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## Definitions of Textual Conventions for Pseudowire (PW) Management

### Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This memo defines a Management Information Base (MIB) module that contains textual conventions (TCs) to represent commonly used pseudowire (PW) management information. The intent is that these TCs will be imported and used in PW-related MIB modules that would otherwise define their own representations.

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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 textual conventions used for pseudowire (PW) technology and for Pseudowire Edge-to-Edge Emulation (PWE3) MIB modules.

2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through 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 Used in This Document

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

## 4. Object Definitions

```
PW-TC-STD-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, Unsigned32, mib-2
        FROM SNMPv2-SMI                -- [RFC2578]

    TEXTUAL-CONVENTION
        FROM SNMPv2-TC;                -- [RFC2579]

pwTcStdMIB MODULE-IDENTITY
    LAST-UPDATED "200904210000Z" -- 21 April 2009 00:00:00 GMT
    ORGANIZATION "Pseudowire Edge-to-Edge Emulation (PWE3) Working
        Group"
    CONTACT-INFO
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          The PWE3 Working Group (email distribution pwe3@ietf.org,
          http://www.ietf.org/html.charters/pwe3-charter.html)
        "

DESCRIPTION
    "This MIB module defines TEXTUAL-CONVENTIONS
    for concepts used in pseudowire edge-to-edge
    networks.

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```

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This version of this MIB module is part of RFC 5542; see the RFC itself for full legal notices."

-- Revision history.

```
REVISION "200904210000Z" -- 21 April 2009 00:00:00 GMT
DESCRIPTION
    "Original Version"
    ::= { mib-2 188 }
```

```
PwGroupID ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "An administrative identification for grouping a
        set of service-specific pseudowire services."
    SYNTAX      Unsigned32
```

```
PwIDType ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
```

## DESCRIPTION

"Pseudowire Identifier. Used to identify the PW (together with some other fields) in the signaling session."

SYNTAX Unsigned32

PwIndexType ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

## DESCRIPTION

"Pseudowire Index. A unique value, greater than zero, for each locally defined PW. Used for indexing several MIB tables associated with the particular PW. It is recommended that values are assigned contiguously starting from 1. The value for each PW MUST remain constant at least from one re-initialization to the next re-initialization."

SYNTAX Unsigned32 (1..4294967295)

PwIndexOrZeroType ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

## DESCRIPTION

"This TEXTUAL-CONVENTION is an extension of the PwIndexType convention. The latter defines a greater-than-zero value used to identify a pseudowire in the managed system. This extension permits the additional value of zero. The zero value is object-specific and MUST therefore be defined as part of the description of any object that uses this syntax. Examples of the usage of zero might include situations where pseudowire was unknown, or where none or all pseudowires need to be referenced."

SYNTAX Unsigned32 (0..4294967295)

PwOperStatusTC ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"Indicates the operational status of the PW.

- up(1): Ready to pass packets.
- down(2): PW signaling is not yet finished, or indications available at the service level indicate that the PW is not passing packets.
- testing(3): AdminStatus at the PW level is set to test.

- dormant(4): The PW is not in a condition to pass packets but is in a 'pending' state, waiting for some external event.
- notPresent(5): Some component is missing to accomplish the setup of the PW. It can be configuration error, incomplete configuration, or a missing H/W component.
- lowerLayerDown(6): One or more of the lower-layer interfaces responsible for running the underlying PSN is not in OperStatus 'up' state."

```
SYNTAX  INTEGER {
    up(1),
    down(2),
    testing(3),
    dormant(4),
    notPresent(5),
    lowerLayerDown(6)
}
```

PwAttachmentIdentifierType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"An octet string used in the generalized Forward Error Correction (FEC) element for identifying attachment forwarder and groups. A NULL identifier is of zero length.

"

SYNTAX OCTET STRING (SIZE (0..255))

PwGenIdType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Represents the Attachment Group Identifier (AGI) Type and Attachment Individual Identifier (AII) Type in generalized FEC signaling and configuration.

"

SYNTAX Unsigned32( 0..254 )

PwCwStatusTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Indicates the status of the control word (CW) negotiation based on the local configuration and the indications received from the peer node.

waitingForNextMsg(1) indicates that the node is waiting for another label mapping from the peer.

sentWrongBitErrorCode(2) indicates that the local node has notified the peer about a mismatch in the C-bit.

rxWithdrawWithWrongBitErrorCode(3) indicates that a withdraw message has been received with the wrong C-bit error code.

illegalReceivedBit(4) indicates a C-bit configuration with the peer that is not compatible with the PW type.

cwPresent(5) indicates that the CW is present for this PW. If signaling is used, the C-bit is set and agreed upon between the nodes. For manually configured PW, the local configuration requires the use of the CW.

cwNotPresent(6) indicates that the CW is not present for this PW. If signaling is used, the C-bit is reset and agreed upon between the nodes. For manually configured PW, the local configuration requires that the CW not be used.

notYetKnown(7) indicates that a label mapping has not yet been received from the peer.

"

#### REFERENCE

"Martini, et al., 'Pseudowire Setup and Maintenance Using the Label Distribution Protocol', [RFC4447]."

```
SYNTAX    INTEGER {
           waitingForNextMsg(1),
           sentWrongBitErrorCode(2),
           rxWithdrawWithWrongBitErrorCode(3),
           illegalReceivedBit(4),
           cwPresent(5),
           cwNotPresent(6),
           notYetKnown(7)
           }
```

PwStatus ::= TEXTUAL-CONVENTION

STATUS current

#### DESCRIPTION

"Indicates the status of the PW and the interfaces affecting this PW. If none of the bits are set, it indicates no faults are reported.

"

```
SYNTAX  BITS {
    pwNotForwarding(0),
    servicePwRxFault(1),
    servicePwTxFault(2),
    psnPwRxFault(3),
    psnPwTxFault(4)
}
```

```
PwFragSize ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "If set to a value other than zero, it indicates the desired
        fragmentation length in bytes.  If set to zero,
        fragmentation is not desired for PSN bound packets."
    SYNTAX      Unsigned32
```

```
PwFragStatus ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "Indicates the status of the fragmentation/reassembly process
        based on local configuration and peer capability.

        noFrag(0) bit indicates that local configuration is for no
        fragmentation.

        cfgFragGreaterThanPsnMtu(1) bit indicates that the local node
        is set to fragment, but the fragmentation size is greater
        than the MTU available at the PSN between the nodes.
        Fragmentation is not done in this case.

        cfgFragButRemoteIncapable(2) bit indicates that the local
        configuration conveys the desire for fragmentation but
        the peer is not capable of reassembly.

        remoteFragCapable(3) bit indicates that the remote node
        is capable to accept fragmented PDUs.

        fragEnabled(4) bit indicates that fragmentation will be used
        on this PW.  Fragmentation can be used if the local node was
        configured for fragmentation, the peer has the capability
        to accept fragmented packets, and the CW is in use for this
        PW."
```

#### REFERENCE

"Malis, A. and M. Townsley, 'Pseudowire Emulation Edge-to-Edge (PWE3) Fragmentation and Reassembly', [RFC4623]."



```

SYNTAX  BITS {
    noFrag(0),
    cfgFragGreaterThanPsnMtu(1),
    cfgFragButRemoteIncapable(2),
    remoteFragCapable(3),
    fragEnabled(4)
}

```

```

PwCfgIndexOrzero ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "Index in any of the relevant configuration tables for
        supplement information regarding configuration of the
        specific technology. Value zero implies no additional
        configuration information is applicable."
    SYNTAX  Unsigned32 (0..4294967295)
END

```

## 5. Security Considerations

This module does not define any management objects. Instead, it defines a set of textual conventions that may be used by other PWE3 MIB modules to define management objects.

Meaningful security considerations can only be written in the MIB modules that define management objects. Therefore, this document has no impact on the security of the Internet.

## 6. IANA Considerations

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

Descriptor	OBJECT IDENTIFIER value
-----	-----
pwTcStdMIB	{ mib-2 188 }

## 7. References

### 7.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [RFC2578] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [RFC2579] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "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.
- [RFC4447] Martini, L., Ed., 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.

### 7.2. Informative References

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

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