv3 did not include adequate security.

Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

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

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

[15.](#) IANA Considerations

[15.1.](#) ifType for PW

IANA has been requested to register a value for PW in the IANAifType-MIB called ifPwType. When the assignment has been made, the RFC Editor is asked to document the value here.

[15.2.](#) PW MIB Modules OBJECT IDENTIFIER values

A PW may appear as ifIndex in the ifTable, and therefore it is requested below that the pwStdMIB OBJECT IDENTIFIER will be assigned under the 'transmission' subtree, as the common practice in assigning OBJECT IDENTIFIERS for MIB modules representing entities in the ifTable.

All other MIB modules related to PW management SHOULD be assigned under the 'mib-2' subtree, individual request will appear in the MIB module memo IANA Considerations section.

[15.3.](#) IANA Considerations for PW-STD-MIB

The MIB module in this document uses the following IANA-assigned

OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor -----	OBJECT IDENTIFIER value -----
pwStdMIB	{ transmission ZZZZ }

Editor's Note (to be removed prior to publication): The IANA is requested to assign a value for "ZZZZ" under the 'transmission' subtree and to record the assignment in the SMI Numbers registry. This value SHOULD be the same value assigned for the PW ifType for representation of the PW in the ifTable. When the assignment has been made, the RFC Editor is asked to replace "ZZZZ" (here and in the MIB module) with the assigned value and to remove this note.

[15.4.](#) IANA Considerations for IANA-PWE3-MIB

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

Descriptor -----	OBJECT IDENTIFIER value -----
ianaPwe3MIB	{ mib-2 XXXX }

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

[16.](#) Acknowledgements

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[17.](#) References

17.1. Normative References

- [BCP14] Bradner, S., "Key words for use in RFCs to Indicate requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [PWTC] Nadeau, T. and D. Zelig, "Definitions for Textual Conventions and OBJECT-IDENTITIES for Pseudowires Management", work-in-progress .
- [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., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, [RFC 2580](#), April 1999.
- [RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", [RFC 2863](#), June 2000.
- [RFC3411] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks", STD 62, [RFC 3411](#), December 2002.
- [RFC3413] Levi, D., Meyer, P., and B. Stewart, "Simple Network Management Protocol (SNMP) Applications", STD 62, [RFC 3413](#), December 2002.
- [RFC3593] Tesink, K., "Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", [RFC 3593](#), September 2003.
- [RFC3705] Ray, B. and R. Abbi, "High Capacity Textual Conventions for MIB Modules Using Performance History Based on 15

- [RFC3931] Lau, J., Townsley, M., and I. Goyret, "Layer Two Tunneling Protocol - Version 3 (L2TPv3)", [RFC 3931](#), March 2005.
- [RFC4001] Daniele, M., Haberman, B., Routhier, S., and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses", [RFC 4001](#), February 2005.
- [RFC4446] Martini, L., "IANA Allocations for Pseudowire Edge to Edge Emulation (PWE3)", [BCP 116](#), [RFC 4446](#), April 2006.
- [RFC4447] Martini, L., Rosen, E., El-Aawar, N., Smith, T., and G. Heron, "Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)", [RFC 4447](#), April 2006.
- [RFC4623] Malis, A. and M. Townsley, "Pseudowire Emulation Edge-to-Edge (PWE3) Fragmentation and Reassembly", [RFC 4623](#), August 2006.
- [RFC4720] Malis, A., Allan, D., and N. Del Regno, "Pseudowire Emulation Edge-to-Edge (PWE3) Frame Check Sequence Retention", [RFC 4720](#), November 2006.
- [RFC4863] Martini, L. and G. Swallow, "Wildcard Pseudowire Type", [RFC 4863](#), May 2007.

[17.2](#). Informative References

- [CEPMIB] Zelig, D., Nadeau, T., and R. Cohen, "SONET/SDH Circuit Emulation Service Over Packet (CEP) Management Information Base Using SMIV2", work-in-progress .
- [PWPMLSMIB] Zelig, D. and T. Nadeau, "Pseudowire (PW) Over MPLS PSN Management Information Base", work-in-progress .
- [RFC2434] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 2434](#), October 1998.
- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.
- [RFC3916] Xiao, X., McPherson, D., and P. Pate, "Requirements for Pseudo-Wire Emulation Edge-to-Edge (PWE3)", [RFC 3916](#), September 2004.

[RFC3985] Bryant, S. and P. Pate, "Pseudo Wire Emulation Edge-to-Edge (PWE3) Architecture", [RFC 3985](#), March 2005.

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PW MIB

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