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Definitions of Managed Objects for G.SHDSL.BIS Lines
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Abstract

This document defines a portion of the Management Information Base (MIB) module for use with network management protocols in the Internet community. In particular, it introduces extensions to several objects and textual conventions defined in the HDLSL2-SHDSL Line MIB ([RFC 3276](#)) [[RFC3276](#)] to manage a G.SHDSL.bis interface.

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[1.](#) 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 [[RFC2119](#)].

[2.](#) Overview

This document describes extensions to several objects and textual conventions defined in the HDSL2-SHDSL Line MIB ([RFC 3276](#)) [[RFC3276](#)] to support equivalent management of a G.SHDSL.bis interface. These extensions are based upon the specifications for G.SHDSL.bis as defined in the ITU documentation [[ITUXXXX](#)].

[2.1.](#) Relationship of G.SHDSL.bis to G.SHDSL

As discussed in [RFC3276](#), G.SHDSL supports up to two wire pairs in a G.SHDSL line. With G.SHDSL.bis, the ITU has extended the

specification of G.SHDSL to support an additional two pairs of wires.

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Thus, to support G.SHDSL.bis, several textual conventions and objects must have their ranges and enumerations changed.

A modified version of Figure 2 from [RFC3276, section 4.3.1](#), is below:

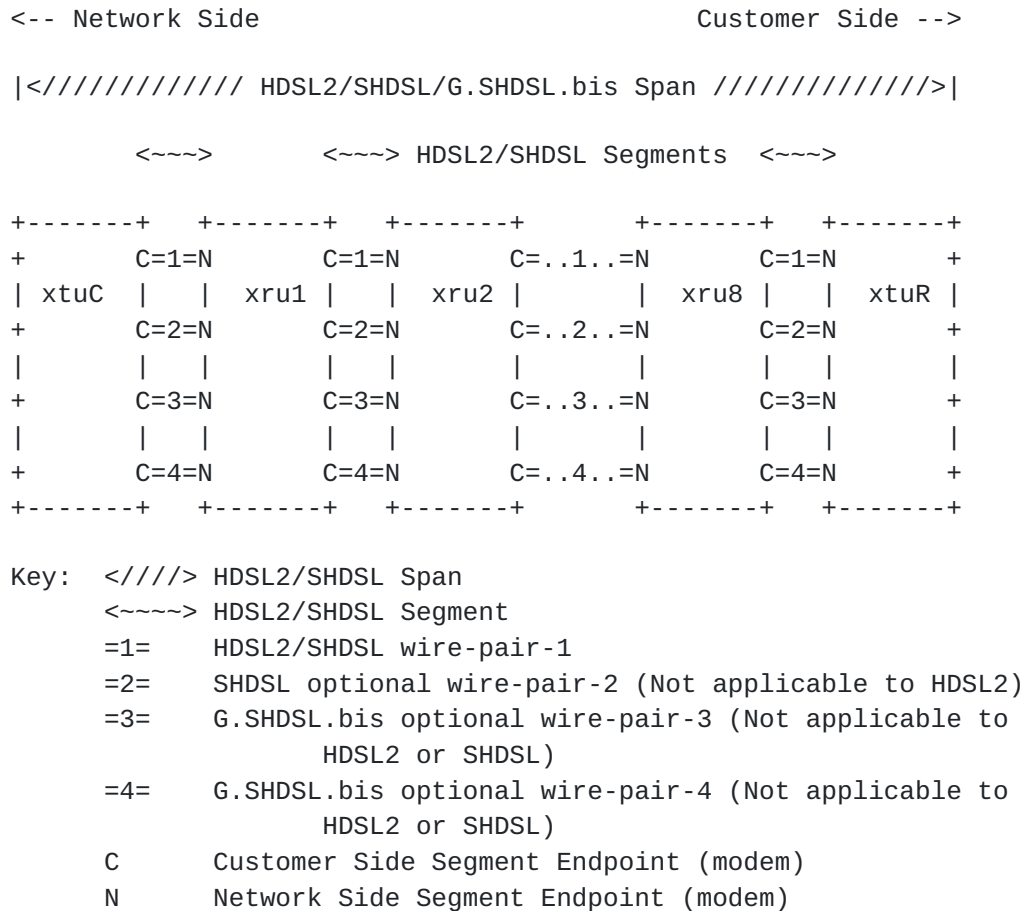


Figure 1: General topology for an HDSL2/SHDSL/G.SHDSL.bis Line

2.2. Changes to [RFC 3276](#) Textual Conventions

The textual convention, `Hdsl2ShdslWirePair`, is found in [RFC3276](#):

```

Hdsl2ShdslWirePair ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This is the referenced pair of wires in a HDSL2/SHDSL Segment.
         HDSL2 only supports a single pair (wirePair1), while SHDSL
         supports an optional second pair (wirePair2)."
```

SYNTAX INTEGER

```

    {
        wirePair1(1),
        wirePair2(2)
    }
```

The introduction of two additional wire pairs on the line leads to the following:

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```

Hdsl2ShdslWirePair ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This is the referenced pair of wires in a HDLSL2/SHDSL Segment.
        HDLSL2 only supports a single pair (wirePair1), while SHDSL
        supports an optional second pair (wirePair2). G.SHDSL.bis
        supports optional third and fourth wire pairs (wirePair3
        and wirePair4)."
```

```

SYNTAX      INTEGER
    {
        wirePair1(1),
        wirePair2(2),
        wirePair2(3),
        wirePair2(4)
    }
```

2.3. Changes to [RFC 3276](#) Objects

The addition of two (optional) wire pairs leads to one direct and several indirect changes.

2.3.1. Changes to `hdlsl2ShdslConfWireInterface`

From [RFC3276](#):

```

hdlsl2ShdslSpanConfWireInterface OBJECT-TYPE
    SYNTAX      INTEGER
        {
            twoWire(1),
            fourWire(2)
        }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object configures the two-wire or optional four-wire
        operation for SHDSL Lines."
    DEFVAL      { twoWire }
    ::= { hdsl2ShdslSpanConfProfileEntry 2 }
```

Two additional enumerations are required to support G.SHDSL.bis.

```

hdlsl2ShdslSpanConfWireInterface OBJECT-TYPE
    SYNTAX      INTEGER
        {
            twoWire(1),
            fourWire(2),
            sixWire(3),
            eightWire(4)
        }
```

```
    }  
    MAX-ACCESS read-create  
    STATUS current
```

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DESCRIPTION

"This object configures the number of wire pairs to be used in the line. HDLSL2 supports one pair (twoWire), SHDSL lines support an optional, addition pair (fourWire), and G.SHDSL.bis lines support up to four pairs (sixWire or eightWire)."

DEFVAL { twoWire }
::= { hds12ShdslSpanConfProfileEntry 2 }

2.3.2. Changes to Line Rate Objects

Four objects in the HDLSL2/SHDSL Line MIB have rate limitations. In each case, these objects have the syntax

SYNTAX Unsigned32(0..4112000)

Changes introduced in G.SHDSL.bis support an increased upper rate of 5696 kbits/s, leading to the updated syntax

SYNTAX Unsigned32(0..5696000).

These objects with updated syntax are listed below:

hds12ShdslStatusMaxAttainableLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..5696000)

UNITS "bps"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the maximum attainable line rate in this HDLSL2/SHDSL span. This object provides the maximum rate the line is capable of achieving. This is based upon measurements made during line probing."

::= { hds12ShdslSpanStatusEntry 2 }

hds12ShdslStatusActualLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..5696000)

UNITS "bps"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Contains the actual line rate in this HDLSL2/SHDSL span. This should equal ifSpeed."

::= { hds12ShdslSpanStatusEntry 3 }

hds12ShdslSpanConfMinLineRate OBJECT-TYPE

SYNTAX Unsigned32(0..5696000)

UNITS "bps"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object configures the minimum transmission rate for

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```
the associated SHDSL Line in bits-per-second (bps).  If
the minimum line rate equals the maximum line rate
(hdsl2ShdslSpanMaxLineRate), the line rate is considered
'fixed'.  If the minimum line rate is less than the maximum
line rate, the line rate is considered 'rate-adaptive'."
DEFVAL      { 1552000 }
::= { hdsl2ShdslSpanConfProfileEntry 3 }
```

```
hdsl2ShdslSpanConfMaxLineRate OBJECT-TYPE
    SYNTAX      Unsigned32(0..5696000)
    UNITS        "bps"
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "This object configures the maximum transmission rate for
        the associated SHDSL Line in bits-per-second (bps).  If
        the minimum line rate equals the maximum line rate
        (hdsl2ShdslSpanMaxLineRate), the line rate is considered
        'fixed'.  If the minimum line rate is less than the maximum
        line rate, the line rate is considered 'rate-adaptive'."
    DEFVAL      { 1552000 }
    ::= { hdsl2ShdslSpanConfProfileEntry 4 }
```

2.4. Changes to [RFC 3276](#) Compliance Section

To maintain dual compliance with the existing HDLSL2-SHDSL-LINE-MIB, the compliance section must be extended. To accomplish this, the objects identified above are restated with their original ranges from [RFC 3276](#).

```
OBJECT hdsl2ShdslSpanConfWireInterface
    SYNTAX      INTEGER
                {
                    twoWire(1),
                    fourWire(2)
                }
    DESCRIPTION
        "An implementation only has to support the range
        as applicable for the original g.shdsl specification."

OBJECT hdsl2ShdslStatusMaxAttainableLineRate
    SYNTAX      Unsigned32(0..4112000)
    DESCRIPTION
        "An implementation only has to support the range
        as applicable for the original g.shdsl specification."

OBJECT hdsl2ShdslStatusActualLineRate
    SYNTAX      Unsigned32(0..4112000)
    DESCRIPTION
```

"An implementation only has to support the range
as applicable for the original g.shdsl specification."

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```
OBJECT hds12ShdslSpanConfMinLineRate
SYNTAX      Unsigned32(0..4112000)
DESCRIPTION
    "An implementation only has to support the range
    as applicable for the original g.shdsl specification."

OBJECT hds12ShdslSpanConfMaxLineRate
SYNTAX      Unsigned32(0..4112000)
DESCRIPTION
    "An implementation only has to support the range
    as applicable for the original g.shdsl specification."
```

2.5. Updated MIB Location

A version of the MIB object definitions found in [RFC3276](#) modified to contain the above changes is available at:

www.ietf.org/internet-drafts/SHDSL-BIS-LINE-MIB.mib

3. Implementation Analysis

A management application which supports [RFC3276](#) could mistakenly flag a unit which responds with a rate or wire pair which exceeds the ranges and/or enumerations specified in [RFC3276](#). For example, a G.SHDSL.bis line with four wire pairs would report statistics for wire pairs that do not exist in [RFC3276](#). That is, a GET-NEXT request issued with the object identifier:

```
hds12ShdslEndpointCurrAtn.1.1.1.2
```

might return

```
hds12ShdslEndpointCurrAtn.1.1.1.3 = 0
```

with a G.SHDSL.bis unit and

```
hds12ShdslEndpointCurrSnrMgn.1.1.1.1 = 0
```

with an HDLS2 unit as these objects are indexed by

```
INDEX { ifIndex, hds12ShdslInvIndex, hds12ShdslEndpointSide,
        hds12ShdslEndpointWirePair }
```

A management application which intends to manage G.SHDSL.bis agents, should be modified to accept this sequence.

One should note that this same unmodified management application is still capable of managing G.SHDSL.bis agents albiet to the degree of G.SHDSL (non-bis) limitations. That is, it can create and monitor configurations limited to two wire pairs with an

upper rate limit of 4112000 bits/second.

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4. Security Considerations

In addition to the security considerations presented in [RFC3276](#), it is conceivable that a management application could be broken by a G.SHDSL.bis agent which reports objects for additional wire pairs (as noted in [section 3](#)).

For example, if a management application blindly loaded object instances into an array until the an object changes (during repeated GET-NEXT requests). It is anticipated that the modifications to the management application code would be straightforward. Perhaps, of the form:

```
if (name[12] > 2)    reject();
```

or

```
if (*val > 4112000) reject();
```

5. References

5.1. Normative References

- [ITUXXXX] ITU-T G.shdsl.bis, October 2003.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
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[RFC3418] Presuhn, R., "Management Information Base (MIB) for the

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[5.2.](#) Informative References

- [RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart,
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