Pseudo Wire Edge to Edge Emulation Internet-Draft Intended status: Standards Track Expires: April 15, 2009 O. Nicklass RADVISION Ltd. S. Sathappan M. Venkatesan Marconi Communications T. Nadeau Cisco Systems, Inc. October 12, 2008

Managed Objects for ATM over Packet Switched Network (PSN) draft-ietf-pwe3-pw-atm-mib-06.txt

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling ATM Pseudowire (PW) carrying ATM cells over Packet Switch Network (PSN). Internet-Draft

Manage ATM over PSN

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1. Introduction

This document describes a model for managing "emulated" ATM services over a Packet Switched Network(PSN).

The document follows the requirements for Pseudo-Wire Emulation Edgeto-Edge [<u>PWREQ</u>], and closely related to [<u>ATMENCAP</u>] and [<u>ATMTRANS</u>] which describe the encapsulation of ATM signals and provide the Emulation Service over a Packet Switched Network.

The ATM management model consists of several MIB modules, following the layering model described in the PWE3 Architecture [PWARCH] document. The ATM MIB module described in this document works closely with the MIB modules described in [ATOMTC], [ATOM], [IFMIB], [PWMIB] and the textual conventions defined in [PWTC]. The conceptual layering and relationship among all those is described in Figure 1 and in the "Relation to other PW-MIB modules" section listed below. AN ATM connection will be a pseudo-wire (PW) connection. It will not be treated as an interface and will therefore not be represented in the ifTable.



	++ ATM MIB ATM-TC-MIB, ++ ATMMIB	
Service Layer	++ ATM PW MIB PW-ATM-MIB ++	
Generic PW Layer		
PSN VC Layer	++ MPLS VC MIBS PW-MPLS-MIB ++	
PSN Laver	++ MPLS MIBs MPLS-TE-STD-MIE ++ MPLS-LSR-STD-MI	3, [B

Figure 1

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Comments should be made directly to PWE3 group at pwe3@ietf.org.

2. 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 <u>RFC 2119</u> [<u>BCP14</u>].

3. Terminology

This document follows the terminology used in PW Architecture [PWARCH].

PSN bound References the traffic direction where a ATM Cell is received, adapted to packet, assigned a PW label, and sent into the PSN. Within the MIB objects it is called outbound. CE bound The direction where packets are received from the PSN, cells are reconstructed from the packet payloads, and sent into the ATM Network as cells. Within the MIB objects it is called inbound. Refers to the method of adapting a "foreign" Adaptation communications protocol such that it can be carried by a packet switched net (the PSN). For example, in a ATM service the foreign protocol is ATM. The PSN may be MPLS. PSN Packet Switched Network. PSN Tunnel A general term indicating a virtual connection between the two PW edge devices. In practice this connection is not limited to path-oriented types of PSNs such as MPLS. An example of a non-

<u>4</u>. The Internet-Standard Management Framework

path-oriented PSN is an IP PSN.

<u>RFC 3410</u> [<u>RFC3410</u>].

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, <u>RFC 2578 [RFC2578]</u>, STD 58, <u>RFC 2579 [RFC2579]</u> and STD 58, <u>RFC 2580</u> [<u>RFC2580</u>].

5. Overview

This MIB module is designed to satisfy the following requirements and constraints:

- o Fit within the architecture defined by [PWARCH] and [PWMIB].
- Fit within the model for VP/VC definitions and management concept as defined in the [ATOM] MIB.
- o Supports manually configured ATM PWs
- o Supports automatically configured ATM PWs
- o The MIB module enables the use of any PSN type
- The MIB module supports point-to-point ATM PW connections.
 Point-to-multipoint and multipoint-to-point connections are for future study.
- The MIB module allows configuration of all the parameters needed to establish a PW to carry ATM cells.
- The MIB module reports: ATM performance metrics for the ATM PW. This includes cells transmit, Cells dropped, Cells received, and unknownCells. In addition it reports performance metrics at packet level.
- o ATM OAM cell support.
- o The MIB module does not consider ILMI support

6. Relation to other PW-MIB modules

The MIB structure for defining a PW service is composed of three layers of MIB modules functioning together. This general model is defined in the PWE3 Architecture [PWARCH]. The layering model is intended to sufficiently isolate PW services from the underlying PSN layer that carries the emulated service. This is done at the same time as providing a standard means for connecting any supported services to any supported PSNs.

The first layer known as the service layer contains service-specific modules such as the one defined in this document. These modules define service-specific management objects that interface or

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collaborate with existing MIB modules for the native version of the service. The service-specific module "glues" the standard module to the PWE MIB framework.

The next layer of the PWE MIB framework is comprised of the PW-MIB module [PWMIB]. This module is used to configure general parameters of PW connections that are common to all types of emulated services and PSNs. This layer is connected to the service-specific layer above, and the PSN layer below.

The PSN layer provides PSN-specific modules 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. This module is used to "glue" the PW service to the underlying PSN-specific MIB modules. In the case of MPLS, for example, the PW-MPLS MIB [PWMPLSMIB] is used to connect the PW service to either the MPLS-LDP [LDPMIB] or MPLS-TE [TEMIB] MIBS.

[PWTC] defines some of the object types used in these modules.

7. ATM-PW MIB Usage

This section provides an example of using the MIB objects described in <u>section 9</u> to set up an ATM PW. While this example is not meant to illustrate every permutation of the MIB, it is intended as an aid in the understanding of some key concepts. It is meant to be read after going through the MIB itself. See [<u>PWMIB</u>] for an example of setting up a PSN Tunnel.

The following example illustrates how a user will set up an AAL5 ATM PW on a switch/router with cells entering the switch/router through ATM Interface with IfIndex 1000 [IFMIB], VPI 1 and VCI 100 (from ATM Network to PSN - outbound direction) and on the way back, it goes out of the switch/router through ATM Interface 1000 with VPI 1 and VCI 100 (PSN to ATM Network - inbound direction)

First create an entry in PW MIB with pwType atmAal5SduVcc(2), then create entries in pwAtmCfg table, inbound and outbound tables.

```
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```
In PW ATM MIB
In pwAtmCfgTable:
pwAtmCfgMaxCellConcatenation 29
pwAtmCfgTimeoutMode enabled(3)
pwAtmClpQosMapping false(0) --CLP will not be mapped to QoS
pwAtmOamCellSupported true(1) --OAM cells will be supported
In pwAtmOutboundTable:
{
 pwAtmOutboundAtmIf
                                       --Outbound AtmIf
                               1000
 pwAtmOutboundVpi
                               1
                                       --Outbound VPI
 pwAtmOutboundVci
                               100
                                       --Outbound VCI
 pwAtmOutboundTrafficParamDescr 0.0
                                       --Best Effort
 pwAtmOutboundRowStatus
                               createAndGo
}
In pwAtmInboundTable
{
 pwAtmInboundAtmIf
                              1000 -- Inbound AtmIf
 pwAtmInboundVpi
                              1 -- Inbound VPI
 pwAtmInboundVci
                              100 --Inbound VCI
 pwAtmInboundTrafficParamDescr 0.0 --Best Effort
 pwAtmInboundRowStatus createAndGo
}
```

8. Structure of the MIB module

This MIB consists of 4 types of tables;

It is important to note that the TrafficParamDescr Table is not defined as part of this MIB although an object pointing to such table entry exist in all configuration tables of this MIB module. Users can refer to any ATM TrafficDescr (TD) Table if there is a need to overwrite the TD assigned to the ATM endpoint in the ATM service MIB [ATOM].

- PW ATM Cfg Table A table for generic parameters for ATM PW configuration that is applicable for each ATM PW.

- PW ATM Outbound Table There are 2 tables to configure an outbound ATM PW depending on the type of service. One table for 1: 1 service, and the other for N:1 service and transparent cell mode [<u>ATMTRANS</u>].

- PW ATM Inbound Table There are 2 tables to configure an inbound ATM PW depending on the type of service. One table for 1: 1 service, and the other for N:1 service and transparent cell mode.

- PW ATM Perf Table There are 3 tables each contains the relevant time dependent statistics for an ATM PW Entry. There is a current table, 15 minutes interval table and one day interval table. The tables are aligned with statistic model of other PW services.

9. Object definition

PW-ATM-MIB DEFINITIONS ::= BEGIN

IMPORTS MODULE-IDENTITY, OBJECT-TYPE, Counter32, Unsigned32, mib-2 FROM SNMPv2-SMI

MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF

TruthValue, RowStatus, RowPointer FROM SNMPv2-TC

PerfCurrentCount, PerfIntervalCount FROM PerfHist-TC-MIB

InterfaceIndex FROM IF-MIB

pwIndex

FROM PW-STD-MIB

AtmVpIdentifier, AtmVcIdentifier FROM ATM-TC-MIB;

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Postal: 1000 Marconi Drive Warrendale PA 15086 Tel: +1-724-742-7058 Email: venkatesan.marichetty@marconi.com Thomas D. Nadeau Postal: Cisco Systems, Inc. 250 Apollo Drive Chelmsford, MA 01824 Tel: +1-978-497-3051 Email: tnadeau@cisco.com Orly Nicklass Postal: RADVISION Ltd. 24 Raul Wallenberg Tel Aviv, Israel Email: orlyn@radvision.com Discussion and general questions should be posed to the PWE3 Working Group (pwe3@ietf.org)." DESCRIPTION "This MIB contains managed object definitions for Pseudo Wire emulation of ATM over Packet Switched Networks (PSN). This MIB supplements the PW-STD-MIB module. The PW-STD-MIB contains structures and MIB associations generic to Pseudo-Wire (PW) emulation. PW-specific MIBs (such as this) contain config and stats for specific PW types. Copyright (C) The IETF Trust (2008). This version of this MIB module is part of RFC XXXX; see the RFC itself for full legal notices. -- RFC Ed.: replace XXXX with actual RFC number & remove this note" -- Revision history. REVISION "200804290000Z" -- 2008 DESCRIPTION "Initial version published as RFC XXXX." -- RFC Ed.: replace XXXX with actual RFC number & remove this note" ::= { mib-2 YYY } -- RFC Editor: replace YYY with IANA-assigned number & remove this

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-- note. Please see IANA considerations section.

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```
-- Top-level components of this MIB
   pwAtmNotifications OBJECT IDENTIFIER ::= { pwAtmMIB 0 }
   pwAtmObjects
                  OBJECT IDENTIFIER ::= { pwAtmMIB 1 }
   pwAtmConformance OBJECT IDENTIFIER ::= { pwAtmMIB 2 }
-- ATM PW PSN Bound(Outbound) Table for 1 to 1 connection
pwAtmOutboundTable OBJECT-TYPE
   SYNTAX
            SEQUENCE OF PwAtmOutboundEntry
   MAX-ACCESS
                     not-accessible
                     current
   STATUS
   DESCRIPTION
       "This table specifies the information for an ATM PW to
       be carried over PSN in the outbound direction. An
       entry is created in this table for every entry in
       the pwTable with a pwType equal to one of the following:
       atmAal5SduVcc(2), atmCell1to1Vcc(12), atmCell1to1Vpc(13)
       or atmAal5PduVcc(14), or atmTransparent(3)."
    ::= { pwAtmObjects 1 }
pwAtmOutboundEntry OBJECT-TYPE
   SYNTAX
                PwAtmOutboundEntry
   MAX-ACCESS
                not-accessible
   STATUS
                 current
   DESCRIPTION
        "A row in this table represents an ATM PW that needs to be
        adapted and carried over PSN. This table is indexed by
        pwIndex from pwTable. Unless otherwise specified, all
        writeable objects in this table MUST NOT be changed after
        row activation in the generic pwTable and values must
        persist after reboot."
   REFERENCE
      "See [PWMIB] "
   INDEX { pwIndex }
    ::= { pwAtmOutboundTable 1 }
```

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 PwAtmOutboundEntry ::= SEQUENCE {
                                          InterfaceIndex,
       pwAtmOutboundAtmIf
       pwAtmOutboundVpi
                                          AtmVpIdentifier,
       pwAtmOutboundVci
                                          AtmVcIdentifier,
       pwAtmOutboundTrafficParamDescr
                                          RowPointer,
       pwAtmOutboundRowStatus
                                          RowStatus
       }
 pwAtmOutboundAtmIf OBJECT-TYPE
     SYNTAX
                  InterfaceIndex
                   read-create
     MAX-ACCESS
                   current
     STATUS
     DESCRIPTION
         "The ATM Interface that receives cells from the ATM
         network."
      ::= { pwAtmOutboundEntry 1 }
 pwAtmOutboundVpi OBJECT-TYPE
     SYNTAX
                   AtmVpIdentifier
     MAX-ACCESS
                   read-create
     STATUS
                   current
     DESCRIPTION
          "VPI value of this ATM PW. The value may indicate the
          translated value when egress generates new VPI."
      ::= { pwAtmOutboundEntry 2 }
 pwAtmOutboundVci OBJECT-TYPE
     SYNTAX
                  AtmVcIdentifier
     MAX-ACCESS
                  read-create
     STATUS
                  current
     DESCRIPTION
          "VCI value of this ATM PW. The value may indicate the
         translated value when egress generates new VCI."
      ::= { pwAtmOutboundEntry 3 }
 pwAtmOutboundTrafficParamDescr OBJECT-TYPE
     SYNTAX
                   RowPointer
     MAX-ACCESS
                   read-create
     STATUS
                   current
     DESCRIPTION
          "This object represents a pointer to an ATM traffic parameter
           specific row in either a private or standard table which
           will be employed while receiving cells from the ATM network.
           This row should contain a set of self-consistent ATM traffic
           parameters including the ATM traffic service category.
          A value of 0.0 indicates Best Effort"
```

```
::= { pwAtmOutboundEntry 4 }
```

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```
pwAtmOutboundRowStatus OBJECT-TYPE
   SYNTAX
                  RowStatus
   MAX-ACCESS
                 read-create
   STATUS
                  current
   DESCRIPTION
        "This Object is used to create, modify or delete a row in
         this table. Unless otherwise specified, all writeable
         objects in this table MUST NOT be changed after row
         activation as explained in the pwAtmOutboundEntry "
    ::= { pwAtmOutboundEntry 5 }
-- End of ATM PW Outbound Table
-- ATM PW CE Bound(Inbound) Table for 1 to 1 mode
pwAtmInboundTable OBJECT-TYPE
   SYNTAX
             SEQUENCE OF PwAtmInboundEntry
   MAX-ACCESS
                      not-accessible
   STATUS
                      current
   DESCRIPTION
        "This table specifies the information for an ATM PW in the
        Inbound direction."
    ::= { pwAtmObjects 3 }
pwAtmInboundEntry OBJECT-TYPE
   SYNTAX
             PwAtmInboundEntry
   MAX-ACCESS
                  not-accessible
   STATUS
                  current
   DESCRIPTION
        "A row in this table represents an ATM PW that needs to be
         sent into the ATM Network after reconstructing cells from
         Packets received from a PSN. This table is indexed by
         pwIndex from pwTable. An entry is created in this table
         for every entry in the pwTable with a
         pwType equal to one of the following:
         atmAal5SduVcc(2), atmCell1to1Vcc(12), atmCell1to1Vpc(13,)
         or atmAal5PduVcc(14), or atmTransparent(3).Unless otherwise
         specified, all writeable objects in this table MUST NOT
         be changed after row activation in the generic pwTable
         and values must persist after reboot."
   REFERENCE
      "See [PWMIB] "
   INDEX { pwIndex }
    ::= { pwAtmInboundTable 1 }
```

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```
PwAtmInboundEntry ::= SEQUENCE {
                                        InterfaceIndex,
      pwAtmInboundAtmIf
      pwAtmInboundVpi
                                        AtmVpIdentifier,
      pwAtmInboundVci
                                        AtmVcIdentifier,
      pwAtmInboundTrafficParamDescr
                                        RowPointer,
      pwAtmInboundRowStatus
                                        RowStatus
          }
pwAtmInboundAtmIf OBJECT-TYPE
    SYNTAX
                  InterfaceIndex
    MAX-ACCESS
                 read-create
    STATUS
                  current
    DESCRIPTION
        "The ATM Interface that sends cells into the ATM network
        after reconstructing cells from packets received from
        a PSN."
    ::= { pwAtmInboundEntry 1 }
pwAtmInboundVpi OBJECT-TYPE
    SYNTAX
                 AtmVpIdentifier
    MAX-ACCESS
                 read-create
    STATUS
                 current
    DESCRIPTION
        "VPI value of this ATM PW.
         If the pwType is atmTransparent then the value will
        be set to zero."
        ::= { pwAtmInboundEntry 2 }
pwAtmInboundVci OBJECT-TYPE
    SYNTAX
                  AtmVcIdentifier
    MAX-ACCESS
                  read-create
    STATUS
                  current
    DESCRIPTION
        "VCI value of this ATM PW.
         If the pwType is atmTransparent atmCell1to1Vpc or
         atmCellNto1Vpc then the value will be set to zero."
        ::= { pwAtmInboundEntry 3 }
```

pwAtmInboundTrafficParamDescr OBJECT-TYPE SYNTAX RowPointer MAX-ACCESS read-create STATUS current DESCRIPTION "This object represents a pointer to a ATM traffic parameter specific row in either a private or standard table which will be employed while transmit into the ATM network. This table contains a set of self-consistent ATM traffic parameters including the ATM traffic service category. A value of 0.0 indicates Best Effort." ::= { pwAtmInboundEntry 4 } pwAtmInboundRowStatus OBJECT-TYPE SYNTAX RowStatus MAX-ACCESS read-create STATUS current DESCRIPTION "This Object is used to create, modify or delete a row in this table.Unless otherwise specified, all writeable objects in this table MUST NOT be changed after row activation as explained in the pwAtmInboundEntry " ::= { pwAtmInboundEntry 5 } -- End of ATM PW Inbound Table --Generic ATM PW table for all types of ATM PW connection. pwAtmCfgTable OBJECT-TYPE SYNTAX SEQUENCE OF PwAtmCfgEntry MAX-ACCESS not-accessible STATUS current DESCRIPTION "This table specifies generic information for an ATM PW to be carried over PSN in any mode." ::= { pwAtmObjects 5 }

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```
pwAtmCfgEntry OBJECT-TYPE
   SYNTAX
                  PwAtmCfgEntry
   MAX-ACCESS
                  not-accessible
   STATUS
                  current
   DESCRIPTION
           "This table contains a set of parameters for
         the ATM PW that needs to be adapted and carried
         over PSN. This table is indexed by pwIndex from
         pwTable. An entry is created for every newly ATM
         type associated pwIndex in the pwTable. Unless
         otherwise specified, all read-write objects in
         this table MAY be changed when the PW is defined
         as not active and all RW objects values must
         persist after reboot"
   REFERENCE
      "See [PWMIB] "
   INDEX { pwIndex }
    ::= { pwAtmCfgTable 1 }
PwAtmCfgEntry ::= SEQUENCE {
        pwAtmCfgMaxCellConcatenation
                                           Unsigned32,
        pwAtmCfgFarEndMaxCellConcatenation Unsigned32,
        pwAtmCfqTimeoutMode
                                           INTEGER,
        pwAtmClpQosMapping
                                           TruthValue
                }
pwAtmCfgMaxCellConcatenation OBJECT-TYPE
                   Unsigned32 (1..29)
    SYNTAX
                   read-write
    MAX-ACCESS
    STATUS
                   current
    DESCRIPTION
         "The maximum number of ATM cells that can be
          concatenated into one PW packet towards PSN.
          In non LDP or other signaling protocol environment,
          this object MAY be changed at anytime, but traffic
          might be interuppted, otherwise, it may be changed
          when PW is not active."
    ::= { pwAtmCfgEntry 1 }
```

```
pwAtmCfgFarEndMaxCellConcatenation OBJECT-TYPE
    SYNTAX
                   Unsigned32 (1..29)
    MAX-ACCESS
                   read-write
    STATUS
                   current
    DESCRIPTION
         "The maximum number of ATM cells that can be
          concatenated into one PW packet towards PSN as reported by
          the far end. If no LDP in use, the object will either
          return value 0 or allow setting it for calculating
          protocol overhead."
    ::= { pwAtmCfgEntry 2 }
pwAtmCfgTimeoutMode OBJECT-TYPE
     SYNTAX
                   INTEGER
                        {
                         notApplicable (1),
                         disabled
                                       (2),
                         enabled
                                       (3)
                        }
    MAX-ACCESS
                   read-write
    STATUS
                   current
    DESCRIPTION
         "This objects determines whether a packet can be
          transmitted to the PSN based on time out expiration
          for collecting cells or not. The actual handling of the
          time out is implementation specific-as such this object
          may be changed at any time under proper consideration of
          traffic interupption effect."
    ::= { pwAtmCfgEntry 3 }
pwAtmClpQosMapping OBJECT-TYPE
   SYNTAX
                  TruthValue
   MAX-ACCESS
                  read-write
   STATUS
                  current
   DESCRIPTION
        "This Object indicates whether the CLP bits should be
         considered when setting the value in the Quality
         of Service fields of the encapsulating protocol
         (e.g. EXP fields of the MPLS Label Stack). Selecting
         True allows the drop precedence to be preserved
         across the PSN. In transparent cell transport,
         the value of this object MUST be false(2), in other
         cases it can be changed at any time."
   REFERENCE
      "See [ATMENCAP] section 12"
    ::= { pwAtmCfgEntry 4 }
```

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```
-- Device capable of implementing N:1, 1:1 and transparent cell
-- mode assumes to support the N:1 table for all
-- modes with respective applicable setting.
-- In such implementation, user can create an entry for either
-- 1:1 or transparent cell transport modes only
-- in pwAtmInboundNto1Table. The side effect of such
-- will be an automatic create of the respective line in the
-- pwAtmOutboundNto1Table.
-- ATM PW Outbound Table for N to 1 connection
pwAtmOutboundNto1Table OBJECT-TYPE
             SEQUENCE OF PwAtmOutboundNto1Entry
   SYNTAX
   MAX-ACCESS
                      not-accessible
   STATUS
                      current
   DESCRIPTION
        "This table specifies the information for an ATM PW to
        be carried over PSN in the outbound direction. Up to
        N entries can be created in this table for every
        entry in the pwTable with a pwType equal to:
        atmCellNto1Vcc(9), or atmCellNto1Vpc(10).
         An entry can be created only when the VP/VC are known.
        A single entry will be created in this table for every
        entry in the pwTable with a pwType equal to
        one of the following: atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13), or atmAal5PduVcc(14), or
        atmAal5SduVcc(2), or atmTransparent(3).
    ::= { pwAtmObjects 6 }
pwAtmOutboundNto1Entry OBJECT-TYPE
   SYNTAX
                 PwAtmOutboundNto1Entry
   MAX-ACCESS
                not-accessible
   STATUS
                 current
   DESCRIPTION
        "A row in this table represents an ATM PW that needs to be
         adapted and carried over PSN. This table is indexed by
         pwIndex from pwTable and the ATM interface with VPL/ VCLs.
         In atmTransparent(3), Vpi and VCi will be 0xFFFF
         during set operation.
        Unless otherwise specified, all read-create objects in this
         table MUST NOT be changed after row activation
         and SHOULD remain unchanged after reboot."
```

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INDEX { pwIndex, pwAtmOutboundNto1AtmIf ,

pwAtmOutboundNto1Vpi,

pwAtmOutboundNto1Vci }

::= { pwAtmOutboundNto1Table 1 }

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```
PwAtmOutboundNto1Entry ::= SEQUENCE {
                                                InterfaceIndex,
      pwAtmOutboundNto1AtmIf
     pwAtmOutboundNto1Vpi
                                                AtmVpIdentifier,
     pwAtmOutboundNto1Vci
                                                AtmVcIdentifier,
     pwAtmOutboundNto1RowStatus
                                                RowStatus,
     pwAtmOutboundNto1TrafficParamDescr
                                                RowPointer,
     pwAtmOutboundNto1MappedVpi
                                                AtmVpIdentifier,
                                                AtmVcIdentifier
     pwAtmOutboundNto1MappedVci
     }
pwAtmOutboundNto1AtmIf OBJECT-TYPE
   SYNTAX
                 InterfaceIndex
   MAX-ACCESS
                 not-accessible
   STATUS
                 current
   DESCRIPTION
        "The ATM Interface that receives cells from the ATM network."
    ::= { pwAtmOutboundNto1Entry 1 }
pwAtmOutboundNto1Vpi OBJECT-TYPE
   SYNTAX
                 AtmVpIdentifier
   MAX-ACCESS
                 not-accessible
   STATUS
                 current
   DESCRIPTION
        "VPI value of this ATM PW. In atmTransparent(3),
        Vpi will be the equivalent of 0xFFFF"
    ::= { pwAtmOutboundNto1Entry 2 }
pwAtmOutboundNto1Vci OBJECT-TYPE
                 AtmVcIdentifier
   SYNTAX
   MAX-ACCESS
                not-accessible
   STATUS
                  current
   DESCRIPTION
        "VCI value of this ATM PW. In atmTransparent(3), or
        VP case, the value will be the equivalent of
        0xFFFF"
    ::= { pwAtmOutboundNto1Entry 3 }
pwAtmOutboundNto1RowStatus OBJECT-TYPE
   SYNTAX
                  RowStatus
   MAX-ACCESS
                read-create
   STATUS
                  current
   DESCRIPTION
        "This Object is used to create, modify or delete a row in
        this table."
    ::= { pwAtmOutboundNto1Entry 4 }
```

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```
pwAtmOutboundNto1TrafficParamDescr OBJECT-TYPE
   SYNTAX
                 RowPointer
   MAX-ACCESS
                 read-create
   STATUS
                  current
   DESCRIPTION
        "This object represents a pointer to a ATM traffic parameter
         specific row in either private or standard table which will
         be employed while receiving cells from the ATM network.
         This table should contain a set
         of self-consistent ATM traffic parameters including the ATM
         traffic service category. A value of 0.0 indicates Best
        Effort."
    ::= { pwAtmOutboundNto1Entry 5 }
pwAtmOutboundNto1MappedVpi
                                   OBJECT-TYPE
   SYNTAX
                 AtmVpIdentifier
   MAX-ACCESS
                 read-create
   STATUS
                  current
   DESCRIPTION
        "The egress generated VPI value of this ATM PW. The
        entry is valid for PW type of atmCellNto1Vcc(9),
        atmCellNto1Vpc(10), atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13). In other types, the value will be the
        equivalent of 0xFFFF. Value MAY be changed when the
        PW is defined as not active "
    ::= { pwAtmOutboundNto1Entry 6 }
                                OBJECT-TYPE
pwAtmOutboundNto1MappedVci
   SYNTAX
                 AtmVcIdentifier
   MAX-ACCESS
                  read-create
   STATUS
                  current
   DESCRIPTION
        "The egress generated VCI value of this ATM PW. The
        entry is valid for PW type of atmCellNto1Vcc(9),
        atmCellNto1Vpc(10), atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13. In VP case or other types, the
        value will be the equivalent of 0xFFFF.
        Value MAY be changed when the PW is defined
        as not active."
    ::= { pwAtmOutboundNto1Entry 7 }
```

-- ATM PW Inbound Table for N to 1 connection
```
pwAtmInboundNto1Table OBJECT-TYPE
   SYNTAX
              SEQUENCE OF PwAtmInboundNto1Entry
   MAX-ACCESS
                      not-accessible
   STATUS
                      current
   DESCRIPTION
        "This table specifies the information for an ATM PW to
        be carried over PSN in the Inbound direction. Up to
        N entries can be created in this table for every
        entry in the pwTable with a pwType equal to:
        atmCellNto1Vcc(9), or atmCellNto1Vpc(10).
          An entry can be created only when the VP/VC are known.
        A single entry will be created in this table for every
        entry in the pwTable with a pwType equal to
        one of the following:atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13), or atmAal5PduVcc(14), or
        atmAal5SduVcc(2), or atmTransparent(3)."
    ::= { pwAtmObjects 7 }
pwAtmInboundNto1Entry OBJECT-TYPE
   SYNTAX
                 PwAtmInboundNto1Entry
   MAX-ACCESS
                  not-accessible
   STATUS
                  current
   DESCRIPTION
        "A row in this table represents an ATM PW that needs to be
         adapted and carried over PSN. This table is indexed by
         pwIndex from pwTable and the ATM interface with VPL/ VCLs.
         In atmTransparent(3), Vpi and VCi will be 0xFFFF
         during set operation.
         Unless otherwise specified, all Read-Creat objects in this
         table MUST NOT be changed after row activation
         and SHOULD remain unchanged after reboot."
    INDEX { pwIndex, pwAtmInboundNto1AtmIf ,
                        pwAtmInboundNto1Vpi,
                        pwAtmInboundNto1Vci
                        }
    ::= { pwAtmInboundNto1Table 1 }
PwAtmInboundNto1Entry ::= SEQUENCE {
      pwAtmInboundNto1AtmIf
                                           InterfaceIndex,
      pwAtmInboundNto1Vpi
                                           AtmVpIdentifier,
      pwAtmInboundNto1Vci
                                           AtmVcIdentifier,
      pwAtmInboundNto1RowStatus
                                           RowStatus,
      pwAtmInboundNto1TrafficParamDescr
                                           RowPointer,
      pwAtmInboundNto1MappedVpi
                                           AtmVpIdentifier,
      pwAtmInboundNto1MappedVci
                                           AtmVcTdentifier
    }
```

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```
pwAtmInboundNto1AtmIf OBJECT-TYPE
   SYNTAX
                 InterfaceIndex
                not-accessible
   MAX-ACCESS
   STATUS
                 current
   DESCRIPTION
       "The ATM Interface that receives cells from the ATM network."
    ::= { pwAtmInboundNto1Entry 1 }
pwAtmInboundNto1Vpi OBJECT-TYPE
   SYNTAX
                AtmVpIdentifier
   MAX-ACCESS
                not-accessible
                 current
   STATUS
   DESCRIPTION
       "VPI value of this ATM PW. In atmTransparent(3),
        Vpi will be the equivalent of 0xFFFF."
    ::= { pwAtmInboundNto1Entry 2 }
pwAtmInboundNto1Vci OBJECT-TYPE
   SYNTAX
                 AtmVcIdentifier
   MAX-ACCESS
                 not-accessible
   STATUS
                 current
   DESCRIPTION
       "VCI value of this ATM PW. In atmTransparent(3), or
        VP case, the value will be the equivalent of
        0xFFFF"
    ::= { pwAtmInboundNto1Entry 3 }
pwAtmInboundNto1RowStatus OBJECT-TYPE
   SYNTAX
                 RowStatus
   MAX-ACCESS
                read-create
   STATUS
                 current
   DESCRIPTION
       "This Object is used to create, modify or delete a row in
       this table."
    ::= { pwAtmInboundNto1Entry 4 }
```

```
pwAtmInboundNto1TrafficParamDescr OBJECT-TYPE
   SYNTAX
                  RowPointer
   MAX-ACCESS
                 read-create
   STATUS
                  current
   DESCRIPTION
        "This object represents a pointer to a ATM traffic parameter
         specific row in either private or standard table which will
         be employed while receiving cells from the ATM network.
         This table should contain a set
         of self-consistent ATM traffic parameters including the ATM
         traffic service category. A value of 0.0 indicates Best
        Effort."
    ::= { pwAtmInboundNto1Entry 5 }
pwAtmInboundNto1MappedVpi
                             OBJECT-TYPE
   SYNTAX
                 AtmVpIdentifier
   MAX-ACCESS
                  read-create
   STATUS
                  current
   DESCRIPTION
        "The generated VPI value of this ATM PW. The
        entry is valid for PW type of atmCellNto1Vcc(9),
        atmCellNto1Vpc(10), atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13). In other types, the value will be the
        equivalent of 0xFFFF. Value MAY be changed when the
        PW is defined as not active."
    ::= { pwAtmInboundNto1Entry 6 }
pwAtmInboundNto1MappedVci
                              OBJECT-TYPE
   SYNTAX
                 AtmVcIdentifier
   MAX-ACCESS
                  read-create
   STATUS
                  current
   DESCRIPTION
        "The generated VCI value of this ATM PW. The
        entry is valid for PW type of atmCellNto1Vcc(9),
        atmCellNto1Vpc(10), atmCell1to1Vcc(12), or
        atmCell1to1Vpc(13. In VP case or other types, the
        value will be the equivalent of 0xFFFF.
        Value MAY be changed when the
        PW is defined as not active."
    ::= { pwAtmInboundNto1Entry 7 }
-- ATM PW Outbound Perf Table
-- The following supplement the counters presented in the
```

-- PW generic MIB

```
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                           Manage ATM over PSN
                                                            October 2008
  -- ATM PW Performance Current Table.
 pwAtmPerfCurrentTable OBJECT-TYPE
    SYNTAX
                 SEQUENCE OF PwAtmPerfCurrentEntry
   MAX-ACCESS
                 not-accessible
    STATUS
                  current
   DESCRIPTION
        "The current 15 minute interval counts are in
        this table.
        This table provides performance information per ATM PW."
    ::= { pwAtmObjects 8 }
 pwAtmPerfCurrentEntry OBJECT-TYPE
    SYNTAX
                 PwAtmPerfCurrentEntry
   MAX-ACCESS
                 not-accessible
    STATUS
                  current
    DESCRIPTION
        "An entry in this table is created by the agent for every
        pwAtmCfgTable entry. After 15 minutes, the contents of this
        table entry are copied to a new entry in the
        pwAtmPerfInterval table and the counts in this entry
        are reset to zero."
    INDEX { pwIndex }
    ::= { pwAtmPerfCurrentTable 1 }
 PwAtmPerfCurrentEntry ::= SEQUENCE {
       pwAtmPerfCurrentMissingPkts
                                      PerfCurrentCount,
       pwAtmPerfCurrentPktsReOrder
                                      PerfCurrentCount,
      pwAtmPerfCurrentPktsMisOrder
                                      PerfCurrentCount,
       pwAtmPerfCurrentPktsTimeout
                                      PerfCurrentCount,
       pwAtmPerfCurrentCellsXmit
                                      PerfCurrentCount,
      pwAtmPerfCurrentCellsDropped
                                      PerfCurrentCount,
       pwAtmPerfCurrentCellsReceived PerfCurrentCount,
       pwAtmPerfCurrentUnknownCells
                                      PerfCurrentCount
    }
 pwAtmPerfCurrentMissingPkts OBJECT-TYPE
    SYNTAX
                  PerfCurrentCount
   MAX-ACCESS
                  read-onlv
    STATUS
                  current
   DESCRIPTION
        "Number of missing packets (as detected via control word
        sequence number gaps)."
    ::= { pwAtmPerfCurrentEntry 1 }
```

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```
pwAtmPerfCurrentPktsReOrder OBJECT-TYPE
                PerfCurrentCount
 SYNTAX
 MAX-ACCESS
                read-only
  STATUS
                current
  DESCRIPTION
      "Number of packets detected out of sequence (via control
       word sequence number), but successfully re-ordered.
       Note: some implementations may not support this Feature."
  ::= { pwAtmPerfCurrentEntry 2 }
pwAtmPerfCurrentPktsMisOrder OBJECT-TYPE
               PerfCurrentCount
  SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
 DESCRIPTION
      "Number of packets detected out of order (via control word
       sequence numbers)."
   ::= { pwAtmPerfCurrentEntry 3 }
pwAtmPerfCurrentPktsTimeout OBJECT-TYPE
                PerfCurrentCount
  SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
 DESCRIPTION
      "Number of packets transmitted due to timeout expiration
      while attempting to collect cells."
   ::= { pwAtmPerfCurrentEntry 4 }
pwAtmPerfCurrentCellsXmit OBJECT-TYPE
 SYNTAX
                PerfCurrentCount
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of transmitted cells."
   ::= { pwAtmPerfCurrentEntry 5 }
pwAtmPerfCurrentCellsDropped OBJECT-TYPE
                PerfCurrentCount
  SYNTAX
  MAX-ACCESS
                read-onlv
 STATUS
                current
 DESCRIPTION
      "Number of dropped cells."
   ::= { pwAtmPerfCurrentEntry 6 }
```

```
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```

```
pwAtmPerfCurrentCellsReceived OBJECT-TYPE
 SYNTAX
                PerfCurrentCount
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of received cells."
   ::= { pwAtmPerfCurrentEntry 7 }
pwAtmPerfCurrentUnknownCells OBJECT-TYPE
  SYNTAX
                PerfCurrentCount
 MAX-ACCESS
                read-only
  STATUS
                current
  DESCRIPTION
      "Number of cells received from the PSN with unknown VPI or
     VCI values. This object is relevant only in N:1 mode."
   ::= { pwAtmPerfCurrentEntry 8 }
-- End ATM PW Performance Current Interval Table
-- ATM PW Performance Interval Table.
pwAtmPerfIntervalTable OBJECT-TYPE
                SEQUENCE OF PwAtmPerfIntervalEntry
  SYNTAX
 MAX-ACCESS
                not-accessible
  STATUS
                current
  DESCRIPTION
      "This table provides performance information per ATM PW
       similar to the pwAtmPerfCurrentTable above. However,
       these counts represent historical 15 minute intervals.
       Typically, this table will have a maximum of 96 entries
       for a 24 hour period. "
  ::= { pwAtmObjects 9 }
pwAtmPerfIntervalEntry OBJECT-TYPE
  SYNTAX
                PwAtmPerfIntervalEntry
 MAX-ACCESS
               not-accessible
  STATUS
                current
  DESCRIPTION
      "An entry in this table is created by the agent for
       every pwAtmPerfCurrentEntry that is 15 minutes old.
       The contents of the Current entry are copied to the new
       entry here. The Current entry, then resets its counts
       to zero for the next current 15 minute interval. "
  INDEX { pwIndex, pwAtmPerfIntervalNumber }
  ::= { pwAtmPerfIntervalTable 1 }
```

```
PwAtmPerfIntervalEntry ::= SEQUENCE {
     pwAtmPerfIntervalNumber
                                     Unsigned32,
    pwAtmPerfIntervalValidData
                                     TruthValue,
     pwAtmPerfIntervalDuration
                                     Unsigned32,
    pwAtmPerfIntervalMissingPkts
                                     PerfIntervalCount,
     pwAtmPerfIntervalPktsReOrder
                                     PerfIntervalCount,
     pwAtmPerfIntervalPktsMisOrder
                                     PerfIntervalCount,
     pwAtmPerfIntervalPktsTimeout
                                     PerfIntervalCount,
    pwAtmPerfIntervalCellsXmit
                                     PerfIntervalCount,
                                     PerfIntervalCount,
     pwAtmPerfIntervalCellsDropped
     pwAtmPerfIntervalCellsReceived PerfIntervalCount,
     pwAtmPerfIntervalUnknownCells
                                     PerfIntervalCount
     }
pwAtmPerfIntervalNumber OBJECT-TYPE
                Unsigned32 (1..96)
  SYNTAX
                not-accessible
  MAX-ACCESS
 STATUS
                current
  DESCRIPTION
      "A number (normally between 1 and 96 to cover a 24 hour
       period) 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 through 32. The
       maximum value of N is 96."
  ::= { pwAtmPerfIntervalEntry 1 }
pwAtmPerfIntervalValidData OBJECT-TYPE
  SYNTAX
                TruthValue
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "This variable indicates if the data for this interval
       is valid."
  ::= { pwAtmPerfIntervalEntry 2 }
```

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```
pwAtmPerfIntervalDuration OBJECT-TYPE
   SYNTAX
               Unsigned32
  MAX-ACCESS read-only
   STATUS
               current
   DESCRIPTION
     "The duration of a particular interval in seconds,
      Adjustments in the system's time-of-day clock, may
      cause the interval to be greater or less than, the
      normal value. Therefore this actual interval value
      is provided."
   ::= { pwAtmPerfIntervalEntry 3 }
pwAtmPerfIntervalMissingPkts OBJECT-TYPE
                PerfIntervalCount
  SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of missing packets (as detected via control
      word sequence number gaps)."
  ::= { pwAtmPerfIntervalEntry 4 }
pwAtmPerfIntervalPktsReOrder OBJECT-TYPE
  SYNTAX
               PerfIntervalCount
 MAX-ACCESS
                read-only
  STATUS
                current
  DESCRIPTION
      "Number of packets detected out of sequence (via control
       word sequence number), but successfully re-ordered.
       Note: some implementations may not support this
       Feature."
  ::= { pwAtmPerfIntervalEntry 5 }
 pwAtmPerfIntervalPktsMisOrder OBJECT-TYPE
  SYNTAX
               PerfIntervalCount
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of packets detected out of order (via control word
       sequence numbers)."
  ::= { pwAtmPerfIntervalEntry 6 }
pwAtmPerfIntervalPktsTimeout OBJECT-TYPE
                PerfIntervalCount
  SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of packets transmitted due to timeout expiration."
   ::= { pwAtmPerfIntervalEntry 7 }
```

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```
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```

```
pwAtmPerfIntervalCellsXmit OBJECT-TYPE
                PerfIntervalCount
 SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of transmitted cells."
   ::= { pwAtmPerfIntervalEntry 8 }
pwAtmPerfIntervalCellsDropped OBJECT-TYPE
 SYNTAX
                PerfIntervalCount
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of dropped cells."
   ::= { pwAtmPerfIntervalEntry 9 }
pwAtmPerfIntervalCellsReceived OBJECT-TYPE
 SYNTAX
                PerfIntervalCount
 MAX-ACCESS
                read-only
                current
 STATUS
  DESCRIPTION
      "Number of received cells."
   ::= { pwAtmPerfIntervalEntry 10 }
pwAtmPerfIntervalUnknownCells OBJECT-TYPE
                PerfIntervalCount
 SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of cells received from the PSN with unknown VPI or
     VCI values. This object is relevant only in N:1 mode."
   ::= { pwAtmPerfIntervalEntry 11 }
```

-- End ATM PW Performance Interval Table

-- ATM PW 1day Performance Table

```
pwAtmPerf1DayIntervalTable OBJECT-TYPE
  SYNTAX
                SEQUENCE OF PwAtmPerf1DayIntervalEntry
 MAX-ACCESS
                not-accessible
  STATUS
                current
  DESCRIPTION
      "This table provides performance information per ATM PW
       similar to the pwAtmPerfIntervalTable above. However,
       these counters represent historical 1 day intervals up to
       one full month."
  ::= { pwAtmObjects 10 }
pwAtmPerf1DayIntervalEntry OBJECT-TYPE
  SYNTAX
                PwAtmPerf1DayIntervalEntry
 MAX-ACCESS
                not-accessible
 STATUS
                current
 DESCRIPTION
      "An entry is created in this table by the agent
       for every entry in the pwAtmCfgTable table."
  INDEX { pwIndex,pwAtmPerf1DayIntervalNumber }
     ::= { pwAtmPerf1DayIntervalTable 1 }
PwAtmPerf1DayIntervalEntry ::= SEQUENCE {
     pwAtmPerf1DayIntervalNumber
                                          Unsigned32,
     pwAtmPerf1DayIntervalValidData
                                           TruthValue,
     pwAtmPerf1DayIntervalDuration
                                           Unsigned32,
     pwAtmPerf1DayIntervalMissingPkts
                                           Counter32,
     pwAtmPerf1DayIntervalPktsReOrder
                                           Counter32,
     pwAtmPerf1DayIntervalPktsMisOrder
                                           Counter32,
     pwAtmPerf1DayIntervalPktsTimeout
                                           Counter32,
     pwAtmPerf1DayIntervalCellsXmit
                                           Counter32,
     pwAtmPerf1DayIntervalCellsDropped
                                           Counter32,
     pwAtmPerf1DayIntervalCellsReceived
                                           Counter32,
     pwAtmPerf1DayIntervalUnknownCells
                                           Counter32
     }
pwAtmPerf1DayIntervalNumber OBJECT-TYPE
  SYNTAX
                Unsigned32 (1..365)
                not-accessible
 MAX-ACCESS
                current
 STATUS
 DESCRIPTION
      "The number of interval, where 1 indicates current day
       measured period and 2 and above indicate previous days
       respectively"
  ::= { pwAtmPerf1DayIntervalEntry 1 }
```

```
pwAtmPerf1DayIntervalValidData OBJECT-TYPE
 SYNTAX
                TruthValue
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "This object indicates if the data for this interval
      is valid."
  ::= { pwAtmPerf1DayIntervalEntry 2 }
pwAtmPerf1DayIntervalDuration OBJECT-TYPE
              Unsigned32
  SYNTAX
 MAX-ACCESS read-only
  STATUS
              current
  DESCRIPTION
    "The duration of a particular interval in seconds,
    Adjustments in the system's time-of-day clock, may
    cause the interval to be greater or less than, the
    normal value. Therefore this actual interval value
     is provided."
  ::= { pwAtmPerf1DayIntervalEntry 3 }
pwAtmPerf1DayIntervalMissingPkts OBJECT-TYPE
  SYNTAX
                Counter32
 MAX-ACCESS
                read-only
  STATUS
                current
  DESCRIPTION
    "Number of missing packets (as detected via control word
     sequence number gaps)."
  ::= { pwAtmPerf1DayIntervalEntry 4 }
pwAtmPerf1DayIntervalPktsReOrder OBJECT-TYPE
  SYNTAX
                Counter32
 MAX-ACCESS
                read-only
  STATUS
                current
 DESCRIPTION
      "Number of packets detected out of sequence (via control
       word sequence number), but successfully re-ordered.
       Note: some implementations may not support this
       feature."
  ::= { pwAtmPerf1DayIntervalEntry 5 }
```

```
pwAtmPerf1DayIntervalPktsMisOrder OBJECT-TYPE
 SYNTAX
                Counter32
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of packets detected out of order(via control word
       sequence numbers), and could not be re-ordered."
  ::= { pwAtmPerf1DayIntervalEntry 6 }
pwAtmPerf1DayIntervalPktsTimeout OBJECT-TYPE
  SYNTAX
                Counter32
 MAX-ACCESS
                read-only
  STATUS
                current
  DESCRIPTION
      "Number of packets transmitted due to timeout expiration."
   ::= { pwAtmPerf1DayIntervalEntry 7 }
pwAtmPerf1DayIntervalCellsXmit OBJECT-TYPE
  SYNTAX
                Counter32
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of transmitted cells."
   ::= { pwAtmPerf1DayIntervalEntry 8 }
pwAtmPerf1DayIntervalCellsDropped OBJECT-TYPE
 SYNTAX
                Counter32
 MAX-ACCESS
                read-only
 STATUS
                current
 DESCRIPTION
      "Number of dropped cells."
   ::= { pwAtmPerf1DayIntervalEntry 9 }
pwAtmPerf1DayIntervalCellsReceived OBJECT-TYPE
                Counter32
  SYNTAX
 MAX-ACCESS
                read-only
 STATUS
                current
  DESCRIPTION
      "Number of received cells."
   ::= { pwAtmPerf1DayIntervalEntry 10 }
```

pwAtmPerf1DayIntervalUnknownCells OBJECT-TYPE SYNTAX Counter32 MAX-ACCESS read-only STATUS current DESCRIPTION "Number of cells received from the PSN with unknown VPI or VCI value. This object is relevant only in N:1 mode." ::= { pwAtmPerf1DayIntervalEntry 11 }

-- End of ATM PW Performance table

pwAtmCompliances OBJECT IDENTIFIER ::= { pwAtmConformance 1 }
pwAtmGroups OBJECT IDENTIFIER ::= { pwAtmConformance 2 }

```
pwAtmCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
        "The compliance statement for agent that support
        ATM PW."
MODULE -- this module
    MANDATORY-GROUPS { pwAtmCfgGroup,
                       pwAtmPerfGroup
                     }
   OBJECT pwAtmCfgFarEndMaxCellConcatenation
   MIN-ACCESS read-only
   DESCRIPTION
    "The ability to set this object
    is not required."
   GROUP
                pwAtmOutbound1to1Group
   DESCRIPTION "This group is mandatory only for implementations
                that support the ATM PW 1:1 mode and not using
                Nto1 table."
                pwAtmInbound1to1Group
   GROUP
   DESCRIPTION "This group is mandatory only for implementations
                that support the ATM PW 1:1 mode and not using
                Nto1 table."
   GROUP
                pwAtmOutboundNto1Group
   DESCRIPTION "This group is mandatory only for implementations
                that support the ATM PW N:1 and transparent mode."
   GROUP
                pwAtmInboundNto1Group
   DESCRIPTION "This group is mandatory only for implementations
                that support the ATM PW N:1 and transparent mode."
::= { pwAtmCompliances 2 }
```

-- Units of conformance.

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```
pwAtmCfgGroup OBJECT-GROUP
OBJECTS {pwAtmCfgMaxCellConcatenation,
         pwAtmCfgFarEndMaxCellConcatenation,
         pwAtmCfgTimeoutMode,
         pwAtmClpQosMapping
                 }
STATUS current
DESCRIPTION
          "Collection of objects for basic ATM PW
           config."
::= { pwAtmGroups 5 }
pwAtmPerfGroup OBJECT-GROUP
OBJECTS {pwAtmPerfCurrentMissingPkts,
         pwAtmPerfCurrentPktsReOrder,
         pwAtmPerfCurrentPktsMisOrder,
         pwAtmPerfCurrentPktsTimeout,
         pwAtmPerfCurrentCellsXmit,
         pwAtmPerfCurrentCellsDropped,
         pwAtmPerfCurrentCellsReceived,
         pwAtmPerfCurrentUnknownCells,
         pwAtmPerfIntervalValidData,
         pwAtmPerfIntervalDuration,
         pwAtmPerfIntervalMissingPkts,
         pwAtmPerfIntervalPktsReOrder,
         pwAtmPerfIntervalPktsMisOrder,
         pwAtmPerfIntervalPktsTimeout,
         pwAtmPerfIntervalCellsXmit,
         pwAtmPerfIntervalCellsDropped,
         pwAtmPerfIntervalCellsReceived,
         pwAtmPerfIntervalUnknownCells,
         pwAtmPerf1DayIntervalValidData,
         pwAtmPerf1DayIntervalDuration,
         pwAtmPerf1DayIntervalMissingPkts,
         pwAtmPerf1DayIntervalPktsReOrder,
         pwAtmPerf1DayIntervalPktsMisOrder,
         pwAtmPerf1DayIntervalPktsTimeout,
         pwAtmPerf1DayIntervalCellsXmit,
         pwAtmPerf1DayIntervalCellsDropped,
         pwAtmPerf1DayIntervalCellsReceived,
         pwAtmPerf1DayIntervalUnknownCells
                     }
STATUS current
DESCRIPTION
          "Collection of objects for basic ATM PW Performance."
::= { pwAtmGroups 6 }
```

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```
pwAtmOutbound1to1Group OBJECT-GROUP
OBJECTS {pwAtmOutboundAtmIf,
         pwAtmOutboundVpi,
         pwAtmOutboundVci,
         pwAtmOutboundTrafficParamDescr,
         pwAtmOutboundRowStatus
         }
STATUS current
DESCRIPTION
          "Collection of objects for basic 1:1 ATM PW outbound
           config."
::= { pwAtmGroups 7 }
pwAtmInbound1to1Group OBJECT-GROUP
OBJECTS {pwAtmInboundAtmIf,
         pwAtmInboundVpi,
         pwAtmInboundVci,
         pwAtmInboundTrafficParamDescr,
         pwAtmInboundRowStatus
         }
STATUS current
DESCRIPTION
      "Collection of objects for basic 1:1 ATM PW inbound
       config."
::= { pwAtmGroups 8 }
pwAtmOutboundNto1Group OBJECT-GROUP
OBJECTS {pwAtmOutboundNto1RowStatus,
         pwAtmOutboundNto1TrafficParamDescr,
         pwAtmOutboundNto1MappedVpi,
         pwAtmOutboundNto1MappedVci
                     }
STATUS current
DESCRIPTION
      "Collection of objects for N:1 or 1:1 or transparent
      ATM PW outbound config."
::= { pwAtmGroups 9 }
```

```
pwAtmInboundNto1Group OBJECT-GROUP
OBJECTS {pwAtmInboundNto1RowStatus,
        pwAtmInboundNto1TrafficParamDescr,
        pwAtmInboundNto1MappedVpi,
        pwAtmInboundNto1MappedVci
        }
STATUS current
DESCRIPTION
        "Collection of objects for N:1 or 1:1 or transparent
        ATM PW inbound config."
    ::= { pwAtmGroups 10 }
```

END

<u>10</u>. Security considerations

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

The pwAtmOutboundTable, pwAtmInboundTable, pwAtmCfgTable, pwAtmOutboundNto1Table, and pwAtmInboundNto1Table contain objects of ATM PW parameters on a Provider Edge (PE) device. Unauthorized access to objects in these tables could result in disruption of traffic on the network.

The use of stronger mechanisms such as SNMPv3 security should be considered where possible. Specifically, SNMPv3 VACM and USM MUST be used with any SNMPV3 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:

The pwATMCfgTable, pwAtmPerfCurrentTable, pwAtmPerfIntervalTable and pwAtmPerf1DayIntervalTable collectively show the ATM pseudo wire 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.

<u>11</u>. IANA considerations

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

Descriptor OBJECT IDENTIFIER value

pwATMMIB { mib-2 XXX }

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

<u>12</u>. References

<u>12.1</u>. Normative references

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