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Managed Objects for ATM over Packet Switched Networks (PSNs)

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 Switched Networks (PSNs).

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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1. Introduction

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

The document follows the requirements for Pseudowire Emulation Edge-to-Edge [PWREQ]; it is closely related to [ATMENCAP] and [ATMTRANS], 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 of those is described in Figure 1 and in the "Relation to Other PW-MIB Modules" section listed below. An ATM connection will be a pseudowire (PW) connection. It will not be treated as an interface and will therefore not be represented in the ifTable.

Figure 1: Conceptual Layering

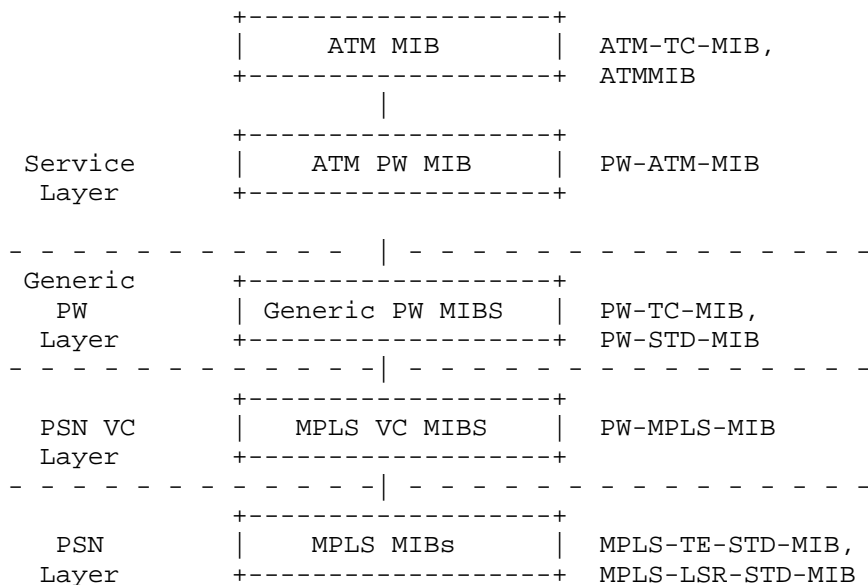


Figure 1

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 RFC 2119 [BCP14].

3. Terminology

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

PSN-bound References the traffic direction where an ATM Cell is received, adapted to the 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 are sent into the ATM network as cells. Within the MIB objects, it is called inbound.
Adaptation	Refers to the method of adapting a "foreign" communications protocol such that it can be carried by a packet switched net (the PSN). For example, in an 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-path-oriented PSN is an IP PSN.

4. 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].

5. Overview

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

- o Fit within the architecture defined by [PWARCH] and [PWMIB].
- o Fit within the model for Virtual Path/Virtual Circuit (VP/VC) definitions and management concept as defined in the [AToM] MIB.
- o Support manually configured ATM PWs.

- o Support automatically configured ATM PWs.
- o Enable the use of any PSN type.
- o Support point-to-point ATM PW connections. Point-to-multipoint and multipoint-to-point connections are for future study.
- o Allow configuration of all the parameters needed to establish a PW to carry ATM cells.
- o Report 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 Support ATM Operations, Administration, and Management (OAM) cells.
- o Do not consider Integrated Local Management Interface (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 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 section 9 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 [PWMIB] for an example of setting up a PSN Tunnel.

The following example illustrates how a user will set up an ATM Adaptation Layer 5 (AAL5) ATM PW on a switch/router with cells entering the switch/router through ATM Interface with IfIndex 1000 [IFMIB], Virtual Path Identifier (VPI) 1 and Virtual Circuit Identifier (VCI) 100 (from an ATM network to a 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 the PW MIB with pwType atmAal5SduVcc(2), then create entries in the pwAtmCfg table, inbound and outbound tables.

```

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          1000    --Outbound AtmIf
  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 a table entry exists 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].

- o PW ATM Cfg Table: A table for generic parameters for ATM PW configuration that is applicable for each ATM PW.
- o PW ATM Outbound Table: There are two 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 [ATMTRANS].

- o PW ATM Inbound Table: There are two 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.
- o PW ATM Perf Table: There are three tables; each contains the relevant time-dependent statistics for an ATM PW Entry. There is a current table, a 15-minute interval table, and a one-day interval table. The tables are aligned with statistic models 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;

pwAtmMIB MODULE-IDENTITY

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Working Group"

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Discussion and general questions should be posed to the PWE3 Working Group (pwe3@ietf.org)."

DESCRIPTION

"This MIB contains managed object definitions for pseudowire emulation of ATM over Packet Switched Networks (PSNs).

This MIB supplements the PW-STD-MIB module.

The PW-STD-MIB contains structures and MIB associations generic to pseudowire (PW) emulation. PW-specific MIBs (such as this) contain config and stats for specific PW types.

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This version of this MIB module is part of RFC 5605;
see the RFC itself for full legal notices.

"

-- Revision history.

REVISION "200906160000Z" -- 16 June 2009
DESCRIPTION "Initial version published as RFC 5605."

::= { mib-2 183 }

-- 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
STATUS current
DESCRIPTION
"This table specifies the information for an ATM PW to be carried over the 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 the 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 }

PwAtmOutboundEntry ::= SEQUENCE {
 pwAtmOutboundAtmIf InterfaceIndex,
 pwAtmOutboundVpi AtmVpIdentifier,
 pwAtmOutboundVci AtmVcIdentifier,
 pwAtmOutboundTrafficParamDescr RowPointer,
 pwAtmOutboundRowStatus RowStatus
 }

pwAtmOutboundAtmIf OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-create

STATUS current

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 that 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 }

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), atmCell11to1Vcc(12), atmCell11to1Vpc(13), 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 [PMMIB]."

INDEX { pwIndex }
 ::= { pwAtmInboundTable 1 }

PwAtmInboundEntry ::= SEQUENCE {
 pwAtmInboundAtmIf InterfaceIndex,
 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, atmCell11to1Vpc, 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 an ATM traffic-parameter-specific row in either a private or standard table that will be employed while transmitting 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 }

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 the PSN. This table is indexed by pwIndex from pwTable. An entry is created for every new 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,
 pwAtmCfgTimeoutMode INTEGER,
 pwAtmClpQosMapping TruthValue
}

pwAtmCfgMaxCellConcatenation 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 the PSN. In a non-LDP or other signaling protocol environment, this object MAY be changed at anytime, but traffic might be interrupted; 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 there is no LDP in use, the object will either return a value of 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 object determines whether or not a packet can be transmitted to the PSN based on timeout expiration for collecting cells. The actual handling of the timeout is implementation-specific; as such, this object may be changed at any time under proper consideration of the traffic interruption effect."

::= { pwAtmCfgEntry 3 }

pwAtmClpQosMapping OBJECT-TYPE

SYNTAX TruthValue
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION

"This object indicates whether the Cell Loss Priority (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 section 12 of [ATMENCAP]."

::= { pwAtmCfgEntry 4 }

-- 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 pwAtmInboundNtolTable. The side effect of such
 -- will be an automatic create of the respective line in the
 -- pwAtmOutboundNtolTable.

-- ATM PW Outbound Table for N to 1 connection

pwAtmOutboundNtolTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwAtmOutboundNtolEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION

"This table specifies the information for an ATM PW to be carried over the 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:
 atmCellNtolVcc(9) or atmCellNtolVpc(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: atmCell1tolVcc(12),
 atmCell1tolVpc(13), atmAal5PduVcc(14),
 atmAal5SduVcc(2), or atmTransparent(3).
 "

::= { pwAtmObjects 6 }

pwAtmOutboundNtolEntry OBJECT-TYPE

SYNTAX PwAtmOutboundNtolEntry

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."

INDEX { pwIndex, pwAtmOutboundNtolAtmIf ,
 pwAtmOutboundNtolVpi,
 pwAtmOutboundNtolVci }

::= { pwAtmOutboundNtolTable 1 }

PwAtmOutboundNtolEntry ::= SEQUENCE {

pwAtmOutboundNtolAtmIf	InterfaceIndex,
pwAtmOutboundNtolVpi	AtmVpIdentifier,
pwAtmOutboundNtolVci	AtmVcIdentifier,
pwAtmOutboundNtolRowStatus	RowStatus,
pwAtmOutboundNtolTrafficParamDescr	RowPointer,
pwAtmOutboundNtolMappedVpi	AtmVpIdentifier,
pwAtmOutboundNtolMappedVci	AtmVcIdentifier

}

pwAtmOutboundNtolAtmIf OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The ATM Interface that receives cells from the ATM network."

::= { pwAtmOutboundNtolEntry 1 }

pwAtmOutboundNtolVpi 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."
 ::= { pwAtmOutboundNtolEntry 2 }

pwAtmOutboundNtolVci OBJECT-TYPE
 SYNTAX AtmVcIdentifier
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "VCI value of this ATM PW. In atmTransparent(3), or
 the VP case, the value will be the equivalent of
 0xFFFF."
 ::= { pwAtmOutboundNtolEntry 3 }

pwAtmOutboundNtolRowStatus 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."
 ::= { pwAtmOutboundNtolEntry 4 }

pwAtmOutboundNtolTrafficParamDescr 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 private or standard table that 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."
 ::= { pwAtmOutboundNtolEntry 5 }

pwAtmOutboundNtolMappedVpi 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 atmCellNtolVcc(9), atmCellNtolVpc(10), atmCell11tolVcc(12), or atmCell11tolVpc(13). In other types, the value will be the equivalent of 0xFFFF. Value MAY be changed when the PW is defined as not active. "

```
::= { pwAtmOutboundNtolEntry 6 }
```

pwAtmOutboundNtolMappedVci OBJECT-TYPE

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 atmCellNtolVcc(9), atmCellNtolVpc(10), atmCell11tolVcc(12), or atmCell11tolVpc(13). In the 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."

```
::= { pwAtmOutboundNtolEntry 7 }
```

-- ATM PW Inbound Table for N to 1 connection

pwAtmInboundNtolTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwAtmInboundNtolEntry

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: atmCellNtolVcc(9) or atmCellNtolVpc(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: atmCell11tolVcc(12), atmCell11tolVpc(13), atmAal5PduVcc(14), atmAal5SduVcc(2), or atmTransparent(3)."

```
::= { pwAtmObjects 7 }
```

pwAtmInboundNtolEntry OBJECT-TYPE

SYNTAX PwAtmInboundNtolEntry

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."

```
INDEX { pwIndex, pwAtmInboundNtolAtmIf ,
        pwAtmInboundNtolVpi,
        pwAtmInboundNtolVci
      }
```

```
::= { pwAtmInboundNtolTable 1 }
```

```
PwAtmInboundNtolEntry ::= SEQUENCE {
    pwAtmInboundNtolAtmIf      InterfaceIndex,
    pwAtmInboundNtolVpi       AtmVpIdentifier,
    pwAtmInboundNtolVci       AtmVcIdentifier,
    pwAtmInboundNtolRowStatus RowStatus,
    pwAtmInboundNtolTrafficParamDescr RowPointer,
    pwAtmInboundNtolMappedVpi  AtmVpIdentifier,
    pwAtmInboundNtolMappedVci  AtmVcIdentifier
  }
```

pwAtmInboundNtolAtmIf OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The ATM Interface that receives cells from the ATM network."

```
::= { pwAtmInboundNtolEntry 1 }
```

pwAtmInboundNtolVpi 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."

```
::= { pwAtmInboundNtolEntry 2 }
```

pwAtmInboundNtolVci OBJECT-TYPE

SYNTAX AtmVcIdentifier

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"VCI value of this ATM PW. In atmTransparent(3), or the VP case, the value will be the equivalent of 0xFFFF."

```
::= { pwAtmInboundNtolEntry 3 }
```

pwAtmInboundNtolRowStatus 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."

::= { pwAtmInboundNtolEntry 4 }

pwAtmInboundNtolTrafficParamDescr 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 that 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."

::= { pwAtmInboundNtolEntry 5 }

pwAtmInboundNtolMappedVpi 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 atmCellNtolVcc(9), atmCellNtolVpc(10), atmCell1tolVcc(12), or atmCell1tolVpc(13). In other types, the value will be the equivalent of 0xFFFF. Value MAY be changed when the PW is defined as not active."

::= { pwAtmInboundNtolEntry 6 }

pwAtmInboundNtolMappedVci 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 atmCellNtolVcc(9), atmCellNtolVpc(10), atmCell1tolVcc(12), or atmCell1tolVpc(13). In the 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."
 ::= { pwAtmInboundNtolEntry 7 }

-- ATM PW Outbound Perf Table

-- The following supplement the counters presented in the
-- PW generic MIB

-- 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-only
    STATUS          current

```

DESCRIPTION

"Number of missing packets (as detected via control word sequence number gaps)."

::= { pwAtmPerfCurrentEntry 1 }

pwAtmPerfCurrentPktsReOrder OBJECT-TYPE

SYNTAX PerfCurrentCount

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

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets detected out of order (via control word sequence numbers)."

::= { pwAtmPerfCurrentEntry 3 }

pwAtmPerfCurrentPktsTimeout OBJECT-TYPE

SYNTAX PerfCurrentCount

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

SYNTAX PerfCurrentCount

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of dropped cells."

::= { pwAtmPerfCurrentEntry 6 }

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

SYNTAX SEQUENCE OF PwAtmPerfIntervalEntry

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,
pwAtmPerfIntervalCellsDropped	PerfIntervalCount,
pwAtmPerfIntervalCellsReceived	PerfIntervalCount,
pwAtmPerfIntervalUnknownCells	PerfIntervalCount
}	

pwAtmPerfIntervalNumber OBJECT-TYPE

SYNTAX Unsigned32 (1..96)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A number (normally between 1 and 96 to cover a 24 hour period) that 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 }

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

SYNTAX PerfIntervalCount
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

SYNTAX PerfIntervalCount
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "Number of packets transmitted due to timeout expiration."
::= { pwAtmPerfIntervalEntry 7 }

pwAtmPerfIntervalCellsXmit OBJECT-TYPE

SYNTAX PerfIntervalCount
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
STATUS          current
DESCRIPTION
  "Number of received cells."
  ::= { pwAtmPerfIntervalEntry 10 }

```

pwAtmPerfIntervalUnknownCells OBJECT-TYPE

```

SYNTAX          PerfIntervalCount
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 one-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)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The number of intervals, 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

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."

::= { 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 that 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

SYNTAX Counter32

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 values. 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 agents 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 pwAtmOutbound1tolGroup

DESCRIPTION "This group is mandatory only for implementations that support the ATM PW 1:1 mode and not using the Ntol table."

GROUP pwAtmInbound1tolGroup

DESCRIPTION "This group is mandatory only for implementations that support the ATM PW 1:1 mode and not using the Ntol table."

GROUP pwAtmOutboundNtolGroup

DESCRIPTION "This group is mandatory only for implementations
that support the ATM PW N:1 and transparent mode."

GROUP pwAtmInboundNtolGroup

DESCRIPTION "This group is mandatory only for implementations
that support the ATM PW N:1 and transparent mode."

::= { pwAtmCompliances 2 }

-- Units of conformance.

pwAtmCfgGroup OBJECT-GROUP

OBJECTS {pwAtmCfgMaxCellConcatenation,
pwAtmCfgFarEndMaxCellConcatenation,
pwAtmCfgTimeoutMode,
pwAtmClpQosMapping
}

STATUS current

DESCRIPTION

"Collection of objects for basic ATM PW
configuration."

::= { 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 }

pwAtmOutbound1to1Group OBJECT-GROUP
OBJECTS {pwAtmOutboundAtmIf,
        pwAtmOutboundVpi,
        pwAtmOutboundVci,
        pwAtmOutboundTrafficParamDescr,
        pwAtmOutboundRowStatus
    }
STATUS current
DESCRIPTION
    "Collection of objects for basic 1:1 ATM PW outbound
    configuration."
::= { pwAtmGroups 7 }

pwAtmInbound1to1Group OBJECT-GROUP
OBJECTS {pwAtmInboundAtmIf,
        pwAtmInboundVpi,
        pwAtmInboundVci,
        pwAtmInboundTrafficParamDescr,
        pwAtmInboundRowStatus
    }
STATUS current
DESCRIPTION
    "Collection of objects for basic 1:1 ATM PW inbound
    configuration."
::= { pwAtmGroups 8 }

pwAtmOutboundNto1Group OBJECT-GROUP
OBJECTS {pwAtmOutboundNto1RowStatus,
        pwAtmOutboundNto1TrafficParamDescr,
        pwAtmOutboundNto1MappedVpi,
        pwAtmOutboundNto1MappedVci
    }
STATUS current
DESCRIPTION
    "Collection of objects for N:1, 1:1, or transparent
    ATM PW outbound configuration."
::= { pwAtmGroups 9 }

```



```
pwAtmInboundNtolGroup OBJECT-GROUP
OBJECTS {pwAtmInboundNtolRowStatus,
         pwAtmInboundNtolTrafficParamDescr,
         pwAtmInboundNtolMappedVpi,
         pwAtmInboundNtolMappedVci
        }
STATUS current
DESCRIPTION
    "Collection of objects for N:1, 1:1, or transparent
     ATM PW inbound configuration."
 ::= { pwAtmGroups 10 }
```

END

10. 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, pwAtmOutboundNtolTable, and pwAtmInboundNtolTable 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 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.

11. 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-2 183 }

12. References

12.1. Normative References

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13. Acknowledgements

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