ATM-Based xDSL Bonded Interfaces MIB
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Abstract

This document defines Management Information Base (MIB) module for use with network management protocols in TCP/IP based networks. This document proposes an extension to the GBOND-MIB module with a set of objects for managing ATM-based multi-pair bonded xDSL interfaces, defined in ITU-T recommendation G.998.1.

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1. Introduction

The ATM-Based Multi-Pair Bonding, a.k.a. G.Bond/ATM, is specified in ITU-T G.998.1 recommendation [G.998.1], which defines a method for bonding (or aggregating) of multiple xDSL lines (or individual bearer channels in multiple xDSL lines) into a single bi-directional logical link carrying an ATM stream.

This specification can be viewed as an evolution of the legacy Inverse Multiplexing over ATM (IMA) technology [af-phy-0086], applied to xDSL with variable rates on each line/bearer channel. As with the other bonding schemes, ATM bonding also allows bonding of up to 32 individual sub-layers with variable rates, providing common functionality for the configuration, initialization, operation and monitoring of the bonded link.

The MIB module, defined in this document, defines a set of managed objects for the management of G.998.1 bonded interfaces, extending the common objects specified in the GBOND-MIB [I-D.ietf-adslmib-gbond-mib] module.

2. The Internet-Standard Management Framework

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

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

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 [RFC2119].

3. The DSL Forum Management Framework for xDSL Bonding

This document makes use of the DSL Forum technical report Management Framework for xDSL Bonding [TR-159], defining a management model and a hierarchy of management objects for the bonded xDSL interfaces.
4. Relationship to other MIB modules

This section outlines the relationship of the MIB modules defined in this document with other MIB modules described in the relevant RFCs. Specifically, the following MIB modules are discussed: Interfaces Group MIB (IF-MIB) and G.Bond MIB (GBOND-MIB).

4.1. Relationship to Interfaces Group MIB module

A G.Bond/ATM port is a private case of a Bonded multi-pair xDSL interface and as such is managed using generic interface management objects defined in the IF-MIB [RFC2863]. In particular an interface index (ifIndex) is used to index instances of G.Bond/ATM ports, as well as xDSL lines/channels, in a managed system.

4.2. Relationship to G.Bond MIB module

GBOND-MIB [I-D.ietf-adslmib-gbond-mib] module defines management objects common for all Bonded multi-pair xDSL interfaces. In particular it describes the bonding management, bonded port and channel configuration, initialization sequence etc.

Both GBOND-MIB and GBOND-ATM-MIB modules are REQUIRED to manage a G.Bond/ATM port.

4.3. Relationship to ATM MIB module

ATM-MIB [RFC2515] module defines management objects for an ATM interface.

ATM-MIB module can be used to manage the ATM aspects of a G.Bond/ATM port.

5. MIB Structure

5.1. Overview

All management objects defined in the GBOND-ATM-MIB module are contained in a single group gBondAtmPort. This group is further split into 4 sub-groups, structured as recommended by RFC 4181 [RFC4181]:

- gBondTdimPortNotifications - containing notifications (Up/Downstream Diff. Delay Tolerance Exceeded).
- gBondAtmPortConfTable - containing objects for configuration of a G.Bond/ATM port.
o gBondAtmPortStatusTable - containing objects providing overall status information of a G.Bond/ATM port, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-MIB.

o gBondAtmPM - containing objects providing historical performance monitoring (PM) information of a G.Bond/ATM port, complementing the PM information from the gBondPortPM of GBOND-MIB.

Note that the rest of the objects for the Generic Bonded Sub-layer (GBS) port configuration, capabilities, status, notifications and performance monitoring is located in the GBOND-MIB module.

5.2. Performance Monitoring

The OPTIONAL performance monitoring counters, thresholds and history buckets (interval-counters) are implemented using the textual conventions defined in the HC-PerfHist-TC-MIB [RFC3705]. The HC-PerfHist-TC-MIB defines 64-bit versions of the textual conventions found in PerfHist-TC-MIB [RFC3593].

The agent SHOULD align the beginning of each interval to a fifteen minute boundary of a wall clock. Likewise, the beginning of each one day intervals SHOULD be aligned with the start of a day.

Counters are not reset when a GBS is reinitialized, but rather only when the agent is reset or reinitialized (or under specific request outside the scope of this MIB module).

5.3. Mapping of Broadband Forum TR-159 Managed Objects

This section contains the mapping between relevant managed objects (attributes) defined in [TR-159] and the managed objects defined in this document.
Table 1: Mapping of TR-159 Managed Objects

6. G.Bond/ATM MIB Definitions

GBOND-ATM-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY,
  OBJECT-TYPE,
  NOTIFICATION-TYPE,
  mib-2,
  Unsigned32,
  Counter32
  FROM SNMPv2-SMI -- [RFC2578]
  TEXTUAL-CONVENTION,
  TruthValue
  FROM SNMPv2-TC -- [RFC2579]
  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  NOTIFICATION-GROUP
FROM SNMPv2-CONF -- [RFC2580]
ifIndex
FROM IF-MIB -- [RFC2863]
HCPerfCurrentCount,
HCPerfIntervalCount,
HCPerfValidIntervals,
HCPerfInvalidIntervals,
HCPerfTimeElapsed
FROM HC-PerfHist-TC-MIB -- [RFC3705]
;

-- gBondAtmMIB MODULE-IDENTITY
LAST-UPDATED "201103140000Z" -- Mar 14, 2011
ORGANIZATION "IETF ADSL MIB Working Group"
CONTACT-INFO
"WG charter:

Mailing Lists:
General Discussion: adslmib@ietf.org
To Subscribe: adslmib-request@ietf.org
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DESCRIPTION
"The objects in this MIB module are used to manage the
multi-pair bonded xDSL Interfaces using ATM inverse
multiplexing, defined in ITU-T recommendation G.998.1
(G.Bond/ATM).

This MIB module MUST be used in conjunction with GBOND-MIB
module, common to all G.Bond technologies."
The following references are used throughout this MIB module:

[G.998.1] refers to:
ITU-T Recommendation G.998.1: 'ATM-based multi-pair bonding',
January 2005.

[TR-159] refers to:
xDSL Bonding', December 2008.

Naming Conventions:
ATM   - Asynchronous Transfer Mode
BCE   - Bonding Channel Entity
BTU   - Bonding Terminating Unit
CO    - Central Office
CPE   - Customer Premises Equipment
GBS   - Generic Bonding Sublayer
GBS-C - Generic Bonded Sub-layer, CO side
GBS-R - Generic Bonded Sub-layer, RT (or CPE) side
PM    - Performance Monitoring
RT    - Remote Terminal
SNR   - Signal to Noise Ratio
SES   - Severely Errored Seconds
US    - Unavailable Seconds

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

REVISION "201103140000Z" -- Mar 14, 2011
DESCRIPTION "Initial version, published as RFC YYYY."

-- EdNote: Replace YYYY with the actual RFC number &
-- remove this note
::= { mib-2 ZZZ }

-- EdNote: Replace ZZZ with a real OID once it is
-- allocated & remove this note.

-- Sections of the module
-- Structured as recommended by [RFC4181], Appendix D

gBondAtmObjects OBJECT IDENTIFIER ::= { gBondAtmMIB 1 }
gBondAtmConformance OBJECT IDENTIFIER ::= { gBondAtmMIB 2 }

-- Groups in the module
gBondAtmPort OBJECT IDENTIFIER ::= { gBondAtmObjects 1 }

-- Textual Conventions

MilliSeconds ::= TEXTUAL-CONVENTION
  DISPLAY-HINT "d"
  STATUS current
  DESCRIPTION "Represents time unit value in milliseconds."
  SYNTAX Unsigned32

-- Port Notifications Group

gBondAtmPortNotifications OBJECT IDENTIFIER ::= { gBondAtmPort 0 }

gBondAtmUpDiffDelayToleranceExceeded NOTIFICATION-TYPE
  OBJECTS {
    gBondAtmUpDiffDelayTolerance,
    gBondAtmMaxUpDiffDelay
  }
  STATUS current
  DESCRIPTION "This notification indicates that the maximum upstream
differential delay has exceeded the max upstream differential
delay threshold, specified by gBondAtmUpDiffDelayTolerance.

  This notification MAY be sent for the GBS-C ports while the
port is up, on the crossing event in both directions: from
normal (diff. delay is above the threshold) to low (diff. delay
equals the threshold or below it) and from low to normal. This notification is not applicable to the GBS-R
ports.

  Generation of this notification is controlled by the
gBondAtmDiffDelayToleranceExceededEnable attribute.

  This object maps to the TR-159 notification
  nIMAUpDiffDelayToleranceExceeded."
  REFERENCE "[TR-159] 5.5.2.8"
  ::= { gBondAtmPortNotifications 1 }

gBondAtmDnDiffDelayToleranceExceeded NOTIFICATION-TYPE
  OBJECTS {
    gBondAtmDnDiffDelayTolerance,
    gBondAtmMaxDnDiffDelay
  }
  STATUS current
  DESCRIPTION "This notification indicates that the maximum downstream
differential delay has exceeded the max downstream differential
delay threshold, specified by gBondAtmDnDiffDelayTolerance."

  This notification MAY be sent for the GBS-C ports while the
port is up, on the crossing event in both directions: from
normal (diff. delay is below the threshold) to high (diff. delay
equals the threshold or above it) and from high to normal. This notification is not applicable to the GBS-R
ports.

  Generation of this notification is controlled by the
gBondAtmDiffDelayToleranceExceededEnable attribute.

  This object maps to the TR-159 notification
  nIMAxDnDiffDelayToleranceExceeded."
  REFERENCE "[TR-159] 5.5.2.8"
  ::= { gBondAtmPortNotifications 1 }
gBondAtmMaxDnDiffDelay

}  
STATUS   current
DESCRIPTION

"This notification indicates that the maximum downstream
differential delay has exceeded the max downstream
differential delay threshold, specified by
\textit{gBondAtmDnDiffDelayTolerance}.

This notification \textit{MAY} be sent for the GBS-C ports while the
port is up, on the crossing event in both directions: from
normal (diff. delay is above the threshold) to low (diff.
delay equals the threshold or below it) and from low to
normal. This notification is not applicable to the GBS-R
ports.

Generation of this notification is controlled by the
\textit{gBondAtmDiffDelayToleranceExceededEnable} attribute.

This object maps to the TR-159 notification
\textit{nIMADownDiffDelayToleranceExceeded}.

REFERENCE

\textit{[TR-159] 5.5.2.9}
::= { gBondAtmPortNotifications 2 }

-- G.Bond/ATM Port group

gBondAtmPortConfTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondAtmPortConfEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

"Table for Configuration of G.Bond/ATM ports. Entries in
this table MUST be maintained in a persistent manner"
::= { gBondAtmPort 1 }

gBondAtmPortConfEntry OBJECT-TYPE
SYNTAX      GBondAtmPortConfEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

"An entry in the G.Bond/ATM Port Configuration table.
Each entry represents a G.Bond/ATM port indexed by the
\textit{ifIndex}. Additional configuration parameters are available
via the \textit{gBondPortConfEntry} of GBOND-MIB.
Note that a G.Bond/ATM port runs on top of a single or
multiple BCE port(s), which are also indexed by \textit{ifIndex}.
"  
INDEX  { ifIndex }
::= { gBondAtmPortConfTable 1 }

GBondAtmPortConfEntry ::= 
SEQUENCE {
  gBondAtmUpDiffDelayTolerance MilliSeconds,
  gBondAtmDnDiffDelayTolerance MilliSeconds,
  gBondAtmDiffDelayToleranceExceededEnable TruthValue
}

gBondAtmUpDiffDelayTolerance OBJECT-TYPE
SYNTAX MilliSeconds(0..2047)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"A maximum tolerated upstream differential delay (among the member BCEs) of a G.Bond/ATM port, expressed in ms.

This object is read-write for the GBS-C and irrelevant for the GBS-R ports.

This object maps to TR-159 attribute aIMAUpDiffDelayTolerance"
REFERENCE
"[TR-159] 5.5.2.5; [G.998.1] 11.4.1 (6)"
::= { gBondAtmPortConfEntry 1 }

gBondAtmDnDiffDelayTolerance OBJECT-TYPE
SYNTAX MilliSeconds(0..2047)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"A maximum tolerated downstream differential delay (among the member BCEs) of a G.Bond/ATM port, expressed in ms.

This object is read-write for the GBS-C and irrelevant for the GBS-R ports.

This object maps to TR-159 attribute aIMADownDiffDelayTolerance"
REFERENCE
"[TR-159] 5.5.2.6; [G.998.1] 11.4.1 (6)"
::= { gBondAtmPortConfEntry 2 }

gBondAtmDiffDelayToleranceExceededEnable OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"Indicates whether gBondAtmUpDiffDelayToleranceExceeded and gBondAtmDnDiffDelayToleranceExceeded notifications should be generated for G.Bond/ATM port.

Value of true(1) indicates that the notifications are enabled.
Value of false(2) indicates that the notifications are disabled.

This object is read-write for the GBS-C and irrelevant for the GBS-R ports.
This object MUST be maintained in a persistent manner.

This object maps to the TR-159 attribute aIMADiffDelayToleranceExceededEnable."
REFERENCE
"[TR-159] 5.5.5.7"
::= { gBondAtmPortConfEntry 3 }

gBondAtmPortStatusTable OBJECT-TYPE
SYNTAX       SEQUENCE OF GBondAtmPortStatusEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"This table provides overall status information of G.Bond/ATM ports, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-MIB. Additional status information about connected BCEs is available from the relevant line MIBs.

This table contains live data from the equipment. As such, it is NOT persistent."
::= { gBondAtmPort 2 }

gBondAtmPortStatusEntry OBJECT-TYPE
SYNTAX       GBondAtmPortStatusEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"An entry in the G.Bond/ATM port Status table.
Each entry represents a G.Bond/ATM port indexed by the ifIndex.
Note that a GBS port runs on top of a single or multiple BCE port(s), which are also indexed by ifIndex."
INDEX  { ifIndex }
::= { gBondAtmPortStatusTable 1 }
GBondAtmPortStatusEntry ::= SEQUENCE {
  gBondAtmRxLostCells            Counter32,
  gBondAtmTxLostCells            Counter32,
  gBondAtmMaxUpDiffDelay         Unsigned32,
  gBondAtmMaxDnDiffDelay         Unsigned32
}

gBondAtmRxLostCells  OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION  "The number of lost ATM cells detected by the G.Bond/ATM port
in the receive direction, i.e. upstream direction for
a GBS-C port.

Discontinuities in the value of this counter can occur at
re-initialization of the management system, and at other times
as indicated by the value of ifCounterDiscontinuityTime,
defined in IF-MIB.

This object maps to TR-159 attribute aIMARxLostCells."
REFERENCE
 "[TR-159] 5.5.2.1; [G.998.1] 11.4.2 (4)"
::= { gBondAtmPortStatusEntry 1 }

gBondAtmTxLostCells  OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION  "The number of lost ATM cells detected by the peer G.Bond/ATM
port in the receive direction, e.g. downstream direction for a
GBS-C port.

This object is read only for the GBS-C ports and irrelevant
for the GBS-R ports.

Discontinuities in the value of this counter can occur at
re-initialization of the management system, and at other times
as indicated by the value of ifCounterDiscontinuityTime,
defined in IF-MIB.

This object maps to TR-159 attribute aIMAPeerRxLostCells."
REFERENCE
 "[TR-159] 5.5.2.1; [G.998.1] 11.4.2 (4)"
::= { gBondAtmPortStatusEntry 2 }
gBondAtmMaxUpDiffDelay  OBJECT-TYPE
SYNTAX      Unsigned32
UNITS       "0.1 ms"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
 "Current maximum upstream differential delay between all
operational BCEs in the G.Bond/ATM bonding group, measured in
units of 0.1ms.

This object is read-only for the GBS-C and irrelevant for
the GBS-R ports.

This object maps to TR-159 attribute aIMAMaxUpDiffDelay."
REFERENCE
 "[TR-159] 5.5.2.3"
 ::= { gBondAtmPortStatusEntry 3 }

::= { gBondAtmPortStatusEntry 3 }

------------------------------
-- Performance Monitoring group
------------------------------

-- Performance Monitoring group
for a G.Bond/ATM port. This table contains live data from the
equipment and as such is NOT persistent.

::= { gBondAtmPM 1 }

gBondAtmPortPerfCurrEntry OBJECT-TYPE
SYNTAX      GBondAtmPortPerfCurrEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"An entry in the G.Bond/ATM Port PM table.
Each entry represents a G.Bond/ATM port indexed by the
ifIndex."
INDEX  { ifIndex }
::= { gBondAtmPortPerfCurrTable 1 }

GBondAtmPortPerfCurrEntry ::= SEQUENCE {
gBondAtmPortPerf15MinValidIntervals      HCPerfValidIntervals,
gBondAtmPortPerf15MinInvalidIntervals    HCPerfInvalidIntervals,
gBondAtmPortPerfCurr15MinTimeElapsed     HCPerfTimeElapsed,
gBondAtmPortPerfCurr15MinRxLostCells     HCPerfCurrentCount,
gBondAtmPortPerfCurr15MinTxLostCells     HCPerfCurrentCount,
gBondAtmPortPerfCurr15MinUpDiffDelay     HCPerfCurrentCount,
gBondAtmPortPerfCurr15MinDnDiffDelay     HCPerfCurrentCount,
gBondAtmPortPerf1DayValidIntervals       Unsigned32,
gBondAtmPortPerf1DayInvalidIntervals     Unsigned32,
gBondAtmPortPerfCurr1DayTimeElapsed      HCPerfTimeElapsed,
gBondAtmPortPerfCurr1DayRxLostCells      HCPerfCurrentCount,
gBondAtmPortPerfCurr1DayTxLostCells      HCPerfCurrentCount,
gBondAtmPortPerfCurr1DayUpDiffDelay      HCPerfCurrentCount,
gBondAtmPortPerfCurr1DayDnDiffDelay      HCPerfCurrentCount
}

gBondAtmPortPerf15MinValidIntervals  OBJECT-TYPE
SYNTAX      HCPerfValidIntervals
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only number of 15-minute intervals for which the
performance data was collected. The value of this object will
be 96 or the maximum number of 15-minute history intervals
collected by the implementation unless the measurement was
(re-)started recently, in which case the value will be the
number of complete 15 minutes intervals for which there are at
least some data.
In certain cases it is possible that some intervals are
unavailable. In this case, this object reports the maximum
interval number for which data is available."
This object partially maps to the TR-159 attribute
aGroupPerf15MinValidIntervals."
REFERENCE
"[TR-159] 5.5.1.32"
::= { gBondAtmPortPerfCurrEntry 1 }

gBondAtmPortPerf15MinInvalidIntervals OBJECT-TYPE
SYNTAX      HCPerfInvalidIntervals
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only number of 15-minute intervals for which the
performance data was not always available. The value will
typically be zero except in cases where the data for some
intervals are not available.

This object partially maps to the TR-159 attribute
aGroupPerf15MinInvalidIntervals."
REFERENCE
"[TR-159] 5.5.1.33"
::= { gBondAtmPortPerfCurrEntry 2 }

gBondAtmPortPerfCurr15MinTimeElapsed OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of seconds that have elapsed since the
beginning of the current 15-minute performance interval.

This object partially maps to the TR-159 attribute
aGroupPerfCurr15MinTimeElapsed."
REFERENCE
"[TR-159] 5.5.1.34"
::= { gBondAtmPortPerfCurrEntry 3 }

gBondAtmPortPerfCurr15MinRxLostCells OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of lost ATM cells detected by a G.Bond/ATM
port (e.g. GBS-C) in the receive direction, during the current
15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the
gBondAtmRxBLostCells object.
This object is inhibited during Severely Errored Seconds (SES) or Unavailable Seconds (UAS).

REFERENCE

"[TR-159] 5.5.2.1"
::= { gBondAtmPortPerfCurrEntry 4}

gBondAtmPortPerfCurr15MinTxLostCells OBJECT-TYPE
SYNTAX       HCPerfCurrentCount
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"A read-only count of lost ATM cells detected by the peer G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the current 15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the gBondAtmTxLostCells object.

This object is inhibited during Unavailable Seconds (UAS).

REFERENCE

"[TR-159] 5.5.2.2"
::= { gBondAtmPortPerfCurrEntry 5}

gBondAtmPortPerfCurr15MinUpDiffDelay OBJECT-TYPE
SYNTAX       HCPerfCurrentCount
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1ms, during the current 15-minute performance interval.

Note that the current max upstream differential delay is indicated by the gBondAtmMaxUpDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS).

REFERENCE

"[TR-159] 5.5.2.3"
::= { gBondAtmPortPerfCurrEntry 6}

gBondAtmPortPerfCurr15MinDnDiffDelay OBJECT-TYPE
SYNTAX       HCPerfCurrentCount
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS-C (as perceived
by GBS-R), measured in units of 0.1ms, during the current
15-minute performance history interval.

Note that the current max downstream differential delay is
indicated by the gBondAtmMaxDnDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."
REFERENCE
"[TR-159] 5.5.2.4"
::= { gBondAtmPortPerfCurrEntry 7}

gBondAtmPortPerf1DayValidIntervals  OBJECT-TYPE
SYNTAX      Unsigned32 (0..7)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only number of 1-day intervals for which data was
collected. The value of this object will be 7 or the maximum
number of 1-day history intervals collected by the
implementation unless the measurement was (re-)started recently,
in which case the value will be the number of complete 1-day
intervals for which there are at least some data.
In certain cases it is possible that some intervals are
unavailable. In this case, this object reports the maximum
interval number for which data is available."
REFERENCE
"[TR-159] 5.5.1.45"
::= { gBondAtmPortPerfCurrEntry 8 }

gBondAtmPortPerf1DayInvalidIntervals  OBJECT-TYPE
SYNTAX      Unsigned32 (0..7)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only number of 1-day intervals for which data was
not always available. The value will typically be zero except in
cases where the data for some intervals are not available."
REFERENCE
"[TR-159] 5.5.1.46"
::= { gBondAtmPortPerfCurrEntry 9 }

gBondAtmPortPerf1DayTimeElapsed  OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of seconds that have elapsed since the
beginning of the current 1-day performance interval."
REFERENCE
"[TR-159] 5.5.1.47"
:= { gBondAtmPortPerfCurrEntry 10 }
gBondAtmPortPerfCurr1DayRxLostCells OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of lost ATM cells detected by the G.Bond/ATM port (e.g. GBS-C), during the current 1-day performance interval.

This object is inhibited during Severely Errored Seconds (SES) and Unavailable Seconds (UAS)."
:= { gBondAtmPortPerfCurrEntry 11 }
gBondAtmPortPerfCurr1DayTxLostCells OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only count of lost ATM cells detected by the peer G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the current 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
:= { gBondAtmPortPerfCurrEntry 12 }
gBondAtmPortPerfCurr1DayUpDiffDelay OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1ms, during the current 1-day performance interval.

This object is inhibited during Unavailable Seconds (UAS)."
:= { gBondAtmPortPerfCurrEntry 13 }
gBondAtmPortPerfCurr1DayDnDiffDelay OBJECT-TYPE
SYNTAX      HCPerfCurrentCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A read-only value specifying maximum downstream differential
delay between all operational BCEs in the GBS-C, measured in units of 0.1ms, during the current 1-day performance interval.

This object is inhibited during Unavailable Seconds (UAS).

::= { gBondAtmPortPerfCurrEntry 14 }

-- Port PM history: 15-min buckets

gBondAtmPortPerf15MinTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondAtmPortPerf15MinEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "This table contains historical 15-minute buckets of Performance Monitoring information for a G.Bond/ATM port (a row for each 15-minute interval, up to 96 intervals). Entries in this table MUST be maintained in a persistent manner."
::= { gBondAtmPM 2 }

gBondAtmPortPerf15MinEntry OBJECT-TYPE
SYNTAX      GBondAtmPortPerf15MinEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "An entry in the G.Bond/ATM Port historical 15-minute PM table. Each entry represents performance monitoring data for a G.Bond/ATM port, indexed by ifIndex, collected during a particular 15-minute interval, indexed by gBondAtmPortPerf15MinIntervalIndex."
INDEX  { ifIndex, gBondAtmPortPerf15MinIntervalIndex }
::= { gBondAtmPortPerf15MinTable 1 }

GBondAtmPortPerf15MinEntry ::= SEQUENCE {
  gBondAtmPortPerf15MinIntervalIndex       Unsigned32,
  gBondAtmPortPerf15MinIntervalMoniTime    HCPerfTimeElapsed,
  gBondAtmPortPerf15MinIntervalRxLostCells HCPerfIntervalCount,
  gBondAtmPortPerf15MinIntervalTxLostCells HCPerfIntervalCount,
  gBondAtmPortPerf15MinIntervalUpDiffDelay HCPerfIntervalCount,
  gBondAtmPortPerf15MinIntervalDnDiffDelay HCPerfIntervalCount,
  gBondAtmPortPerf15MinIntervalValid       TruthValue
}

gBondAtmPortPerf15MinIntervalIndex  OBJECT-TYPE
SYNTAX      Unsigned32 (1..96)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Performance Data Interval number. 1 is the most recent previous
interval; interval 96 is 24 hours ago.
Intervals 2..96 are OPTIONAL.

This object partially maps to the TR-159 attribute
aGroupPerf15MinIntervalNumber."

REFERENCE
"[TR-159] 5.5.1.57"
::= { gBondAtmPortPerf15MinEntry 1 }

--
gBondAtmPortPerf15MinIntervalMoniTime  OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
MAX-ACCESS  read-only
STATUS      current

DESCRIPTION
"A read-only count of seconds over which the performance data
was actually monitored. This value will be the same as the
interval duration (900 seconds), except in a situation where
performance data could not be collected for any reason."
::= { gBondAtmPortPerf15MinEntry 2 }

--
gBondAtmPortPerf15MinIntervalRxLostCells  OBJECT-TYPE
SYNTAX      HCPerfIntervalCount
MAX-ACCESS  read-only
STATUS      current

DESCRIPTION
"A read-only count of lost ATM cells detected by a G.Bond/ATM
port (e.g. GBS-C) in the receive direction, during the
15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the
gBondAtmRxLostCells object.

This object is inhibited during Severely Errored Seconds (SES)
or Unavailable Seconds (UAS)."

REFERENCE
"[TR-159] 5.5.2.1"
::= { gBondAtmPortPerf15MinEntry 3 }

--
gBondAtmPortPerf15MinIntervalTxLostCells  OBJECT-TYPE
SYNTAX      HCPerfIntervalCount
MAX-ACCESS  read-only
STATUS      current

DESCRIPTION
"A read-only count of lost ATM cells detected by the peer
G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the 15-minute
performance history interval."
Note that the total number of lost ATM cells is indicated by the gBondAtmTxLostCells object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE
"[TR-159] 5.5.2.2"
::= { gBondAtmPortPerf15MinEntry 4 }

gBondAtmPortPerf15MinIntervalUpDiffDelay OBJECT-TYPE
SYNTAX  HCPerfIntervalCount
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS, measured in units of 0.1ms, during the 15-minute performance history interval.

Note that the current max upstream differential delay is indicated by the gBondAtmMaxUpDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE
"[TR-159] 5.5.2.3"
::= { gBondAtmPortPerf15MinEntry 5 }

gBondAtmPortPerf15MinIntervalDnDiffDelay OBJECT-TYPE
SYNTAX  HCPerfIntervalCount
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS, as perceived by its peer port, measured in units of 0.1ms, during the 15-minute performance history interval.

Note that the current max upstream differential delay is indicated by the gBondAtmMaxDnDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE
"[TR-159] 5.5.2.4"
::= { gBondAtmPortPerf15MinEntry 6 }

gBondAtmPortPerf15MinIntervalValid OBJECT-TYPE
SYNTAX  TruthValue
MAX-ACCESS read-only
STATUS   current
DESCRIPTION

"A read-only object indicating whether or not this history bucket contains valid data. Valid bucket is reported as true(1) and invalid bucket as false(2).

If this history bucket is invalid the BTU MUST NOT produce notifications based upon the value of the counters in this bucket.

Note that an implementation may decide not to store invalid history buckets in its data base. In such case this object is not required as only valid history buckets are available while invalid history buckets are simply not in the data base.

This object partially maps to the TR-159 attribute aGroupPerf15MinIntervalValid."

REFERENCE

"[TR-159] 5.5.1.58"
::= { gBondAtmPortPerf15MinEntry 7 }

-- Port PM history: 1-day buckets

gBondAtmPortPerf1DayTable OBJECT-TYPE
SYNTAX      SEQUENCE OF GBondAtmPortPerf1DayEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

"This table contains historical 1-day buckets of Performance Monitoring information for a G.Bond/ATM port (a row for each 1-day interval, up to 7 intervals).

Entries in this table MUST be maintained in a persistent manner."
::= { gBondAtmPM 3 }

GBondAtmPortPerf1DayEntry OBJECT-TYPE
SYNTAX      GBondAtmPortPerf1DayEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

"An entry in the G.Bond/ATM port historical 1-day PM table. Each entry represents performance monitoring data for such port, indexed by ifIndex, collected during a particular 1-day interval, indexed by gBondAtmPortPerf1DayIntervalIndex."
INDEX  { ifIndex, gBondAtmPortPerf1DayIntervalIndex }
::= { gBondAtmPortPerf1DayTable 1 }

GBondAtmPortPerf1DayEntry ::= SEQUENCE {
    gBondAtmPortPerf1DayIntervalIndex  Unsigned32,
    gBondAtmPortPerf1DayIntervalMoniTime  HCPerfTimeElapsed,
    gBondAtmPortPerf1DayIntervalRxLostCells  HCPerfIntervalCount,
gBondAtmPortPerf1DayIntervalTxLostCells  HCPerfIntervalCount,
gBondAtmPortPerf1DayIntervalUpDiffDelay  HCPerfIntervalCount,
gBondAtmPortPerf1DayIntervalDnDiffDelay  HCPerfIntervalCount,
gBondAtmPortPerf1DayIntervalValid  TruthValue
}

```
gBondAtmPortPerf1DayIntervalIndex  OBJECT-TYPE
SYNTAX  Unsigned32 (1..7)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "Performance Data Interval number. 1 is the most recent previous
  interval; interval 7 is 24 hours ago. Intervals 2..7 are OPTIONAL.

  This object partially maps to the TR-159 attribute
  aGroupPerf1DayIntervalNumber."
REFERENCE
  "[TR-159] 5.5.1.62"
::= { gBondAtmPortPerf1DayEntry 1 }
```

```
gBondAtmPortPerf1DayIntervalMoniTime  OBJECT-TYPE
SYNTAX      HCPerfTimeElapsed
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A read-only count of seconds over which the performance data
  was actually monitored. This value will be the same as the
  interval duration (86400 seconds), except in a situation where
  performance data could not be collected for any reason.

  This object partially maps to the TR-159 attribute
  aGroupPerf1DayIntervalMoniSecs."
REFERENCE
  "[TR-159] 5.5.1.64"
::= { gBondAtmPortPerf1DayEntry 2 }
```

```
gBondAtmPortPerf1DayIntervalRxLostCells  OBJECT-TYPE
SYNTAX      HCPerfIntervalCount
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A read-only count of lost ATM cells detected by the G.Bond/ATM
  port (e.g. GBS-C), during the 1-day performance history interval.

  This object is inhibited during Severely Errored Seconds (SES)
  and Unavailable Seconds (UAS)."
::= { gBondAtmPortPerf1DayEntry 3 }
```
gBondAtmPortPerf1DayIntervalTxLostCells OBJECT-TYPE
SYNTAX    HCPerfIntervalCount
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"A read-only count of lost ATM cells detected by the peer
G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the 1-day
performance history interval. This object is inhibited during Unavailable Seconds (UAS)."
 ::= { gBondAtmPortPerf1DayEntry 4 }

gBondAtmPortPerf1DayIntervalUpDiffDelay OBJECT-TYPE
SYNTAX    HCPerfIntervalCount
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"A read-only value specifying maximum upstream differential
delay between all operational BCEs in the GBS-C, measured in
units of 0.1ms, during the 1-day performance history interval. This object is inhibited during Unavailable Seconds (UAS)."
 ::= { gBondAtmPortPerf1DayEntry 5 }

gBondAtmPortPerf1DayIntervalDnDiffDelay OBJECT-TYPE
SYNTAX    HCPerfIntervalCount
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"A read-only value specifying maximum downstream differential
delay between all operational BCEs in the GBS-C, measured in
units of 0.1ms, during the 1-day performance history interval. This object is inhibited during Unavailable Seconds (UAS)."
 ::= { gBondAtmPortPerf1DayEntry 6 }

gBondAtmPortPerf1DayIntervalValid OBJECT-TYPE
SYNTAX    TruthValue
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"A read-only object indicating whether or not this history
bucket contains valid data. Valid bucket is reported as true(1)
and invalid bucket as false(2). If this history bucket is invalid the BTU MUST NOT produce
notifications based upon the value of the counters in this
bucket. Note that an implementation may decide not to store invalid
history buckets in its data base. In such case this object is
not required as only valid history buckets are available while
invalid history buckets are simply not in the data base.

This object partially maps to the TR-159 attribute
aGroupPerf1DayIntervalValid."

REFERENCE
"[TR-159] 5.5.1.63"
::= { gBondAtmPortPerf1DayEntry 7 }

--
-- Conformance Statements
--

gBondAtmGroups OBJECT IDENTIFIER
::= { gBondAtmConformance 1 }

gBondAtmCompliances OBJECT IDENTIFIER
::= { gBondAtmConformance 2 }

-- Object Groups

gBondAtmBasicGroup OBJECT-GROUP
OBJECTS {
    gBondAtmRxLostCells,
    gBondAtmTxLostCells,
    gBondAtmMaxUpDiffDelay,
    gBondAtmMaxDnDiffDelay
}
STATUS      current
DESCRIPTION
"A collection of objects representing management information
for a G.Bond/ATM port."
::= { gBondAtmGroups 1 }

gBondAtmAlarmConfGroup OBJECT-GROUP
OBJECTS {
    gBondAtmUpDiffDelayTolerance,
    gBondAtmDnDiffDelayTolerance,
    gBondAtmDiffDelayToleranceExceededEnable
}
STATUS      current
DESCRIPTION
"A collection of objects required for configuration of alarm
thresholds and notifications in G.Bond/ATM ports."
::= { gBondAtmGroups 2 }

gBondAtmNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS {  
gBondAtmUpDiffDelayToleranceExceeded,  
gBondAtmDnDiffDelayToleranceExceeded  
}  
STATUS current  
DESCRIPTION "This group supports notifications of significant conditions  
associated with G.Bond/ATM ports."  
 ::= ( gBondAtmGroups 3 )  

gBondAtmPerfCurrGroup OBJECT-GROUP  
OBJECTS {  
gBondAtmPortPerf15MinValidIntervals,  
gBondAtmPortPerf15MinInvalidIntervals,  
gBondAtmPortPerfCurr15MinTimeElapsed,  
gBondAtmPortPerfCurr15MinRxLostCells,  
gBondAtmPortPerfCurr15MinTxLostCells,  
gBondAtmPortPerfCurr15MinUpDiffDelay,  
gBondAtmPortPerfCurr15MinDnDiffDelay,  
gBondAtmPortPerf1DayValidIntervals,  
gBondAtmPortPerf1DayInvalidIntervals,  
gBondAtmPortPerfCurr1DayTimeElapsed,  
gBondAtmPortPerfCurr1DayRxLostCells,  
gBondAtmPortPerfCurr1DayTxLostCells,  
gBondAtmPortPerfCurr1DayUpDiffDelay,  
gBondAtmPortPerfCurr1DayDnDiffDelay  
}  
STATUS current  
DESCRIPTION "A collection of objects supporting OPTIONAL current Performance  
Monitoring information for G.Bond/ATM ports."  
 ::= ( gBondAtmGroups 4 )  

gBondAtmPerf15MinGroup OBJECT-GROUP  
OBJECTS {  
gBondAtmPortPerf15MinIntervalMoniTime,  
gBondAtmPortPerf15MinIntervalRxLostCells,  
gBondAtmPortPerf15MinIntervalTxLostCells,  
gBondAtmPortPerf15MinIntervalUpDiffDelay,  
gBondAtmPortPerf15MinIntervalDnDiffDelay,  
gBondAtmPortPerf15MinIntervalValid  
}  
STATUS current  
DESCRIPTION "A collection of objects supporting OPTIONAL historical  
Performance Monitoring information for G.Bond/ATM ports, during  
previous 15-minute intervals ."  
 ::= ( gBondAtmGroups 5 )
gBondAtmPerf1DayGroup OBJECT-GROUP
  OBJECTS {
    gBondAtmPortPerf1DayIntervalMoniTime,
    gBondAtmPortPerf1DayIntervalRxLostCells,
    gBondAtmPortPerf1DayIntervalTxLostCells,
    gBondAtmPortPerf1DayIntervalUpDiffDelay,
    gBondAtmPortPerf1DayIntervalDnDiffDelay,
    gBondAtmPortPerf1DayIntervalValid
  }

STATUS current
DESCRIPTION
  "A collection of objects supporting OPTIONAL historical Performance Monitoring information for G.Bond/ATM ports, during previous 1-day intervals."
 ::= { gBondAtmGroups 6 }

-- Compliance Statements

gBondAtmCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
  "The compliance statement for G.Bond/ATM interfaces. Compliance with the following external compliance statements is REQUIRED:

MIB Module         Compliance Statement
-------------------- ------------------------
IF-MIB              ifCompliance3
GBOND-MIB           gBondCompliance"

MODULE -- this module
MANDATORY-GROUPS {
  gBondAtmBasicGroup,
  gBondAtmAlarmConfGroup,
  gBondAtmNotificationGroup
}

GROUP gBondAtmPerfCurrGroup
DESCRIPTION
  "Support for this group is only required for implementations supporting Performance Monitoring."

GROUP gBondAtmPerf15MinGroup
DESCRIPTION
  "Support for this group is only required for implementations supporting historical Performance Monitoring."
GROUP    gBondAtmPerf1DayGroup
DESCRIPTION  
"Support for this group is only required for implementations 
supporting 1-day historical Performance Monitoring."
 ::= { gBondAtmCompliances 1 }
END

7. Security Considerations

There is a number of managed objects defined in the GBOND-ATM-MIB module that have a MAX-ACCESS clause of read-write. Writing to these objects can have potentially disruptive effects on network operation, for example:

- Changing of gBondAtmPortConfTable configuration parameters MAY lead to a potential Service Level Agreement (SLA) breach, for example if a traffic delay is increased as a result of the higher delay tolerance (increased gBondAtmUpDiffDelayTolerance and/or gBondAtmDnDiffDelayTolerance), or the differential delay tolerance notifications are disabled by manipulating the gBondAtmDiffDelayToleranceExceededEnable parameter.

The user of the GBOND-ATM-MIB module must therefore be aware that support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

The readable objects in the GBOND-ATM-MIB module (i.e., those with MAX-ACCESS other than not-accessible) may be considered sensitive in some environments since, collectively, they provide information about the performance of network interfaces and can reveal some aspects of their configuration.

In such environments it is important to control also GET and NOTIFY access to these objects and possibly even to encrypt their values when sending them over the network via SNMP.

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.

8. IANA Considerations

An object identifier for gBondAtmMIB MODULE-IDENTITY SHALL be allocated by IANA [1] in the MIB-2 transmission sub-tree, before this document is published as an RFC.

9. Acknowledgments

This document was produced by the [ADSLMIB] working group.

10. References

10.1. Normative References


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10.2. Informative References


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