Lucent Technologies
Bell Labs Innovations

Stinger®

VDSL Line Interface Modules (LIMs)

Guide
Software version 9.10.0

363-217-032R9.10.0
Issue 1
October 2006

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About This Information Product

Purpose

The purpose of this information product is to provide hardware and configuration information for Stinger VDSL LIMs.

Intended audience

This guide is for individuals who install, maintain, or configure Stinger units with VDSL LIMs.

Supported platforms

This guide provides information about VDSL LIMs that are used in the following Stinger platforms.

- Stinger FS+
- Stinger LS
- Stinger RT
- Stinger MS+

How to use this information product

Use this guide to install or configure VDSL LIMs.

Safety information

Before installing your Stinger unit, or any components, ensure to read the safety instructions in the ***Edge Access and Broadband Access Safety and Compliance Guide***. For information specific to your unit, see the "Safety-Related Physical, Environmental, and Electrical Information" appendix in the ***Getting Started Guide*** for your Stinger unit.

Related information

The Stinger documentation set located at http://www.lucent.com/support consists of the following manuals:

Read me first:

- ***Edge Access and Broadband Access Safety and Compliance Guide***. Contains important safety instructions and country-specific information that you must read before installing a Stinger unit.
- ***TAOS Command-Line Interface Guide***. Introduces the TAOS command-line environment and shows you how to use the command-line interface effectively. This guide describes keyboard shortcuts and introduces commands, security levels, profile structure, and parameter types.

Installation and basic configuration:

- ***Getting Started Guide*** for your Stinger platform. Shows how to install your Stinger chassis and hardware. This guide also shows you how to use the command-line interface to configure and verify IP access and basic access security on the unit, and how to configure Stinger control module redundancy on units that support it.
- ***Module guides*** For each Stinger line interface module (LIM), trunk module, or other type of module, an individual guide describes the module's features and provides instructions for configuring the module and verifying its status.

Configuration:

- ***Stinger ATM Configuration Guide***. Describes how to integrate the Stinger into the ATM and Digital Subscriber Line (DSL) access infrastructure. The guide explains how to configure PVCs, and shows how to use standard ATM features such as quality of service (QoS), connection admission control (CAC), and subtending.
- ***Stinger IP Control Module Configuration Guid****e*. For Stinger systems with an IP control module, this guide describes how to integrate the system into the IP infrastructure.
- ***Stinger Private Network-to-Network Interface (PNNI) Supplement***. For the optional PNNI software, this guide provides quick-start instructions for configuring PNNI and soft PVCs (SPVCs), and describes the related profiles and commands.
- ***Stinger SNMP Management of the ATM Stack Supplement.*** Describes SNMP management of ATM ports, interfaces, and connections on a Stinger unit to provide guidelines for configuring and managing ATM circuits through any SNMP management utility.

RADIUS:

- ***TAOS RADIUS Guide and Reference***. Describes how to set up a unit to use the Remote Authentication Dial-In User Service (RADIUS) server and contains a complete reference to RADIUS attributes.

Administration and troubleshooting:

- ***Stinger Administration Guide***. Describes how to administer the Stinger unit and manage its operations. Each chapter focuses on a particular aspect of Stinger administration and operations. The chapters describe tools for system management, network management, and Simple Network Management Protocol (SNMP) management.

Reference:

- ***Stinger Reference***. An alphabetic reference to Stinger profiles, parameters, and commands.
- ***TAOS Glossary***. Defines terms used in documentation for Stinger units.

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1 VDSL LIM Hardware

Overview

Purpose

This chapter describes the physical specifications of the Stinger VDSL line interface module (LIM), and the protocols supported by this LIM.

Contents

This chapter describes VDSL LIM hardware information for the following topics.

Subscriber line standards

Introduction

The Stinger Very high bit-rate Digital Subscriber Line (VDSL) LIM is designed to support higher data speed required for video on demand and other high-speed applications. The VDSL LIM supports the existing ADSL and ADSL2+ protocols.

VDSL standards

The Stinger 24-port VDSL LIM (STGR-LIM-VD-24) provides high-speed asymmetric data interfaces that support data transfer. Data transfer is performed using the ANSI discrete multitone (DMT) and the following VDSL protocol standards:

VDSL1 Bandplan 998:

- ITU-T G.993.1, Annex A
- ETSI TS 101 270-1, regional-specific allocation
- ATIS T1.424-2004

VDSL1 Bandplan 997:

- ITU-T G.993.1, Annex B
- ETSI TS 101 270-1 1

VDSL2 Bandplans 997 and 998:

- ITU-T G993.2, Annex A, and B. The annex B denotes Europe and annex A denotes North America.
- Profiles p8a, p8b, p8c, p8d, p12, p12b
- VDSL2 Masks for Europe and North America.

ADSL standards

VDSL LIMs support the following ADSL protocols and related standards:

- G.992.1 Annex A
- G.992.5 Annex A (G.adsl2plus)

Important! VDSL rates cannot be tested on a network that does not support 10/100Mbps ethernet. So, when testing higher data transfer rates on VDSL lines, ensure that the network equipment, test gear, and all links on the end-user or network support 10/100Mbps rates.

VDSL LIM physical description

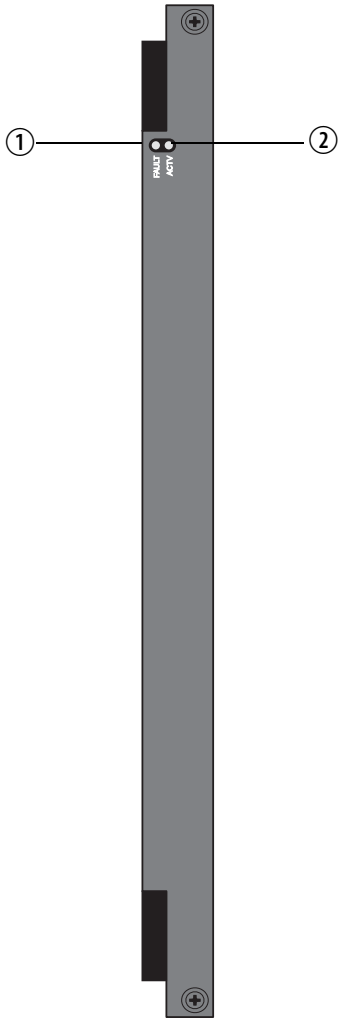
Introduction

This section describes the visible physical characteristics of the VDSL LIM.

LIM faceplate and status lights

The VDSL LIM has a faceplate with two ejector latches, one at the top of the card, and one at the bottom. It has two status lights (LEDs), one labeled FAULT, and one labeled ACTV. The faceplate is illustrated in Figure 1-1

Figure 1-1 VDSL LIM faceplate



Status light indications

When lit, the status lights on the VDSL LIM, displayed in Figure 1-1, have the following indications:

	Light	Color	Indication
1	FAULT	Orange	The module failed to pass its POST.
2	ACTV	Green	The module or port is fully operational and no errors have been detected.

Important! These status lights illuminate briefly during startup or restart, then remain dark until the module passes its power-on self test (POST). When the module passes the POST and becomes operational, the ACTV (active) light illuminates.

Line protection

Currently, VDSL LIMs are not available with integrated line protection hardware. A separate line protection module (LPM) is required for each installed VDSL LIM.

Installing a VDSL LIM

Purpose

This procedure describes how to install a LIM in a Stinger unit.

ESD Grounding

All Stinger chassis have at least one ESD grounding jack. Before installing or removing a LIM, put on an antistatic wrist strap and plug it into an ESD grounding jack on the unit.

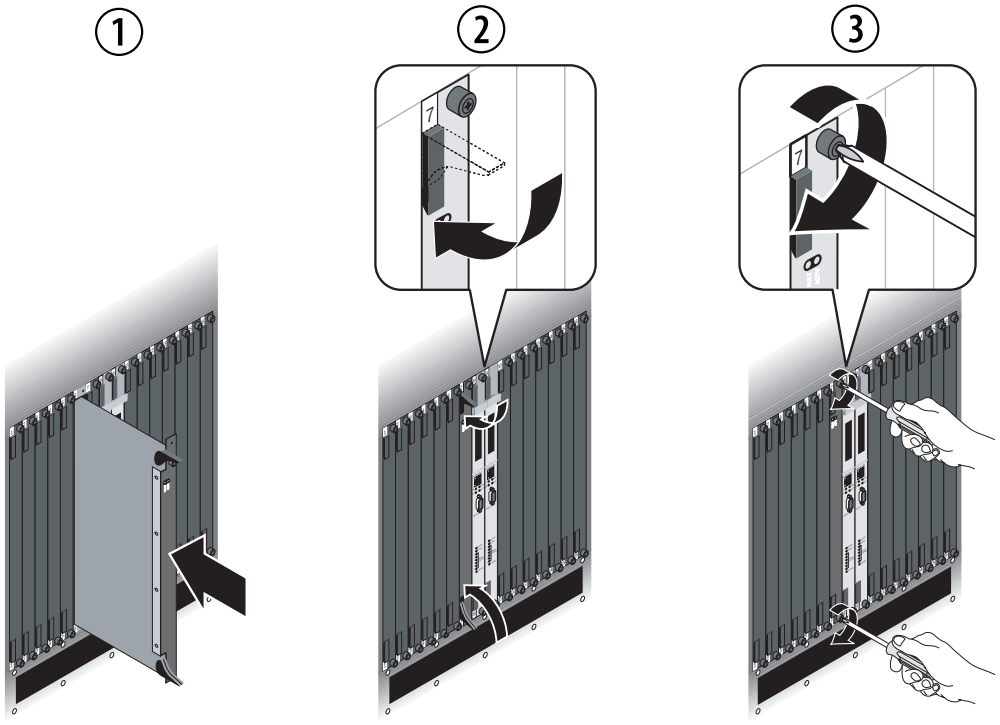
Control module compatibility

Support for the VDSL LIM is available only on the Stinger units that contain one or more IP2100 IP control modules.

Installing a LIM

Prepare for installation by removing the blank slot cover, or old LIM, from the desired slot on the unit. Use the following procedure to install the LIM.

Figure 1-2 Installing the LIM



1 Align the LIM with the card guides and carefully slide the module into the unit.

WARNING

Keep the connector on the LIM being inserted away from components on adjacent LIMs.
Do not force the card.

2 After the card has engaged its bus connector, press firmly to be sure it is fully seated. Depress both ejectors simultaneously.

3 Using a number 2 Phillips screwdriver, secure the LIM by tightening the thumbscrews.

END OF STEPS

Verifying the operational status

After installing the LIM, allow three to five minutes for it to become operational. To verify its operational status, observe the behavior of the status lights on the LIM.

□

Physical specifications

VDSL LIM physical specifications

The Stinger VDSL LIM has the following physical specifications:

Specification	Description
Height	15 inches (38.1 cm)
Width	1.06 inches (2.69 cm)
Depth	9 inches (22.8 cm)
Weight	5 pounds (2.3Kg)
Temperature range	-40°F to 149°F (-40°C to 65°C)
Relative humidity	10% - 95% (non-condensing)
Maximum operation altitude	13,123 feet (4,000m)
Power (maximum)	65-66W
Electromagnetic compliance	FCC Part 15 Class A EN 55022 Class A AS/NZS 3548 Class A VCCI Class A EN 300 386 ICES-003
Certification	Bellcore GR-63-CORE Telcordia GR-63 Bellcore GR-1089-CORE Telcordia GR-1089 EN / IEC 60950
Relative humidity	10% - 95% (non-condensing)

2 The AL-DMT interface profile

Overview

Purpose

This chapter describes the AL-DMT interface profile.

Contents

This chapter describes configuration information for the following topics.

Interfaces

Overview

The TAOS software creates an `al-dmt` profile for each interface in a Stinger VDSL LIM. A parameter in this profile selects whether the VDSL LIM trains using the ADSL settings in the `line-config` subprofile, or VDSL settings in the `vdsl-config` subprofile.

Interface identification

Each `al-dmt` profile is identified by the chassis (shelf), slot location of the LIM, and port number that is associated with it. ADSL-DMT profiles for interfaces physically located on a local chassis are identified as being on shelf-1. The TAOS interface identifies an interface with the following syntax:

{ shelf-*#* slot-*#* *(port)* }

Example of Profile List

The following example is a partial list of the profiles created for the interfaces of a VDSL LIM installed in slot 2, of a stand-alone Stinger unit.

```
admin> dir al-dmt
       44  10/09/2005 23:00:13  { shelf-1 slot-2 1 }  1:2:1
       41  10/20/2005 00:47:43  { shelf-1 slot-2 2 }  1:2:2
       41  10/20/2005 00:47:53  { shelf-1 slot-2 3 }  1:2:3
       44  10/22/2005 18:48:42  { shelf-1 slot-2 4 }  1:2:4
       44  10/22/2005 15:19:28  { shelf-1 slot-2 5 }  1:2:5
       38  10/14/2005 13:32:29  { shelf-1 slot-2 6 }  1:2:6
       38  10/14/2005 13:32:29  { shelf-1 slot-2 7 }  1:2:7
       44  10/22/2005 15:19:57  { shelf-1 slot-2 8 }  1:2:8
       44  10/02/2005 19:20:51  { shelf-1 slot-2 9 }  1:2:9
       39  10/14/2005 13:32:29  { shelf-1 slot-2 10 }  1:2:10
       39  10/14/2005 13:32:29  { shelf-1 slot-2 11 }  1:2:11
       39  10/14/2005 13:32:29  { shelf-1 slot-2 12 }  1:2:12
       39  10/14/2005 13:32:29  { shelf-1 slot-2 13 }  1:2:13
       39  10/14/2005 13:32:29  { shelf-1 slot-2 14 }  1:2:14
       39  10/14/2005 13:32:29  { shelf-1 slot-2 15 }  1:2:15
       39  10/14/2005 13:32:29  { shelf-1 slot-2 16 }  1:2:16
       39  10/14/2005 13:32:29  { shelf-1 slot-2 17 }  1:2:17
       39  10/14/2005 13:32:29  { shelf-1 slot-2 18 }  1:2:18
       39  10/14/2005 13:32:29  { shelf-1 slot-2 19 }  1:2:19
       45  10/24/2005 22:13:29  { shelf-1 slot-2 20 }  1:2:20
       ....
```

The AL-DMT profile

Introduction

In the `al-dmt` profile, and the subprofiles, you have to set parameters to specify the data rate, signal quality and power, and interleaving delay of the interface. The Stinger unit references these parameters in the training process.

Discrete multitone (DMT) standards define the fast and interleaved data latencies for each direction (upstream and downstream) of transmission.

ADSL vs. VDSL settings

The interfaces on the VDSL LIM can be configured to use ADSL or ADSL2+ protocols with the same `al-dmt` settings and profiles used to configure ADSL or ADSL2+ LIMs.

The `vdsl-config` subprofile, and its included subprofiles, contain the settings used to configure the interfaces of the VDSL LIM for VDSL connections. These settings are used when the `dsl-type` parameter is set to `vdsl`.

Active parameters

The following sets of parameters are active for VDSL LIMs:

- Line activation and DMT parameters
- Rate adaptive mode parameters
- Power spectral density (PSD) and power-level parameters
- Fast and interleaved bit rate parameters
- Interleaving delay parameters
- Noise margin parameters
- Trellis encoding
- Power back-off

Default settings

The following parameters in the `al-dmt` profile, shown with their default settings, are associated with basic line activation. The parameters and subprofiles for `al-dmt` are described in the Chapter 3, “The AL-DMT subprofiles”.

```
[in AL-DMT/{ any-shelf any-slot 0 }]
   name = ""
   physical-address* = { any-shelf any-slot 0 }
   enabled = no
   sparing-mode = inactive
   ignore-lineup = system-defined
   line-config = { 1 15 automatic-at-startup automatic-at-startup 100 100
```

```
13 20 40+
fast-path-config = { 128 128 1000 8000 512 1000 }
interleave-path-config = { 128 128 1000 8000 512 1000 16 16 auto }
margin-config = { 6 6 6 6 31 31 3 60 3 60 3 60 3 60 no }
thresh-profile = default
bin-loading-profile = default
dsl-type = adsl
vdsl-config = { { 1 ansi ptm-64-65 auto-select fast fast automatic-at-
startup a+
```

AL-DMT parameter descriptions

Parameter	Setting
`name`	Specifies the name of the interface. The default value is the interface address in *`shelf:slot:port`* format (for example, `1:2:3`), however, you can assign a text string of up to 16 characters.
`physical-address`	Specifies the physical address of the interface in the Stinger unit.
`enabled`	Enables the VDSL-DMT interface. A VDSL-DMT line is disabled until you activate the line in the `vl-dmt` profile.
`sparing-mode`	Enables or disables port redundancy (sparing) and specifies the mode. The default value, `inactive`, disables LIM port redundancy (sparing). The `automatic` setting activates automatic sparing for the port. Automatic sparing uses the values specified in the `error threshold` parameters of the `auto-lim-sparing-config:lim-sparing-config [`*`slot number`*`]` profile. The `manual` setting deactivates the LIM port and reestablishes the connection on the same port of the spare LIM.
`ignore-lineup`	Allows call control to be configured on a per-port basis. This parameter interacts with the `ignore-lineup` parameter of the `system` profile. See “Configuring call control” (p. 2-7) for details.
`dsl-type`	Selects the DSL type for the port and the profiles that are used to configure the port. Specify one of the following values: `adsl` (the default)—selects legacy settings in the `al-dmt` profile to configure the port for ADSL operation. `vdsl`—selects the settings in the `vdsl-config` subprofile to configure the port for VDSL operation.

AL-DMT subprofile descriptions

subprofile	Settings
`line-config`	Used for ADSL configurations. It contains the parameters for selecting rate adaptation modes and setting line rate, power, and other parameters. See "The AL-DMT:Line-Config subprofile" (p. 3-2) for details.
`fast-path-config`	Used for ADSL configuration. It contains the bit rate parameter settings used to control the use of the fast path for both upstream and downstream ADSL traffic. See "The AL-DMT:Fast-Path-Config subprofile" (p. 3-18) for details.
`interleave-path-config`	Used for ADSL configuration. It contains the bit rate parameter settings used to control the use of the interleave path channel for both upstream and downstream ADSL traffic. See "The AL-DMT:Interleave-Path-Config subprofile" (p. 3-13) for details.
`margin-config`	Used for ADSL configuration. It contains two groups of parameters that determine the following: • Parameters that set the noise margin • Parameters that set the amount of time beyond the noise margin needed to trigger rate adaption See "The AL-DMT:Margin-Config subprofile" (p. 3-20) for details.
`thresh-profile`	Currently not supported on the VDSL LIM.
`bin-loading-profile`	Currently not supported on the VDSL LIM
`vdsl-config`	Used for VDSL configuration. It contains five subprofiles parameters that are used to configure the line for a VDSL connection. See Chapter 4, "The VDSL-Config subprofile" for details.

Line activation

Description

The line is enabled by setting the `enabled` parameter to `yes` and then saving the `al-dmt` profile. Before changing this setting ensure that other line parameters have been configured as needed and saved.

Example

The following parameters in the `al-dmt` profile, shown with their default settings, are associated with basic line activation. Other parameters and subprofiles are described later.

```
[in AL-DMT/{ any-shelf any-slot 0 }]
   name = ""
   physical-address* = { any-shelf any-slot 0 }
   enabled = no
   sparing-mode = inactive
   dsl-type = adsl
   ...
```

Configuring call control

Introduction

The call control mechanism enables the Stinger unit to establish and maintain connections across port state changes. This allows xDSL subscribers to establish connections on LIM interfaces in the operating states before the interfaces are fully trained, as well as in the standard `port-up` state (in which the modem has successfully trained).

How connections work by default

By default, the Stinger unit monitors the physical line state of its interfaces and allows connections to be established only when the line state is fully connected.

How connections work with call control

With call control, connections are accepted when the modem has not fully trained to the `port-up` state. If a LIM interface with an active connection changes from a `port-up` state to the state it was in before it was fully trained, the connection remains established. Connections are broken only if the physical slot or line stops operating or is disabled by an administrator.

Ignore-lineup parameter default setting

The `ignore-lineup` parameter appears in the SYSTEM profile and the AL-DMT profile for each port. In the SYSTEM profile, the setting applies to all ports in the system using the default call control settings. The setting in the AL-DMT profile, allows call control to be configured on a per-port basis. The default settings are shown in the example below.

```
[in SYSTEM]
ignore-lineup = no
[in AL-DMT/{ any-shelf any-slot 0 }]
ignore-lineup = system-defined
```

Ignore-lineup parameter details

Parameter	Setting
`ignore-lineup`	In the System profile, enables or disables the Stinger system's ability to ignore line status when determining whether calls are established or not. Specify one of the following values: • `no` (the default)—Sets the Stinger call-control mechanism to ignore the systemwide setting and allow calls to be established when the line state is operational. Calls are disallowed on the port when the line state is down.
	• `yes`— Sets the Stinger call-control mechanism to ignore the line state and allow calls to be established on a port as long as the specified slot is operational and the specified port is enabled.
`ignore-lineup`	In a `line` profile, specifies whether the line status of a slot has an effect on the Stinger call-control mechanism on the specified port. Specify one of the following values: • `system-defined` (the default)—Sets the Stinger to inherit the `ignore-lineup` value from the `system` profile. • `no`—Sets the Stinger call-control mechanism to ignore the systemwide setting and allow calls to be established when the line state is operational and disallow calls on the port when the line state is down. • `yes`—Sets the Stinger call-control mechanism to ignore the line state and the systemwide setting and allow calls to be established on the specified port as long as the slot is operational and the port is enabled.

Example systemwide configuration

The commands in the following example configure the unit to use the new call-control procedures systemwide:

```
read system
set ignore-lineup = yes
write
```

Example interface configuration

The commands in the following example disable call-control procedures on port one of the LIM in slot 12:

```
read al-dmt { 1 12 1 }
set ignore-lineup = no
write
```

3 The AL-DMT subprofiles

Overview

Purpose

This chapter describes the AL-DMT subprofiles and parameters used to configure ports for ADSL operation. The subprofiles and parameters in the AL-DMT:VDSL-Config profile are used for VDSL configuration. They are described in Chapter 4, “The VDSL-Config subprofile”.

Contents

This chapter describes configuration information for the following topics:

The AL-DMT:Line-Config subprofile

Overview

Purpose

This section describes the parameters of the AL-DMT:Line-Config subprofile.

Contents

This section contains information on the following topics:

Parameter overview

Introduction

The AL-DMT:Line-Config subprofile parameters activate and configure an interface on the VDSL LIM for ADSL operation. These parameters are used when the `dsl-type` parameter is set to `adsl`. The general parameters of this profile are identified and described below. The rate-adaptive and power parameters are described separately.

Default settings

The following listing illustrates the default settings of the AL-DMT:Line-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:line-config]
   trunk-group = 0
   nailed-group = 1
   vp-switching-vpi = 15
   call-route-info = { any-shelf any-slot 0 }
   rate-adapt-mode-up = automatic-at-startup
   rate-adapt-mode-down = automatic-at-startup
   rate-adapt-ratio-up = 100
   rate-adapt-ratio-down = 100
   max-aggr-power-level-up = 13
   max-aggr-power-level-down = 20
   max-power-spectral-density = 40
   line-code = auto-select
   line-latency-down = fast
   line-latency-up = fast
   trellis-encoding = yes
   gain-default = 20-db
   upstream-start-bin = 6
   upstream-end-bin = 31
   downstream-start-bin = 32
   downstream-end-bin = 255
   loop-back = none
   bit-swapping = no
   fbm-dbm-mode = fbm
   alcatel-us-413-boost = unknown
   psd-mask-down = co
```

Parameter descriptions

The following table describes the functions associated with the available parameter settings in the AL-DMT:Line-Config subprofile.

Parameter	Setting
`trunk-group`	Not currently used
`nailed-group`	Specifies the nailed-group number for the ADSL-DMT physical interface. A `connection` or RADIUS profile uses this number to specify the interface. Because each interface is assigned a unique default number, you do not need to modify the value of this parameter. If you assign a new value, it must be a number from 1 through 1024 that is unique within the system.
`vp-switching-vpi`	Specifies the virtual path identifier (VPI) to use for virtual path (VP) switching on the LIM port. The default is 15. All other VPIs are used for virtual channel (VC) switching.
`call-route-info`	Not currently used.
`line-code`	Specifies the DMT line code to be used for training. VDSL LIMs support the following line-code settings: – `auto-select`—(the default) The LIM automatically detects and configures itself for the G.dmt (ITU-T G.992.1), and ansi-dmt (T1.413-1998) protocols. – `ansi-dmt`— The LIM trains using the ansi-dmt protocol. – `g-dmt`—The LIM attempts to train using the g.dmt protocol (ITU-T G992.1). If it is unsuccessful, the line does not train. – `adsl2plus`—The LIM attempts to train using ADSL2+ protocol (ITU-T G.992.3), g-dmt, and ansi-dmt. If it is unsuccessful, the line does not train. – `adsl2plusonly`—The LIM trains using the adsl2plusonly protocol. – `annex-mplus`—The LIM trains using the annexM+ protocol. **Important!** VDSL LIM does not support the bit-mapped line-codes settings.

Parameter	Setting
`line-latency-down`	Specifies the latency path to be used for downstream data transport. Valid values are: interleave—Set the latency path to interleave. This is the default for the G.lite protocol. fast—Set the delay to the lowest possible value. This is the default for all protocols except G.lite. both—Not used. This parameter determines which channel is used in both up and down directions. Ensure that the line-latency-up and line-latencydown values are equal before a write profile is performed, otherwise the profile is rejected as having an invalid setting. This is consistent with adsl2plus capable packs. For related settings, see **Bit rate parameters**.
`line-latency-up`	Specifies the latency path to be used for upstream data transport. Valid values are: `interleave`—Set the latency path to `interleave`. This is the default for the G.lite protocol. `fast`—Set the delay to the lowest possible value. This is the default for all protocols except G.lite. `both`—Not used. This parameter determines which channel is used in both up and down directions. Ensure that the `line-latency-up` and `line-latency-down` values are equal before a write profile is performed, otherwise the profile is rejected as having an invalid setting. This is consistent with adsl2plus capable packs. For related settings, see **Bit rate parameters**.
`trellis-encoding`	Enables or disables trellis encoding. Trellis encoding is specified in the DMT standard. The default is `yes`.
`upstream-start-bin`	*Not currently supported on the VDSL LIM.*
`upstream-end-bin`	*Not currently supported on the VDSL LIM.*
`downstream-start-bin`	*Not currently supported on the VDSL LIM.*
`downstream-end-bin`	*Not currently supported on the VDSL LIM.*

Parameter	Setting
`loop-back`	Provides a digital loop-back on the ADSL interface when set to `digital`. No loopback is present when the default setting of `none` is set.
`bit-swapping`	Used as a noise compensation feature on Annex A full-rate lines. This parameter is not utilized as bit-swapping is always on.
`fbm-dbm-mode`	*Not currently supported on the VDSL LIM.*
`alcatel-us-413-boost`	Not used.
`psd-mask-down`	*Not currently supported on the VDSL LIM.*

Power-level parameters

Maximum power level definition

Maximum aggregate power level is the maximum output power allowed on the line at the transmitter output. This value is expressed in decibels with reference to one milliwatt (dBm), where zero dBm equals 1 milliwatt. It is defined for both directions.

Default settings

The AL-DMT:`line-config` subprofile parameters, shown with their default values, for configuring power:

```
[in AL-DMT/{ any-shelf any-slot 0 }:line-config]
   max-aggr-power-level-up = 13
   max-aggr-power-level-down = 20
   max-power-spectral-density = 40
   gain-default = 16-db
```

Important! If you lower the default value, the line consumes less power and has less capacity. The default value is the maximum allowed setting.

Parameter descriptions

Parameter	Description
`max-aggr-power-level-up`	Specifies the maximum aggregate power level on the upstream channel. Its effective range is from 8dBm through 20dBm.
`max-aggr-power-level-down`	Specifies the maximum aggregate power level on the downstream channel. Its effective range is from 8dBm through 20dBm.
`max-power-spectral-density`	Not used. **Important!** Downstream power is controlled by changing the settings of the max-aggr-power-level-down parameter.
`gain-default`	Not used.

Rate-adaptive mode parameters

Introduction

The `rate-adapt-mode-up` parameters in the AL-DMT:Line-Config subprofile specify rate-adaptive operations to and from the subscriber (downstream and upstream) for ADSL connections.

Default settings

The following parameters in the `al-dmt:line-config` subprofile, shown with default values, define how rate adaptation operates on the line:

```
[in AL-DMT/{ any-shelf any-slot 0 }:line-config]
rate-adapt-mode-up = automatic-at-startup
rate-adapt-mode-down = automatic-at-startup
rate-adapt-ratio-up = 0
rate-adapt-ratio-down = 0
```

Parameter descriptions

Parameter	Setting
`rate-adapt-mode-up`	Specifies the rate-adaptive mode for upstream and downstream training. Valid settings are: `automatic-at-startup`—Specifies that the rate is selected during the startup process, based on the settings of the `margin-config` subprofile. `operator-controlled`—Specifies a fixed rate to which the port trains, if the settings in the `margin-config` subprofile are satisfied.
`rate-adapt-mode-down`	Not used—This is controlled by the setting of the `rate-adapt-mode-up` parameter.
`rate-adapt-ratio-up`	*Not currently supported on the VDSL LIM.* Specifies the percentage ratio for distributing excess upstream bit rate among the fast and interleaved channels when the `rate-adapt-mode` is set to `automatic-at-startup`. Valid settings are 0-100 in increments of 10. See "Configuring rate adaptation" (p. 3-12).
`rate-adapt-ratio-down`	*Not currently supported on the VDSL LIM.* Ratio for distributing excess upstream bit rate among the fast and interleaved channels when dual latency is supported.

The AL-DMT:Line-Config settings and considerations

Overview

Purpose

This section defines issues that must be considered to properly configure the settings of the AL-DMT:Line-Config subprofile. Additionally, the optimum settings for some parameters, and interactions between parameter settings are described.

Contents

This section contains information on the following topics:

Bit rate, interleave, and delay considerations

Bit rate parameters

bit rate parameters specify minimum, maximum, and planned upstream and downstream bit rates for a rate-adaptive connection.

Attainable bit rates

Bit rates depend on the physical interface (the line to which the central office equipment (COE) and customer premises equipment (CPE) are connected) and the ADSL interleaved or fast channel.

Fast-path bit rate settings

The bit rate parameter settings control the use of the fast channel for both upstream and downstream traffic. In the current software version, both upstream and downstream traffic must use the same channel.

Interleave-path bit rate settings

The bit rate parameter settings control the use of the interleave path channel for both upstream and downstream traffic.

Relationship to line latency setting

The `line-latency-up` setting in the `line-config` subprofile determines which channel is used in each direction. For more information, see “Parameter overview” (p. 3-3).

Interleave vs. delay

Data interleaving increases the ability of the system to tolerate noise on the line. However, it increases the latency (delay) of the data traffic. When using the interleave channel, determine the maximum amount of latency by considering the type of traffic sent on the line. If traffic delay tolerance is high, then set the interleave settings at a high value.

□

Configuring rate adaptation

Automatic-at-startup

This rate adaptation setting selects a rate during the training (startup) process. The line attempts to initialize at the maximum specified bit rate, and target noise margin. If the line fails to achieve the maximum bit rate in either direction, it attempts to initialize at a lower rate until it reaches the minimum specified bit rate. If the line is unable to initialize at the minimum specified bit rate, then it does not start and sends a message that the requested bit rate was too high.

Operator-controlled

This rate adaptation setting starts the line at a specific planned bit rate with an acceptable target noise margin and maintains that rate. The line does not use a higher bit rate, even if it can support one.

The AL-DMT:Interleave-Path-Config subprofile

Overview

Purpose

This section describes the parameters of the AL-DMT:Interleave-Path-Config subprofile. Additionally, optimum settings for some parameters are described.

Contents

This section contains information on the following topics for this subprofile:

Bit rate parameters

Introduction

The `al-dmt:interleave-path-config` subprofile, bit rate parameter settings are configured to control the use of the interleave path channel for both upstream and downstream ADSL traffic.

Default settings

```
[in AL-DMT/{ any-shelf any-slot 0 }:interleave-path-config]
min-bitrate-up = 128
min-bitrate-down = 128
max-bitrate-up = 1024
max-bitrate-down = 8000
planned-bitrate-up = 1024
planned-bitrate-down = 8000
```

Parameter descriptions

Parameter	Setting
`min-bitrate-up`	Specifies the minimum bit rate for upstream traffic, from 0Kbps through 2016Kbps. The default value is 128Kbps. **Important!** ***Not valid for the rate adaptation setting of operator-controlled.***
`min-bitrate-down`	Specifies the minimum bit rate for downstream traffic. The valid settings are: 0Kbps through 18016Kbps 0Kbps through 24544Kbps The default value is 128Kbps. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`max-bitrate-up`	Specifies the maximum bit rate for upstream traffic, from 0Kbps through 3480Kbps. The default value is 1000Kbps. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***

Parameter	Setting
`max-bitrate-down`	Specifies the maximum bit rate for downstream traffic. The valid settings are: 0Kbps through 18016Kbps 0Kbps through 24544Kbps The default value is 8000Kbps. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`planned-bitrate-up`	Specifies the constant bit rate for upstream traffic when operator-controlled rate-adaptive mode is in use. Valid values are from 0Kbps through 2016Kbps. The default value is 512Kbps. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***
`planned-bitrate-down`	Specifies the constant bit rate for downstream traffic. The valid settings are: 0Kbps through 18016Kbps 0Kbps through 24544Kbps The default value is 1000Kbps. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***

Optimum setting example

For optimum performance under most conditions when the rate adaption setting is set to `operator-controlled`, interleave bit rates should be configured as shown in the following example. The example shows how the bit rates are set for the first interface of a LIM in slot 2.

```
read al-dmt { 1 2 1 }
set interleave-path-config max-bitrate-up = 1280
set interleave-path-config max-bitrate-down = 12480
set interleave-path-config min-bitrate-up = 32
set interleave-path-config min-bitrate-down = 32
write
```

□

Delay parameters

Introduction

Data interleaving increases the ability of the system to tolerate noise on the line. Additionally, it increases the latency (delay) of the data traffic.

Default settings

Following are the Interleave-Path-Config subprofile parameters, shown with default values for specifying the maximum tolerable delay for interleaver/deinterleaver operations:

```
[in AL-DMT/{ any-shelf any-slot 0 }:interleave-path-config]
max-delay-up = 16
max-delay-down = 16
min-inp-down = auto
min-in-up = auto
```

Parameter descriptions

Parameter	Setting
`max-delay-up`	Specifies the maximum milliseconds of delay allowed in the upstream direction, as a result of interleaving data. The valid range is 0 through 64. The default value is 16 milliseconds.
`max-delay-down`	Specifies the maximum milliseconds of delay allowed in the downstream direction as a result of interleaving data. The valid range is 0 through 64. The default value is 16 milliseconds.

Parameter	Setting

`min-inp-down`	The setting is only valid on lines using the ADSL2+ protocol.
	Specifies the minimum number of downstream DMT symbols with impulse noise errors that can be corrected. Settings for greater correction result in greater delay and lower data rates. The setting is only valid on lines using ADSL2 or ADSL2+ protocols.
	The valid settings are:
	`no-symbols`
	`half-symbol`
	`one-symbol`
	`two-symbols`
	`auto` -(default) This setting automatically selects a setting of `no-symbols`.

`min-inp-up`	The setting is only valid on lines using the ADSL2+ protocol.
	Specifies the minimum number of upstream DMT symbols with impulse noise errors that can be corrected. Settings for greater correction result in greater delay and lower data rates. The setting is only valid on lines using ADSL2 or ADSL2+ protocols.
	The valid settings are:
	`no-symbols`
	`half-symbol`
	`one-symbol`
	`two-symbols`
	`auto` -(default) This setting automatically selects a setting of `no-symbols`.

The AL-DMT:Fast-Path-Config subprofile

Purpose

This section describes the parameters of the `Fast-Path-Config` subprofile.

Contents

This section contains information on the following topic for this subprofile:

Fast-Path-Config parameters

Introduction

The `Fast-Path-Config` subprofile contains parameters that set the upstream and downstream bit rate for the fast path.

Default settings

The following configuration shows the default settings for the `fast-path-config` subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:fast-path-config]
min-bitrate-up = 128
min-bitrate-down = 128
max-bitrate-up = 1024
max-bitrate-down = 8000
planned-bitrate-up = 1024
planned-bitrate-down = 8000
```

Parameter descriptions

The Fast-Path-Config and the Interleave-Path-Config subprofiles have the same set of bit rate parameters. For a detailed description of these parameters refer to their description in **Bit rate parameters**.

The AL-DMT:Margin-Config subprofile

Overview

Purpose

This section describes the AL-DMT:Margin-Config subprofile. It contains parameters used to set the noise density and the length of time the noise must be present, to trigger rate adaption. The noise margins can be controlled to ensure that the line meets or stays within the noise limits required by DMT standards.

Contents

This section contains information on the following topics for this subprofile:

Noise margin parameters

Description

The noise margin parameters are used to set the amount of noise that trigger rate adaption.

noise margin parameter defaults

The following default values configure the target noise margins on the ADSL-DMT line:

```
[in AL-DMT/{ any-shelf any-slot 0 }:margin-config]
target-noise-margin-up = 6
target-noise-margin-down = 6
min-noise-margin-up = 6
min-noise-margin-down = 6
max-add-noise-margin-up = 31
max-add-noise-margin-down = 31
max-margin-enabled = no
```

Noise margin parameter descriptions

Parameter	Setting
`target-noise-margin-up`	Specifies the upstream noise margin, relative to 0dB, that must be present before the line can initialize successfully and rate adapt during normal operations. The valid range is 0dB through 31dB, with a practical limitation of 15dB set by the modem software. The default is 6dB.
`target-noise-margin-down`	Specifies the downstream noise margin, relative to 0dB, that must be present before the line can initialize successfully and rate adapt during normal operations. The valid range is 0dB through 31dB, with a practical limitation of 15dB set by the modem software. The default is 6dB.
`min-noise-margin-up`	*Not currently supported on the VDSL LIM.* Any value entered for this parameter is not currently implemented by TAOS.
`min-noise-margin-down`	*Not currently supported on the VDSL LIM.* Any value entered for this parameter is not currently implemented by TAOS.

Parameter	Setting
`max-add-noise-margin-up`	Maximum upstream noise margin beyond the `target-noise-margin-up` setting that the line tolerates, relative to 0dB, before attempting to reduce power output to bring the margin below this limit. The valid range is 0dB through 31dB. The default is 31dB
`max-add-noise-margin-down`	Maximum downstream noise margin beyond the `target-noise-margin-down` setting that the line tolerates, relative to 0dB, before attempting to reduce power output to bring the margin below this limit. The valid range is 0dB through 31dB. The default is 31dB
`max-margin-enabled`	*Not currently supported on the VDSL LIM.*

Noise margin operation

Purpose

This section describes the interaction between noise and power settings.

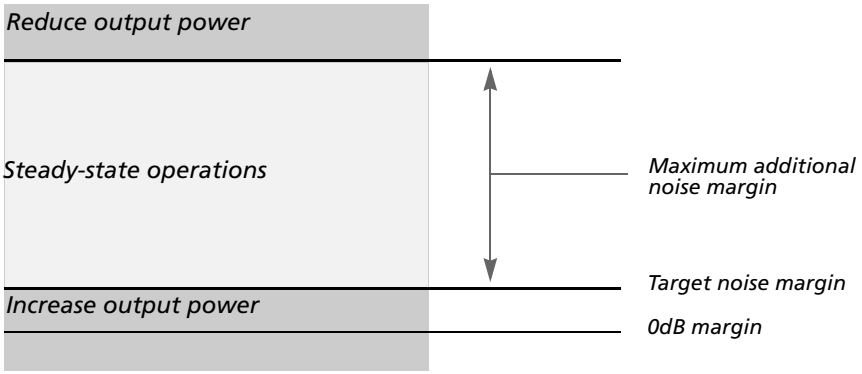
Introduction

The line tolerates a certain level of random frequency voltage (noise) with respect to its received signal. Noise margins are defined in decibels (dB). A BER of 10^{-7}represents 0dB.

Behavior

At train-up, the ADSL transceiver unit (ATU) attempts to reduce the output power if the maximum noise level is exceeded. If the noise drops below a minimum margin, the ATU attempts to increase the power output until the noise level is at or above the configured minimum.

Figure 3-1 Noise margin parameters and power adjustments relationship



LIM power vs. noise

On many loops, a Stinger VDSL LIM that has trained to ADSL or ADSL2+ protocols uses large power margins. To avoid excessive power margins, you can configure the Stinger unit with a maximum downstream noise margin value that it translates into a maximum power output value. The Stinger unit attempts to reduce the transmit power by a maximum of 12dB to achieve the desired maximum downstream noise margin.

On clean short loops with low requested rates, the margin might still be high but the output power is reduced. Power reduction is more significant on short loops where the requested downstream rates are less than the maximum possible—the lower the requested rate, the lower the transmit power.

Recommended power margin

Set the maximum margin to a value close to 8dB for a system with typical noise patterns. You can set a higher value for a system with greater noise patterns.

Example setting

The following sample configuration enables margin management on an ADSL2+ LIM and sets the maximum power margin value to 10:

```
[in AL-DMT/{ shelf-1 slot-2 1 }:margin-config]
set max-add-noise-margin-down = 10
set max-margin-enabled = yes
```

Setting limitation

Ensure that the value you set for the `max-add-noise-margin-down` parameter is not less than that of the `target-noise-margin-down` parameter.

If the `max-add-noise-margin-down` parameter value is lesser than that of `target-noise-margin-down` parameter, then the system to generates the following error message:

```
error: Setting in MARGIN not supported for card.
```

4 The VDSL-Config subprofile

Overview

Purpose

This chapter describes the parameters and profiles contained in the AL-DMT:VDSL-Config subprofile.

Contents

This chapter describes configuration information for these subprofiles.

VDSL-config subprofile overview

Introduction

Parameter settings in the subprofiles contained in the AL-DMT:VDSL-Config subprofile are used to configure the line for VDSL service when the `dsl-type` parameter, in the AL-DMT profile, is set to `vdsl`.

VDSL-Config contents

The following listing illustrates the subprofiles contained in the AL-DMT:VDSL-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config]
   line-config = { 1 ansi ptm-64-65 auto-select fast fast automatic-at-
   startup aut+
   vdsl2-config = {europe, p12a, b8-4-998-m2x-a, eu-32, eu-32 }
   Spectrum-config = { bp-998 a-25-138 cabinet a m1 m1 { no no no no }
   none no }
   fast-path-config = { 100 1000 30000 60000 0 0 0 0 }
   interleave-path-config = { 100 1000 30000 60000 0 0 0 0 no-symbols no-
   symbols }
   margin-config = { 60 60 40 40 100 100 }
```

VDSL-Config:Line-Config subprofile

Introduction

Parameter settings in this subprofile are used to configure the line for VDSL service when the `dsl-type` parameter, in the AL-DMT profile, is set to `vdsl`.

Default settings

The following listing illustrates the default settings of the AL-DMT:VDSL-Config:Line-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config:line-config]
   nailed-group = 1
   standard = ansi
   ptm-encapsulation = ptm-64-65
   line-code = auto-select
   line-latency-down = fast
   line-latency-up = fast
   rate-adapt-mode-up = automatic-at-startup
   rate-adapt-mode-down = automatic-at-startup
   rate-adapt-ratio-up = 0
   rate-adapt-ratio-down = 0
   max-aggr-power-level-up = 115
   max-aggr-power-level-down = 145
   trellis-encoding = yes
   loop-back = none
   bit-swapping = yes
   upbo = disabled
```

Parameter descriptions

The following table describes the functions associated with the available parameter settings in the AL-DMT:VDSL-Config:Line-Config subprofile.

Parameter	Setting
`nailed-group`	Specifies the nailed-group number for the ADSL-DMT physical interface. A `connection` or RADIUS profile uses this number to specify the interface. Because each interface is assigned a unique default number, you do not need to modify the value of this parameter. If you assign a new value, it must be a number from 1 through 1024 that is unique within the system.
`standard`	Specifies the VDSL standard for the port. Valid values are: `ansi`—(the default) The port uses the T1.424 VDSL standard `etsi`— The port uses the ETSI 101 270-1 VDSL standard.

Parameter	Setting
ptm-encapsulation	Specifies the packet transfer mode encapsulation to be used for the frames. Valid values are: ptm-64-65— The default 64/65-octet encapsulation is used. (IEEE 802.3ah-2004, Clause 61) hdlc—HDLC encapsulation is used. (ITU-T G993.1, Section H.4.1 and ETSI TS 101 270-2, Section 6.2.4.2.1) **Important!** ptm-encapsulation has to be set to ptm-hdlc for ether-drop calls to come up.
line-code	Specifies the DMT line code to be used for training. Valid values are: auto-select—In this release, the LIM attempts to train using VDSL. Currently, automatic selection between VDSL and VDSL2 is not supported. vdsl—The LIM attempts to train using VDSL. vdsl2—The LIM attempts to train using VDSL2.
line-latency-down	Specifies the VDSL latency path to be used for downstream data transport. Valid values are: none— Currently not supported on the VDSL LIM. fast—(the default) Sets the delay to the lowest possible value. interleave—Sets the latency path to interleave. both—Not used. Ensure that the line-latency-up and line-latency-down values are equal before a write profile is performed, otherwise the profile is rejected as having an invalid setting. This is consistent with adsl2plus capable packs. For related settings, see “Bit rate parameters” (p. 4-16)and “The VDSL-Config:Fast-Path-Config subprofile” (p. 4-20).

Parameter	Setting
line-latency-up	Specifies the VDSL latency path to be used for upstream data transport. Valid values are: none— Currently not supported on the VDSL LIM. fast—(the default) Sets the delay to the lowest possible value. interleave—Sets the latency path to interleave. both—Not used. Ensure that the line-latency-up and line-latency-down values are equal before a write profile is performed, otherwise the profile is rejected as having an invalid setting. This is consistent with adsl2plus capable packs. For related settings, see "Bit rate parameters" (p. 4-16)and "The VDSL-Config:Fast-Path-Config subprofile" (p. 4-20).
rate-adapt-mode-up	Specifies the rate-adaptive mode for upstream and downstream training. Valid settings are: automatic-at-startup—Specifies that the rate is selected during the startup process, based on the settings of the margin-config subprofile. operator-controlled—Specifies a fixed rate to which the port trains if the settings in the margin-config subprofile are satisfied.
rate-adapt-mode-down	Not used—This is controlled by the setting of the rate-adapt-mode-up parameter.
rate-adapt-ratio-up	Not used.
rate-adapt-ratio-down	Not used
max-aggr-power-level-up	The maximum aggregate output power, in tenths of a dBm, allowed on the line in the upstream direction. A larger setting may result in greater capacity. Valid range is 0 through 145. The default value is 115.
max-aggr-power-level-down	The maximum aggregate output power, in tenths of a dBm, allowed on the line in the downstream direction. A larger setting may result in greater capacity. Valid range is 0 through 145. The default value is 145.
trellis-encoding	Enables or disables trellis encoding Valid values are: yes—(the default) Trellis encoding is enabled. no—Trellis encoding is disabled.

Parameter	Setting
`loop-back`	Sets the loopback status of the line. Valid values are: `none`—(the default) No loopback is set. The line passes data normally. `analog`— Currently not supported on the VDSL LIM. `digital`—A digital loopback is established. Only the digital option is supported
`bit-swapping`	Enables or disables the noise compensation feature, bit-swapping. Bit-swapping enable or disable setting is ignored. Bit-swapping is always on.
`upbo`	Sets the status of upstream power back-off. This can be enabled to provide spectral compatibility between loops of different lengths in the same binder. Valid values are: `disabled`—(the default) Upstream power back-off is disabled. `automatic`—Upstream power back-off is enabled.

VDSL-Config:VDSL2-Config subprofile

Introduction

Parameters in this subprofile enable you to configure VDSL2 settings. This subprofile can be set when `vdsl2` is set as the value for `line-code` in the `al-dmt: vdsl-config:line-config` subprofile.

The `vdsl2-config` subprofile is active only when the `line-code` parameter in the `vdsl-config:line-config` subprofile is set to `vdsl2`. When the `vdsl2-config` subprofile is active, then the certain settings are ignored in the following subprofiles:

- In the `vdsl-config: line-config` subprofile, the `standard` setting is ignored.
- In the `vdsl-config: spectrum-config` subprofile, the following settings are ignored.
  - `band-plan`
  - `u0-band`
  - `scenario`
  - `etsi-variant`
  - `up-psd-template`
  - `down-psd-template`
  - `adsl-presence`
  - `adsl-friendly`

Default Settings

Following is a listing of the `vdsl2-config` subprofile with its default settings.

```
[in AL-DMT/{ shelf-1 slot-4 1 }:vdsl-config:vdsl2-config]
region = europe
profile = p12a
mask-europe = b8-4-998-m2x-a
mask-up-north-america = eu-32
mask-dn-north-america = d-32
```

Parameter descriptions

Parameter	Setting
region	Specifies the region. The settings for this parameter map to the annex A and annex B of G993.2. The annex B denotes Europe and annex A denotes North America. Valid values include europe and north-america. europe:When this value is selected, note the following rules in parameter settings: • This value uses the mask-europe settings. The mask-up/down-north-america are ignored. • With the region selected as Europe, the valid profile selections are 8a, 8b, 8c, 8d and 12a, 12b. The 8X profiles are restricted from using the b7-X settings. When you select either p8a or p8b as the profile setting, then b8-X is the valid mask-europe setting. Setting mask-europe to one of the b7-X settings, rejects the profile for this combination of region and profile. north-america:When this value is selected, note the following rules in parameter settings: • This value uses the mask-up-north-america, mask-dn-north-america settings. The mask-europe setting is ignored. • With the region selected as North America, the valid profile selections are p8c, p8d, p12a, and p12b. Setting profile to p8a or p8b, rejects the profile. If the mask-up-north-america and mask-down-north-america do not match, such as eu-32 and d-64, then the profile is rejected.
profile	Specifies the VDSL2 profile. Valid values: • p8a • p8b • p8c • p8d • p12a • p12b The settings for these parameter directly map to settings in the G993.2 standard.

Parameter	Setting
`mask-europe`	Specifies the VDSL2 mask for the value `europe`. Valid values: • `b8-1-998-m1x-a` • `b8-2-998-m1x-b` • `b8-3-998-m1x-nus0` • `b8-4-998-m2x-a` • `b8-5-998-m2x-m` • `b8-6-998-m2x-b` • `b8-7-998-m2x-nus0` • `b7-1-997-m1c-a-7` • `b7-2-997-m1x-m-8` • `b7-3-997-m1x-m` • `b7-4-997-m2x-m-8` • `b7-5-997-m2x-a` • `b7-6-997-m2x-m` The settings for these parameter directly map to settings in the G993.2 standard.
`mask-up-north-america`	Specifies theVDSL2 upstream mask for the value north-america. Valid values: • `eu-32` • `eu-64` The settings for these parameter directly map to settings in the G993.2 standard.
`mask-dn-north-america`	Specifies the VDSL2 downstream mask for the value `north-america`. Valid values: • `d-32` • `d-64` The settings for these parameter directly map to settings in the G993.2 standard.

VDSL-Config:Spectrum-Config subprofile

Introduction

Parameter settings in this subprofile are used to configure spectrum usage when the `dsl-type` parameter, in the AL-DMT profile, is set to `vdsl`.

Default settings

The following listing illustrates the default settings of the AL-DMT:VDSL-Config:Spectrum-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config:spectrum-config]
   bandplan = bp-998
   u0-band = a-25-138
   scenario = cabinet
   etsi-variant = a
   up-psd-template = m1
   down-psd-template = m1
   notch-config = { no no no no }
   adsl-presence = none
   adsl-friendly = no
```

Parameter descriptions

The following table describes the functions associated with the available parameter settings in the AL-DMT:VDSL-Config:Spectrum-Config subprofile.

Parameter	Setting
`bandplan`	Specifies the VDSL band plan. Valid values are: `998`—(the default) VDSL band plan 998 is enabled. `997`—VDSL band plan 997 is enabled.
`u0-band`	Specifies if the U0 band is used and sets the bandwidth. Valid values are: `none`—The U0 band is not used. `a-25-138`—(the default) The U0 band is set to extend from 25KHz to 138KHz. `b-138-276`—The U0 band is set to extend from 138KHz to 276KHz. `m-25-276`—The U0 band is set to extend from 25KHz to 276KHz.

Parameter	Setting
scenario	Specifies if the deployment scenario is fiber to the cabinet or fiber to the exchange. Valid values are: cabinet—(the default) Sets the deployment scenario as FTT cabinet. exchange—Sets the deployment scenario as FTT exchange.
etsi-variant	This parameter is used only when the scenario parameter is set to cabinet and the standard parameter in the vdsl-config:line-config is set to etsi. It selects the PSD variant that is used. Valid values are: a— Suppresses frequencies below 945Khz. b— Suppresses frequencies below 1100Khz. This setting is ignored when the adsl-friendly parameter is set to yes
up-psd-template	Selects the M1 or M2 PSD mask for both upstream and downstream transmission. Valid values are: M1—(the default) Selects the M1 mask. M2—Selects the M2 mask.
down-psd-template	Not used.
notch-config	A subprofile with parameters to select VDSL notch filters. See "VDSL-Config:Spectrum-Config:Notch-Config subprofile" (p. 4-12)
adsl-presence	Used only when the standard is set to ETSI and scenario to exchange in the vdsl-config:line-config. Selects the type of ADSL that is present in the binder group. The Valid values are: none—(the default) No ADSL in the binder group. aop—Selects ETSI p2 mask (ISDN). aoi— Selects ETSI p1 mask (POTS).
adsl-friendly	Determines whether to suppress the PSD below 1100KHz for operation with ADSL service in the same binder group. Valid values are: no—(the default) PSD not suppressed. yes—PSD suppressed below 1100KHz.

VDSL-Config:Spectrum-Config:Notch-Config subprofile

Introduction

Parameter settings in this subprofile are used to configure the notch filters on VDSL connections.

Guidelines for Usage

- For vdsl2 train-ups, set the nc-XXXXk notches to no. Use the notch-enable variable to enable or disable notches.
- A maximum of 16 notches can be set at any given time. Notches that overlap in frequency range still count one each to the total number of notches.
- For VDSL1, you can use any combination of nc-XXXXk and notch-enable values up to 16 total notches.

Default settings

The following listing illustrates the default settings of the AL-DMT:VDSL-Config:Spectrum-Config:Notch-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config:spectrum-config:notch-
   config]
   nc-1810k = no
   nc-3500k = no
   nc-7000k = no
   nc-10100k = no
   notch-enable = [ no no no no no no no no no no no no no no no no no no
   no no no+
```

Parameter descriptions

The following table lists the notch filters that can be enabled by the parameters in the AL-DMT:VDSL-Config:Spectrum-Config:Notch-Config subprofile.

Parameter	Setting
`nc-1810k`	Sets a notch filter for 1810Khz to 2000Khz. Valid values are: `no`—(the default) `yes`—The notch filter is set.

Parameter	Setting
nc-3500k	Sets a notch filter for 3500Khz to 3800Khz if the standard parameter in the vdsl-config/line-config subprofile is set to etsi. If the standard parameter in the vdsl-config/line-config subprofile is set to ansi, this notch filter is set for 3500Khz to 4000Khz. Valid values are: no—(the default) The notch filter is not set. yes—The notch filter is set.
nc-7000k	Sets a notch filter for 7000Khz to 7100Khz if the standard parameter in the vdsl-config/line-config subprofile is set to etsi. If the standard parameter in the vdsl-config/line-config subprofile is set to ansi, this notch filter is set for 7000Khz to 7300Khz. Valid values are: no—(the default) The notch filter is not set. yes—The notch filter is set.
nc-10100k	Sets a notch filter for 10100Khz to 10150Khz. Valid values are: no—(the default) The notch filter is not set. yes—The notch filter is set.
notch-enable	The notch-enable variable lets you select which RFI notches to enable or disable. Valid values are yes and no. The yes value enables an RFI notch and a no value disables an RFI notch. Valid values are yes and no. The yes value enables an RFI notch and a no value disables an RFI notch.

The following table provides a mapping of notch-enable values to RFI notch ranges:

Index	RFI notch
0	1800-2000
1	1810-2000
2	2173-2191
3	2850-3155
4	3400-3500
5	3500-3800
6	3500-4000
7	3800-4000
8	4200-4215
9	4650-4850

Index	RFI notch
10	5450-5730
11	5900-6200
12	6300-6320
13	6525-6765
14	7000-7100
15	7000-7200
16	7000-7300
17	7200-7450
18	8405-8420
19	8815-9040
20	9400-9900
21	10005-10100
22	10100-10150
23	11175-11400
24	11600-12100

VDSL-Config:Interleave-Path-Config subprofile

Overview

Purpose

This section describes the parameters of the VDSL-Config:Interleave-Path-Config subprofile.

Contents

This section contains information on the following topics for this subprofile:

Bit rate parameters

Introduction

The `vdsl-config:interleave-path-config` subprofile, bit rate parameter settings are configured to control the use of the interleave path channel for both upstream and downstream VDSL traffic.

Default settings

```
[in AL-DMT/{ any-shelf any-slot 0 };vdsl-config:interleave-path-config]
min-bitrate-up = 100
min-bitrate-down = 1000
max-bitrate-up = 30000
max-bitrate-down = 6000
planned-bitrate-up = 0
planned-bitrate-down = 0
```

Parameter descriptions

Parameter	Setting
`min-bitrate-up`	Specifies the minimum requested bit rate for upstream traffic in Kbps, from 0 through 60000. The default value is 100. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`min-bitrate-down`	Specifies the minimum requested bit rate for downstream traffic in Kbps, from 0 through 80000. The default value is 1000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`max-bitrate-up`	Specifies the maximum requested bit rate for upstream traffic in Kbps, from 0 through 60000. The default value is 30000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***

Parameter	Setting
`max-bitrate-down`	Specifies the minimum requested bit rate for downstream traffic in Kbps, from 0 through 80000. The default value is 60000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`planned-bitrate-up`	Specifies the constant bit rate in Kbps for upstream traffic when operator-controlled rate-adaptive mode is in use. Valid values are from 0 through 60000. The default value is 0. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***
`planned-bitrate-down`	Specifies the constant bit rate for downstream traffic. The valid settings are: 0Kbps through 18016Kbps 0Kbps through 24544Kbps The default value is 1000Kbps. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***

Optimum setting example

For optimum performance under most conditions when the rate adaption setting is set to `operator-controlled`, interleave bit rates should be configured as shown in the following example. The example shows how the bit rates are set for the first interface of a LIM in slot 2.

```
read al-dmt { 1 2 1 }
set interleave-path-config max-bitrate-up = 1280
set interleave-path-config max-bitrate-down = 12480
set interleave-path-config min-bitrate-up = 32
set interleave-path-config min-bitrate-down = 32
write
```

□

Delay parameters

Introduction

Data interleaving increases the ability of the system to tolerate noise on the line. However, it increases the latency (delay) of the data traffic.

Default settings

Following are the Interleave-Path-Config subprofile parameters shown with default values for specifying the maximum tolerable delay for interleaver/deinterleaver operations:

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config:interleave-path-config]
max-delay-up = 0
max-delay-down = 0
max-inp-up = no-symbols
max-inp-down = no-symbols
```

Parameter descriptions

Parameter	Setting
`max-delay-up`	Specifies the maximum milliseconds of delay allowed in the upstream direction as a result of interleaving data. The valid range is 0 through 255. The default value is 0 milliseconds.
`max-delay-down`	Specifies the maximum milliseconds of delay allowed in the downstream direction as a result of interleaving data. The valid range is 0 through 255. The default value is 0 milliseconds.

`max-inp-up`	Specifies the maximum number of upstream DMT symbols with impulse noise errors that can be corrected. Settings for greater correction result in greater delay and lower data rates. This setting is used on lines using the VDSL protocol.
	The valid values are:
	`no-symbols`—(the default)
	`half-symbol`
	`one-symbol`
	`two-symbols`
	`four-symbols`
	`eight-symbols`
	`sixteen-symbols`

`max-inp-down`	Specifies the maximum number of downstream DMT symbols with impulse noise errors that can be corrected. Settings for greater correction result in greater delay and lower data rates. This setting is used on lines using the VDSL protocol.
	The valid values are:
	no-symbols -(the default)
	`half-symbol`
	`one-symbol`
	`two-symbols`
	`four-symbols`
	`eight-symbols`
	`sixteen-symbols`

The VDSL-Config:Fast-Path-Config subprofile

Purpose

This section describes the parameters of the Fast-Path-Config subprofile.

Introduction

The `al-dmt:vdsl-config:fast-path-config` subprofile, bit rate parameter settings are configured to control the use of the fast path for both upstream and downstream VDSL traffic.

Default settings

```
[in AL-DMT/{ any-shelf any-slot 0 };vdsl-config:fast-path-config]
min-bitrate-up = 100
min-bitrate-down = 1000
max-bitrate-up = 30000
max-bitrate-down = 60000
planned-bitrate-up = 0
planned-bitrate-down = 0
fec-max-up = 0
fec-max-down = 0
```

Parameter descriptions

Parameter	Setting
`min-bitrate-up`	Specifies the minimum bit rate for upstream traffic, from 0 through 60000000. The default value is 100000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`min-bitrate-down`	Specifies the minimum bit rate for downstream traffic, from 0 through 80000000. The default value is 1000000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`max-bitrate-up`	Specifies the maximum bit rate for upstream traffic, from 0 through 60000000. The default value is 30000000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`max-bitrate-down`	Specifies the maximum bit rate for downstream traffic, from 0 through 80000000. The default value is 60000000. **Important!** ***Not valid for the rate adaptation setting of `operator-controlled`.***
`planned-bitrate-up`	Specifies the constant bit rate for upstream traffic when operator-controlled rate-adaptive mode is in use. Valid values are from 0Kbps through 2016Kbps. The default value is 512Kbps. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***
`planned-bitrate-down`	Specifies the constant bit rate for downstream traffic. The valid settings are: 0Kbps through 18016Kbps 0Kbps through 24544Kbps The default value is 1000Kbps. **Important!** ***Only used for the rate adaptation setting `operator-controlled`.***

Parameter	Setting
`fec-max-up`	Currently not supported on the VDSL LIM.
`fec-max-down`	Currently not supported on the VDSL LIM.

VDSL-Config:Margin-Config subprofile

Introduction

Parameter settings in this subprofile are used to configure upstream and downstream margin requirements when the `dsl-type` parameter, in the AL-DMT profile, is set to `vdsl`.

Default settings

The following listing illustrates the default settings of the AL-DMT:VDSL-Config:Margin-Config subprofile.

```
[in AL-DMT/{ any-shelf any-slot 0 }:vdsl-config:margin-config]
   target-noise-margin-up = 60
   target-noise-margin-down = 60
   min-noise-margin-up = 40
   min-noise-margin-down = 40
   max-noise-margin-up = 100
   max-noise-margin-down = 100
```

Parameter descriptions

The following table describes the functions associated with the available parameter settings in the AL-DMT:VDSL-Config:Margin-Config subprofile.

Parameter	Setting
`target-noise-margin-up`	Specifies the upstream noise margin, relative to 0dB that must be present before the line can initialize successfully and rate adapt during VDSL operations. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 60 (6dB).
`target-noise-margin-down`	Specifies the downstream noise margin, relative to 0dB that must be present before the line can initialize successfully and rate adapt during VDSL operations. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 60 (6dB).
`min-noise-margin-up`	The noise margin setting that is used if the minimum bit rate cannot be achieved on the line using the target noise margin. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 40 (4dB).
`min-noise-margin-down`	The noise margin setting that is used if the minimum bit rate cannot be achieved on the line using the target noise margin. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 40 (4dB).

Parameter	Setting
`max-noise-margin-up`	The upstream maximum noise margin beyond the `up-target-noise-margin` setting that the line tolerates, relative to 0dB, before attempting to reduce power output to bring the margin below this limit. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 100 (10dB).
`max-noise-margin-down`	The downstream maximum noise margin beyond the `down-target-noise-margin` setting that the line tolerates, relative to 0dB, before attempting to reduce power output to bring the margin below this limit. The valid range, in tenths of a dB, is 0 through 320 (0dB through 32dB). The default setting is 100 (10dB).

5 VDSL Ethernet connections

Overview

Purpose

This chapter describes the profiles and parameters used to configure encapsulated Ethernet connections on VDSL ports.

Contents

This chapter describes information on the following topics.

Selecting Ethernet encapsulation

Introduction

Layer-2 Ethernet connections are supported on ports configured for VDSL connections. For these connections, you must configure parameters in the `connection` profile for Ethernet encapsulation, and associate that profile with the VDSL port.

Other aspects of the `connection` profile including PPPOE, BIR, and VLAN operation are documented in the *Stinger IP Control Module Guide*.

Ports configured for ADSL, ADSL2, or ADSL2+ connections support ATM at Layer 2, but do not support layer-2 Ethernet. For information about configuring ATM connections on ports configured for ADSL, ADSL2, or ADSL2+, see the *Stinger ATM Configuration Guide*, and the *Stinger IP Control Module Guide*.

The `encapsulation-type` parameter

The `encapsulation-protocol` parameter in the `connection` profile sets the type of encapsulation that will be used for the connection. If the connection will be used for a VDSL port, the `ethernet` setting must be applied, as shown below.

```
[in CONNECTION/"" (new)]
...
encapsulation-protocol = ethernet
```

Parameter	Setting
encapsulation-protocol	Specifies the encapsulation protocol to be used when communicating with the named station in the connection. Valid values are: mpp—The Multiplexed Packet Protocol used with Pipeline communications with the Pipeline. mp—Standard MP (RFC 1717) ppp—Standard PPP frame-relay—Frame relay frame-relay-circuit—Frame Relay circuit tcp-raw—RAW TCP, no encapsulation atm—Asynchronous Transmission Mode atm-frame-relay-circuit—ATM to Frame Relay circuit atm-circuit—(default) ATM circuit mpp—The Ascend Multiplexed Packet Protocol used with Pipeline communications with the Pipeline atm-ima—ATM IMA interface ethernet—Ethernet encapsulation to a VDSL subscriber

VDSL Ethernet encapsulation options

Introduction

When Ethernet encapsulation is selected, the parameters in the `ether-options` subprofile are used for configuring the connection. ATM parameter settings in the `atm-options`, `atm-connect-options`, and `atm-qos-options` are ignored.

The `ether-options` subprofile

The following illustrates the default settings of the `ether-options` subprofile:

```
[in CONNECTION/"" (new):ether-options]
nailed-group = 1
vlan-id = 0
usr-up-stream-contract = default
usr-dn-stream-contract = default
```

Parameter	Setting
`nailed-group`	The number that identifies the interface or group of interfaces associated with this connection. A numeric field with valid entries from 0 to 65535.
`vlan-id`	*Not currently supported.* The IEEE 802.1Q VLAN tag value added to IP packets transmitted on the Ethernet interface. The valid range is from 0 to 4095, but for full compatibility with IEEE 802.1Q, Lucent recommends that you do not use the vlan-id values of 0, 1, or 4095. However, the system does not prevent you from assigning these values.
`usr-up-stream-contract`	Not currently supported. Only DS ether-qos shaping supported..
`usr-dn-stream-congract`	The name of the `ether-qos` profile to be applied to downstream traffic. **Important!** If the contract named in this parameter does not exist, any ports using this connection will fail to come up.

VDSL Ethernet QOS

Introduction

The quality of service settings for VDSL encapsulated Ethernet connections are configured in a `ether-qos` profile that is identified by a contract name.

Setting bandwidth parameters in the ETHER-QOS profile

The following listing of the ETHER-QOS profile displays the new bandwidth parameters:

```
tt-25-jul>read ether-qos tt-4m
ETHER-QOS/tt-4m read
tt-25-jul>lis
[in ETHER-QOS/tt-4m]
contract-name* = tt-4m
priority = 0
committed-information-rate = 4000
committed-burst-size = 5 << new field
excess-information-rate = 1000 << new field
excess-burst-size = 6 << new field
```

Parameter	Setting
`contract-name`	A text field of up to 31 characters that defines the name for this quality of service contract
`priority`	The priority of this contract This is a numeric field with valid values from 0 to 3. Zero (0) represents the lowest priority.
`committed-information-rate`	The bandwidth, in kbps, allocated to a connection using this contract. This is a numeric field with valid values from 0 to 1000000. A setting of zero (0) will result in use of the full bandwidth of the connection.
`committed-burst-size`	Determines the maximum number of frames that can be transmitted at the committed information rate before they become candidates for discard or marking. The valid range for this value is from 0 through 256.
`excess-information-rate`	The rate allocated to the connection (kbps). The valid range for this value is from 0 through 1000000.
`excess-burst-size`	Determines the maximum number of frames that can be transmitted at the excess information rate before they become candidates for discard or marking. The valid range for this value is from 0 through 256.

Validation

If CIR is set, CBS must not be zero. If EIR is set, EBS must not be zero.

Important! The `priority` parameter in the `ETHER-QOS` profile applies only for ATM backplane VDSL LIM (24 port LIM). It does not apply to the Ethernet backplane VDSL LIM.

Ether CAC for VDSL based cards

This feature adds CAC support for Ethernet based connections on the VDSL cards. Ether CAC utilizes the ETHER-QOS profiles attached to Ethernet based connections for performing CAC on them.

Ether CAC is supported on IP2100, IP200 and CMv2 control modules. In case of slot based CAC, the up-stream and down-stream CAC bandwidth is shared among ATM (ADSL) and Ethernet (VDSL) connections.

Settings and configuration

All settings for Ether CAC remain same as that of ATM CAC except, in ether CAC the *Ether-QoS* profile is used for performing CAC on the connection.

It is required to configure the vdsl-config appropriately in the *AL-DMT* profile of the port on which the connection (which is subjected to CAC) is bought up.

ethercacstat command

This command displays the Ether CAC statistics.

ethercacstat -[s | b| a]

Command Element	Description
s	displays ether CAC summary for slot.
b	displays CAC bandwidth allocation for slot.
a	displays all connection allocation.

Important! The 'b' option displays the sum of bandwidths allocated to ethernet and atm connections combined for that slot. Use the '*atmcacstat*' command to view ATM CAC statistics.

Example to display ether CAC summary for slot:

```
admin> etherc -s 1 1
   ETHER CAC SLOT SUMMARY:
   Cac Data for shelf : 1 slot : 1
   UP STREAM
   Allocated Guaranteed B/W : 1000
   DN STREAM
   Allocated Guaranteed B/W : 4414
```

Example to display CAC bandwidth allocation for slot:

```
admin> etherc -b 1 1
   Cac Data for shelf : 1 slot : 1
   UP STREAM
   Total B/W Kbits/sec         : 70000
```

```
Guaranteed B/W Kbits/sec    : 42500
Allocated Guaranteed B/W    : 1000
Available Guaranteed B/W    : 42500
DN STREAM
Total B/W Kbits/sec         : 599040
Guaranteed B/W Kbits/sec    : 599040
Allocated Guaranteed B/W    : 4414
Available Guaranteed B/W : 594626
```

Important! The output of the -b option shows the combined usage of bandwidth by ethernet and atm connections present on a slot.

Example to display all connection allocation

```
admin> etherc -a
   Connection              Stream  Priority        CIR             Count
   bir-1-1                 UP        3              999              1
                           DN        3              3999             1
```

atmcacstat command

This command is modified to indicate that the slot bandwidth is shared among ethernet and atm connections.

atmcacstat -[s | b| p | a | c | t | h]

Command Element	Description
s	displays ether CAC summary for slot
b <shelf> <slot>	displays CAC bandwidth allocation for slot.
p	displays trunk ports and IMA group bandwidth allocation.
a	displays all connection allocation.
c <type>	displays connection by class type. 0 - CBR, 1 - RTVBR, 2 - NRTVBR, 3 - UBR
t	displays the connections requiring downstream shaping.
h	displays the ppp calls whose atm-circuits require downstream shaping.

The 'b' option displays the sum of bandwidths allocated to ethernet and atm connections combined for that slot. Use the 'ethercacstat' command to view Ethernet CAC statistics.

Call support on Ethernet drop for VLIMs

The R9.10 release provides the following call support on VDSL ports on the new GEB VDSL LIM:

- PPPoE calls
- VLAN stacking calls
- VLAN circuit calls

This feature also provides support for following:

- Multiple calls on a single VDSL port
- Connection specific PPPoE-SERVICE profiles
- Multicast on PPPoE calls on VDSL ports of GEB VDSL LIM

The LIM on a COP supports both ADSL and VDSL ports. This feature is specific to VDSL ports of the LIM.

A single VDSL port supports multiple calls. The calls can be either tagged or untagged. The VLAN IDs distinguish a tagged call. A maximum of one untagged call is allowed on a single VDSL port.

A maximum of eight calls are allowed on a single VDSL port. The calls can be a combination of the following:

- PPPoE calls
- VLAN stacking calls
- VLAN circuit calls

Each call is on a specified VLAN ID. Therefore, on a VDSL port, a one-to-one correspondence is established between a connection and a VLAN ID.

Support is not available for:

- Multiple PPPoE calls on a single VLAN ID on a VDSL port.

Setting up a PPP base connection

PPP base connection is setup using a connection profile as shown in the following table:

Profile	Settings
`encapsulation-protocol`	Ethernet.

pppoe-options pppoe	Yes.
ether-options nailed-group	Nailed-group number of VDSL port on which the PPPoE call is expected.
ether-options vlan-id	VLAN-ID with which the PPPoE packets will be sent and received on the specified VDSL port. vlanid=0 represents an untagged connection

A sample configuration:

```
new CONNECTION
set station = ppp-base
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set telco-options nailed-groups = 4103
set mp-options enabled = no
set atm-options nailed-group = 4103
set pppoe-options pppoe = yes
set ether-options nailed-group = 4103
set ether-options vlan-id = 104
write -f
```

Important! While setting up a PPP base connection, set the value of ip-options ip-routing-enabled and bridging-options bridge parameters to “no”.

Setting up a PPPoE connection

You can use the connection profile to set up the PPPoE connections. You can configure the connection in the same way it is configured for PPP calls on ADSL lines.

Connection specific PPPoE-SERVER profiles

You can specify a connection specific PPPoE-SERVER profile by configuring the pppoe->server-profile in the connection profile of PPP base connection. The semantics are same as ATM based PPP base profile.

Ethernet connection profile (PPP base profile)

Ethernet connection profile identifies the VDSL port and VLAN ID on which the PPPoE call comes using the nailed-group parameter. This profile basically corresponds to the ATM-ckt profile used in the case of ADSL lines for PPPoE calls.

Restrictions on PPPoE calls

The following restrictions apply on a PPPoE call:

- Support for Protocol field compression for PPP is not available. Protocol field compression is not recommended in the PPPoE RFC (2516).

- To bring up a PPPoE call, bring up both PPP base call and PPPoE call.

Two connection profiles are required to support these calls. The first connection profile will have `ethernet` as encapsulation protocol and the second connection profile will have `PPP` as encapsulation protocol. Using the nailed-group field, Ethernet `connection` profile identifies the VDSL port on which the PPPoE call comes up. It also identifies the VLAN ID on which the PPPoE call comes up.

VLAN circuit connections

The following associated profiles support the calls:

- VLAN-ETHERNET
- Connection profile

Configuring VLAN-ETHERNET profile

You can configure `VLAN-ETHERNET` profile in the same way as you configure it for ATM based calls.

Configuring VLAN stacking connection

VLAN Stacking connection is setup using a connection profile as shown in the following table:

Profile	Settings
encapsulation-protocol	Set to 'ethernet'
bridging-options bridging-group bridging-options bridge bridging-options bridge-type bridging-options vlan-stack-user-vlan-id	Settings of these parameters are same as the setup for ATM based VLAN stacking connections.
ether-options nailed-group	Set to the nailed-group number of VDSL port on which the VLAN-stacked call is expected.
ether-options vlan-id	Set to the VLAN-ID with which the VLAN-stacking packets are sent and received on the specified VDSL port.

Limitations

- Support for multiple calls on a single VLAN-ID on a VDSL port is not available.

6 Configuration Examples

Overview

Purpose

This chapter provides examples that can be used as guides for initial configuration of an AL-DMT interface on a VDSL LIM.

Contents

This chapter describes configuration information for the following topics:.

Examples for configuration of ADSL

Introduction

The following examples illustrate settings that commonly work well for ADSL protocols. You should modify the specific settings shown here to meet local requirements.

Planned bit rate with protocol detection

The following commands configure the interface to automatically detect and use the correct ADSL protocol. The protocol uses a constant, planned (operator-controlled) bit rate of 56Kbps upstream and 1.5Mbps downstream, and fast channel in both directions:

```
read al-dmt { 1 3 4 }
set enabled = yes
set dsl-type = adsl
set line-config line-code = g.dmt
set line-config line-latency-up = fast
set line-config line-latency-down = fast
set line-config rate-adapt-mode-up = operator-controlled
set line-config rate-adapt-mode-down = operator-controlled
set fast-path-config planned-bitrate-up = 56
set fast-path-config planned-bitrate-down = 1500
write
```

Automatic Bit rate and protocol detection

The following commands configure the interface to automatically detect and use the correct legacy ADSL protocol. It automatically selects the best possible rate at startup time and specifies a possible upstream bit rate range of 56Kbps through 256Kbps and a possible downstream bit rate range of 512Kbps through 1.5Mbps. They also specify use of the interleaved channel in both directions.

```
read al-dmt { 1 3 4 }
set enabled = yes
set dsl-type = adsl
set line-config line-code = g.dmt
set line-config rate-adapt-mode-up = automatic-at-startup
set line-config rate-adapt-mode-down = automatic-at-startup
set line-config line-latency-up = interleave
set line-config line-latency-down = interleave
set interleave-path-config min-bitrate-up = 56
set interleave-path-config max-bitrate-up = 256
set interleave-path-config min-bitrate-down = 512
set interleave-path-config max-bitrate-up = 1500
write
```

Reserving a VPI

The following commands reserve VPI 7 for VP switching on the interface:

```
read al-dmt { 1 3 4 }
set line-config vp-switching-vpi = 7
write
```

□

Examples for configuration of ADSL2+ line codes

Introduction

The following example illustrates line code options that are available to support line rates that are higher than legacy ADSL rates.

Configuration for ADSL2+

Setting the `line-code` in the `line-config` subprofile to `adsl2plus` configures an al-dmt port to attempt to use the ADSL2+ protocol (ITU-T G.992.5). The line attempts to use this protocol and does not train if it is unsuccessful.

```
read al-dmt {1 1 1}
set enabled = yes
set dsl-type = adsl
set line-config line-code = adsl2plus
set line-config rate-adapt-mode-up = automatic-at-startup
set line-config rate-adapt-mode-down = automatic-at-startup
set line-config line-latency-down = interleave
set line-config line-latency-up = interleave
write
```

□

Examples for configuration of VDSL line codes

Introduction

The following example illustrates line code options that are available to support VDSL and VDSL2 line rates.

Configuration for VDSL

Setting the `dsl-type` in the to `vdsl` configures an al-dmt port to use the settings in the `vdsl-config` subprofile to configure the line for the VDSL protocol (ITU-T G.993.1). The line attempts to use this protocol and does not train if it is unsuccessful.

```
read al-dmt {1 1 1}
set enabled = yes
set dsl-type = vdsl
set vdsl-config line-config line-code = vdsl
set vdsl-config line-config rate-adapt-mode-up = automatic-at-
   startup
set vdsl-config line-config rate-adapt-mode-down = automatic-
   at-startup
set vdsl-config line-config line-latency-up = interleave
write
```

Configuration for VDSL2

Setting the `dsl-type` in the to `vdsl2` configures an al-dmt port to use the settings in the `vdsl-config` subprofile to configure the line for the VDSL2 protocol (ITU-T G.993.2). The line attempts to use this protocol and does not train if it is unsuccessful.

```
read al-dmt {1 1 1}
set enabled = yes
set dsl-type = vdsl
set vdsl-config line-config line-code = vdsl2
set vdsl-config line-config rate-adapt-mode-up = automatic-at-
   startup
set vdsl-config line-config rate-adapt-mode-down = automatic-
   at-startup
set vdsl-config line-config line-latency-up = interleave
write
```

7 Checking interface status

Overview

Purpose

This chapter provides information and examples to check the status of an ADSL-DMT interface on a VDSL LIM.

Contents

This chapter describes configuration information for the following topics:

Checking overall status of ADSL-DMT interface

Introduction

The system creates a read-only `al-dmt-stat` profile for each ADSL-DMT interface. The profiles provide statistics and connection status. Following are the relevant parameters, shown with sample settings for an active line:

AL-DMT-STAT example

```
[in AL-DMT-STAT/{ shelf-1 slot-3 4 }]
physical-address* = { shelf-1 slot-3 4 }
line-state = active
spare-physical-address = { any-shelf any-slot 0 }
sparing-state = sparing-none
sparing-change-reason = unknown
sparing-change-time = 0
sparing-change-counter = 0
vpi-vci-range = vpi-0-15-vci-32-127
vp-switching-vpi = 15
physical-status = { 0 coe port-up 128 2944 fast fast 1.4.1 2 +
physical-statistic = { { 1 1 1 } yes 3 passed 3 6 56 19 5 41 +
```

Parameter descriptions

Parameter	Setting
`line-state`	Indicates the overall state of the line. Valid values are: `does-not-exist`—Link is not physically present on board. `disabled`—Line is disabled. `active`—Multipoint is established.
`spare-physical-address`	Indicates the shelf, slot, and port number of the spare (redundant) LIM.
`sparing-state`	Indicates the state of the redundancy function. If redundancy is not enabled, `sparing-none` is the value. If sparing is enabled and the LIM slot is a primary LIM, the value can be `primary-active` or `primary-inactive`. If sparing is enabled and the LIM slot is the secondary (spare) LIM, the value can be `secondary-active` or `secondary-inactive`.

Parameter	Setting
`sparing-change-reason`	Indicates how redundancy is activated. Valid values are `inactive`, `manual` and `automatic`.
`sparing-change-time`	Indicates the time that the last change in redundancy state occurred.
`sparing-change-counter`	Indicates that each redundancy change, for example, primary to secondary, secondary to primary, increments the counter. The counter is reset when the Stinger starts or restarts.
`vpi-vci-range`	Indicates valid range of VPI and VCI for the circuits established for the line. This range can change only after LIM reboot.
`vp-switching-vpi`	Indicates the VPI to be used for VP switching. The rest of the VPIs are used for VC switching.

Checking status of the physical interface

Introduction

The `physical-status` subprofile provides information about the physical interface.

Bit-error-rate-test results

The interface runs a continuous bit-error-rate test (BERT) over its unused bandwidth, so bit-error counts are always available without explicitly running a BERT and disrupting data transmission. Integrated BERT results are displayed by the `accum-bit-err`, `num-sec-valid`, and `num-sec-invalid` parameters.

Physical-status subprofile example

Following are the Physical-Status subprofile parameters shown with sample settings for an active interface:

```
[in AL-DMT-STAT/{ shelf-1 slot-3 4 }:physical-status]
if-group-index = 0
unit-type = coe
dev-line-state = port-up
up-stream-rate-fast = 32736
down-stream-rate-fast = 65824
up-stream-rate-interleave = 0
down-stream-rate-interleave = 0
up-stream-latency = fast
down-stream-latency = fast
firmware-ver = 1.0.1rIK004010
ansi-adsl-ver = 13
initial-adsl-ver = 0
hardware-ver = 19
modem-hw-state = init-ok
accum-bit-err = 0
num-sec-valid = 0
num-sec-invalid = 0
operational-mode = vdsl
last-state-change = { { 12 10 17 } { Thursday October 2005 27
   } }
```

Physical-status details

Parameter	Setting
`if-group-index`	Indicates the SNMP interface group index of the line.
`unit-type`	Indicates the operating mode (should always be COE).

Parameter	Setting
dev-line-state	Indicates the current state of the interface. Valid values are as follows: down—Either there is no connection or the interface is disabled. training—Training with a modem on the other end. port-up—Interface is successfully trained up. loopback—Interface is in special loopback test mode.
up-stream-rate-fast	Indicates the upstream data rate in bps when latency is fast. Zero means that latency is set to interleave or the data rate is unknown.
down-stream-rate-fast	Indicates the downstream data rate in bps when latency is fast. Zero means that latency is set to interleave or the data rate is unknown.
up-stream-rate-interleave	Indicates the upstream data rate in bps when latency is interleave. Zero means that latency is set to fast or the data rate is unknown.
down-stream-rate-interleave	Indicates the downstream data rate in bps when latency is interleave. Zero means that latency is set to fast or the data rate is unknown.
up-stream-latency	Indicates the operational upstream latency (none, fast, or interleave). The none setting indicates that the line is not operational.
down-stream-latency	Indicates the operational downstream latency (none, fast, or interleave). The none setting indicates that the line is not operational.
firmware-ver	Indicates the version number of the ADSL modem firmware.
ansi-adsl-ver	Currently not supported on the VDSL LIM.
initial-adsl-ver	Currently not supported on the VDSL LIM.
hardware-ver	Indicates the hardware version of the ADSL modem. Currently not supported on the VDSL LIM
modem-hw-State	Indicates the state of the interface after initialization. Valid values are init-ok (all is well), bad-sdram, bad-cache, or bad-cache-sdram. The last three values imply memory problems, probably associated with a self-test failure.
accum-bit-err	Indicates the number of actual bit errors detected during the continuous BERT. Currently not supported on the VDSL LIM.

Parameter	Setting
num-sec-valid	Indicates the number of error-free seconds during the continuous BERT. Currently not supported on the VDSL LIM.
num-sec-invalid	Indicates how many error seconds are detected during the continuous BERT. Currently not supported on the VDSL LIM
operational-mode	Indicates ADSL coding protocol as automatically detected or set by user. Valid values are g-dmt, ansi-dmt, adsl2plus, annex-m-plus, vdsl, and vdsl2.
last-state-change	Reports the date and time, according to the real-time clock in the control module, of the last change in the dev-line-state parameter.

Obtaining statistics about operations

Introduction

The `physical-statistic` subprofile checks the interface operations.

Physical-statistic profile example

Following are the `physical-statistic` parameters shown with sample settings for an active interface:

```
[in AL-DMT-STAT/{ shelf-1 slot-3 4 }:physical-statistic]
line-up-timer = { 0 0 1 }
rx-signal-present = yes
up-dwn-cntr = 3
self-test = passed
noise-margin-down = 6
attenuation-down = 56
output-power-down = 19
noise-margin-up = 5
attenuation-up = 41
output-power-up = 11
near-end-fec = 0
near-end-crc = 0
near-end-hec = 0
far-end-fec = 10
far-end-crc = 0
far-end-hec = 0
received-rs-blcks = 104073
transmitted-rs-blocks = 416772
incoming-cells = 92
outgoing-cells = 100
```

Physical-statistic details

Parameter	Description
`line-up-timer`	Indicates how long the interface has been up (days, hours, and minutes in {***dd hh mm***} format). It is reset when a line is initialized or when the setting of the `dev-line-state` parameter changes to port-up from any other state.
`rx-signal-present`	Indicates whether receiving (`yes`) or not receiving (`no`) signal from the CPE.
`up-down-cntr`	Indicates the number of times the link has changed from an `up` state to a `down` state since the module was last reset.

Parameter	Description
self-test	Indicates whether the port has passed the modem chipset self-test.
noise-margin-down	Indicates current downstream noise margin in dB.
attenuation-down	Indicates current downstream attenuation in dB.
output-power-down	Indicates current downstream aggregate power level in dBm.
noise-margin-up	Indicates current upstream noise margin in dB.
attenuation-up	Indicates current upstream attenuation in dB.
output-power-up	Indicates current upstream aggregate power level in dBm.
near-end-fec	Indicates forward error correction (FEC) errors detected by the COE ADSL transceiver unit (ATU).
near-end-crc	Indicates cyclic redundancy check (CRC) errors detected by the COE ATU.
near-end-hec	Indicates header error control (HEC) errors detected by the COE ATU.
far-end-fec	Indicates forward error correction (FEC) errors detected by the CPE ATU.
far-end-crc	Indicates cyclic redundancy check (CRC) errors detected by the CPE ATU.
far-end-hec	Indicates header error control (HEC) errors detected by the CPE ATU.
received-rs-blcks	Indicates the number of received Reed-Solomon blocks.
transmitted-rs-blocks	Indicates the number of transmitted Reed-Solomon blocks.
incoming-cells	Indicates the number of incoming cells.
outgoing-cells	Indicates the number of outgoing cells.

Displaying ADSL-DMT port status and nailed groups

Introduction

The `dmtal` command is used display the nailed-group numbers for ADSL-DMT lines.

Example dmtal listing

The following `dmtal` command output shows the nailed-group numbers for an ADSL-DMT module in slot 4:

```
dmtal -a
All ADSL lines:
                                (dvOp    dvUpSt  dvRq     sAdm     nailg)
Line    { 1  4  1 }              (Up      Idle    UP       UP     00151)
Line    { 1  4  2 }              (Up      Idle    UP       UP     00152)
Line    { 1  4  3 }              (Up      Idle    UP       UP     00153)
Line    { 1  4  4 }              (Up      Idle    UP       UP     00154)
Line    { 1  4  5 }              (Up      Idle    UP       UP     00155)
Line    { 1  4  6 }              (Up      Idle    UP       UP     00156)
Line    { 1  4  7 }              (Up      Idle    UP       UP     00157)
Line    { 1  4  8 }              (Up      Idle    UP       UP     00158)
Line    { 1  4  9 }              (Up      Idle    UP       UP     00159)
Line    { 1  4 10 }              (Up      Idle    UP       UP     00160)
Line    { 1  4 11 }              (Up      Idle    UP       UP     00161)
....
```

Statistics support for ports

Statistics support for Bridge ports

This feature provides statistics support for the bridge port associated with every vdsl port.

stats traffic bridge slot ifnum" command

Bridge port statistics for vdsl call drops are exposed through "`stats traffic bridge slot ifnum`" command. The existing command on IP LIM has been updated to show the statistics associated with individual calls on a particular bridge port. Each call has now an associated bridge port.

Statistics support for POS ports

This feature provides statistic support for POS ports. "stats" command on GECR VDSL LIM is extended to include additional option "hdlc" to provide POS and HDLC statistics.

Statistics for a DSL port on VDSL LIM

To collect statistics for a DSL port on VDSL LIM (GECR VDSL LIM or Video LIM), the user needs to provide port and device values. The following table shows the correspondences between externally visible DSL ports and (port, device) numbers:

DSL number	(port, device)
1	(0, 1)
2	(0, 3)
3	(0, 5)
.	.
.	.
.	.
46	(1, 43)
47	(1, 45)
48	(1, 47)

The first 24 DSL ports are on UPI (Utopia POS interface) port 0 and next 24 DSL ports are on UPI port 1. On each port, the devices are numbered 1 to 47 and are numbered independently. For the first UPI port, the nth DSL port has device number (n-1)*2+1.

POS statistics

The following facilities are provided for POS statistics:

```
stats <stats-cmd> <stats-type> [port/conn-id/all]
<stats-cmd> : enable,disable,traffic,error,rate,clear
<stats-type>: aal5 atm ether bridge routing mcast hdlc
```

Important! By default hdlc statistics is enabled.

Important! Disabling of hdlc statistics is not supported.

Following examples show the usage of this command.

```
gebwikvdsl2-2/2> stats traffic hdlc 0 5

POS port        : 0
POS device      : 5
Rx Frames       : 0
Rx Bytes        : 40850
Rx IW Frames    : 366
Tx Frames       : 369
Tx Bytes        : 40990
```

gebwikvdsl2-2/2> stats error hdlc 0 5

POS port	: 0
POS device	: 5
CRC errors	: 0
HDLC addr mismatch	: 0
Frame overrun	: 0
Parity errors	: 0
MRU errors	: 0
Errored bytes	: 0
L2 Parsing errors	: 0
POS PHY errors	: 0
Buf overrun	: 0
SOP/EOP errors	: 0
Buf underrun	: 0
MAXSDU errors	: 0
Abort frames	: 0

gebwikvdsl2-2/2> stats clear hdlc 0 5

Hdlc statistics cleared for POS port/device 0/5

gebwikvdsl2-2/2> stats rate hdlc 0 5

P#/Dev	Rx Frames	Tx Frames	Rx Bytes	Tx Bytes	Rx	IW Frames
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	
0 /5	0	1	114	114	1	

info upi command

The command "*info atm*" is renamed to "*info upi*". The command output of "*info upi*" is same as "*info atm*" except that references to "*UTOPIA*" are changed to "*UPI*"

stats clear bridge command

Clearing bridge port statistics is available as a part of this feature.

8 Video LIM

Overview

Purpose

This chapter describes about the new feature Video LIM and its associate features.

Contents

This chapter covers these topics.

Video LIM has a Gige trunk Port on faceplate to send out the aggregate traffic. This faceplate Gige port can be connected to a GOLIM switch trunk port or it can be directly connected to an upstream L2 switch

VLAN circuit and VLAN aggregation on Video LIM

In this release, Stinger supports VLAN circuit and VLAN aggregation connections on Video LIM for Ethernet drops.

In VLAN circuit connections, a VLAN ID on the GigE is translated into another or same VLAN ID on the VDSL side. A 1:1 mapping is established between these VLAN IDs.

This release adds support for multiple calls on a single DSL port.

VLAN circuit configuration

In the following configuration, VLAN ID on the DSL port side is 101 and VLAN ID on the GigE side is 201. In the upstream direction, Ethernet packets entering the VDSL port with VLAN ID 101 is bridged to GigE port with VLAN ID 201.

```
admin>save cons vlan-ether  { { shelf-1 slot-3 49 } 201 }
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:18:57 2006
new VLAN-ETHERNET
set interface-address physical-address shelf = shelf-1
set interface-address physical-address slot = slot-3
set interface-address physical-address item-number = 49
set interface-address logical-item = 201
set enabled = yes
set bridging-options bridging-group = 302
set bridging-options bridge = yes
write -f
;
admin>save cons conn vcc.3.4
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:19:03 2006
new CONNECTION
set station = vcc.3.4
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 302
set bridging-options bridge = yes
set telco-options nailed-groups = 104
set mp-options enabled = no
set atm-options vci = 36
set atm-options nailed-group = 104
set ether-options nailed-group = 104 <--------------
set ether-options vlan-id = 101 <-------------------
write -f
```

Transparent bridging

In transparent bridging, a 1:N bridging maps one VLAN ID on the GigE side to N number of VLAN IDs on the VDSL side. All VLAN IDs are part of the same bridge group.

A sample configuration is shown below.

```
admin>save cons vlan  { { shelf-1 slot-3 49 } 50 }
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:24:30 2006
new VLAN-ETHERNET
set interface-address physical-address shelf = shelf-1
set interface-address physical-address slot = slot-3
set interface-address physical-address item-number = 49
set interface-address logical-item = 50
set enabled = yes
set bridging-options bridging-group = 999
set bridging-options bridge = yes
set bridging-options bridge-type = transparent-bridging
write -f
;

admin>save cons bridge-group 999
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:26:22 2006
new BRIDGE-GROUP
set enable = yes
set bridging-group = 999
set port-block-enabled = no
write -f
;

admin>save cons conn vc.3.4
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:24:37 2006
new CONNECTION
set station = vc.3.4
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 999
set bridging-options bridge = yes
set bridging-options bridge-type = transparent-bridging
set telco-options nailed-groups = 104
set mp-options enabled = no
set atm-options nailed-group = 104
set ether-options nailed-group = 104  <------------------------
   --
set ether-options vlan-id = 102       <------------------------
   --
write -f
;
```

```
admin>save cons conn vc.3.3
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:24:40 2006
new CONNECTION
set station = vc.3.3
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 999
set bridging-options bridge = yes
set bridging-options bridge-type = transparent-bridging
set telco-options nailed-groups = 103
set mp-options enabled = no
set atm-options nailed-group = 103
set ether-options nailed-group = 103    <----------------------
   ----
set ether-options vlan-id = 104         <----------------------
   ----
write -f
;
admin>save cons conn vc.3.4.101
; configuration
; saved from stngrcm2 9.10a0e0
; saved Thu Aug 24  6:25:31 2006
new CONNECTION
set station = vc.3.4.101
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 999
set bridging-options bridge = yes
set bridging-options bridge-type = transparent-bridging
set telco-options nailed-groups = 104
set mp-options enabled = no
set atm-options vci = 36
set atm-options nailed-group = 104
set ether-options nailed-group = 104   <----------------------
   -
set ether-options vlan-id = 101        <----------------------
   -
write -f
;
```

Difference in configuring an atm-drop and ether-drop connections

The difference in configuring an atm-drop connection and an ether-drop connection is that, in case of ether-drop connections the following options are configured:

```
ether-options->nailed-group, ether-options->vlan-id, ether-
   options->usr-dn-stream-contract, etc.
```

For atm-drop, you do not need to configure these options. Instead, you configure the following options:

```
atm-options->nailed-group, atm-options->vpi, atm-options-
   >vci, etc.
```

The following restrictions apply:

- All the calls on video LIM should have one end terminating on the GigE port of video LIM.
- No calls on video LIM can terminate on the GigE ports of a CM because Video LIM does not have a data backplane.
- When ETHER-QoS is applied on transparent bridged connections and flooding is done (broadcast or unknown unicast traffic), the traffic flow on the card stops. You have to reset the cards to get it back to the normal operation.

Multicast VDSL LIM over transparent bridged calls

In the 9.10 release, the Transparent Bridge Groups configured for a Video LIM supports IGMP snooping.

IGMP snooping is done at Layer 2 on interfaces belonging to a Transparent Bridge Group. When IGMP snooping is disabled, the multicast traffic is treated as broadcast traffic and the traffic will be flooded. When IGMP snooping is enabled, the IGMP joins coming from the clients are snooped to maintain the list of members joining a particular group. The multicast data is then forwarded only to those members who have joined in that group. If multicast traffic is received for a group that has no members joined in, the traffic is dropped.

Addresses belonging to 224.0.0.* range do not require JOINs. Ideally, the traffic received on these addresses is flooded. On Video LIM, the traffic received on the following addresses will only be flooded:

224.0.0.1 - All systems in this subnet

224.0.0.2 - All routers in this subnet

224.0.0.9 - RIP v2 multicast address

224.0.0.12 - DHCP/Relay agent

Configuring the bridge group

The configuration remains the same except a generic change in the bridge group. When a bridge group is configured, the physical address of the slot on which the bridge group resides needs to be defined. This is required because when GE-OLIM acts as an Ether-switch and Video LIM handles traffic on the card, it needs to be ensured that all the members of the bridge group terminate on one particular slot. You also need to configure the address slot of the GE-OLIM and Video LIM. For WAN connections belonging to any other LIM, you need to configure the slot address of the CM.

A sample configuration is shown below:

```
admin> new bridge
BRIDGE-GROUP/0 read
admin> list
[in BRIDGE-GROUP/0 (new)]
enable = no
bridging-group* = 0
mac-entry-age-time = 300
igmp-snooping-enabled = no
port-block-enabled = yes
lan-router-interface-address = { { any-shelf any-slot 0 } 0 }
wan-router-interface-profile = ""
dhcp-snooping = { no { no no 0.0.0.0 "" 1 no } { no no 0.0.0.0
   "" 1 no } }
pppoe-snooping = { no { no no 0.0.0.0 "" 1 no } { no no 0.0.0.0
   "" 1 no } }
pppoa-bridging-enabled = no
pppoe-anti-spoof-age-time = 0
slot-address = { shelf-1 first-control-module 0 }
```

The default values for the subprofile `slot-address` is shown below:

```
admin> list slot-address
[in BRIDGE-GROUP/0:slot-address (new)]
shelf = shelf-1
slot = first-control-module
item-number = 0
```

If you change this field, then you need to bounce the LAN interfaces belonging to that bridge group. This is for bringing up the interfaces. LAN interfaces would not come up by itself after this change.

Configuration Errors

If you change the slot address of the bridge group when it has active interfaces, the following error is displayed:

```
error: Cannot change SlotNumber when Bridge Group is in use.
```

The following log message is displayed when there is a mismatch between the interface's bridge group and bridge group's slot address:

```
LOG error, Shelf 1, Slot 12, Time: 14:50:29--
  BridgeGroup Slot mis-match
```

IP Filters and bridge port based statistics for VDSL LIM

This release supports the following two features:

- Input IP filter support for PPPOE calls on etherdrop
- Packet statistics for all calls on etherdrop

IP Filters

Filters can be applied to connections by creating a filter profile and applying to the data-filter under session-options of a connection profile.

For more information, refer *Stinger IP2000 Configuration guide*.

IP Filters input (upstream)

You can apply IP input filters to WAN connections. The WAN connection types can be either vlan-ckt or transparent bridged.

A sample configuration for IP input filters is as follows:

Configuring a new connection

```
admin> save c conn jk-aggr-11-1
; configuration
; saved from stngrcm2 9.10.0c7
; saved Wed Oct 25  4:38:50 2006
new CONNECTION
set station = jk-aggr-11-1
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 228
set bridging-options bridge = yes
set bridging-options bridge-type = transparent-bridging
set bridging-options mac-address-learning-limit = 2
set session-options data-filter = pav-ip <========= IP-Filter
set telco-options nailed-groups = 501
set mp-options enabled = no
set atm-options nailed-group = 501
set ether-options nailed-group = 501
set ether-options vlan-id = 35
write -f
```

;

Configuring a new filter

```
admin> save c filter pav-ip
; configuration
; saved from stngrcm2 9.10.0c7
; saved Wed Oct 25  4:38:58 2006
new FILTER
set filter-name = pav-ip
set input-filters 1 valid-entry = yes
set input-filters 1 Type = ip-filter
set input-filters 1 ip-filter source-address-mask =
   255.255.255.255
set input-filters 1 ip-filter source-address = 192.1.1.1
set input-filters 2 valid-entry = yes
set input-filters 2 Type = ip-filter
set input-filters 2 ip-filter protocol = 6
set input-filters 2 ip-filter Dst-Port-Cmp = eql
set input-filters 2 ip-filter dest-port = 2222
set input-filters 3 valid-entry = yes
set input-filters 3 forward = yes
set input-filters 3 Type = ip-filter
write -f
;
```

Viewing the filter :

```
video-vdsl2-1/11> ifmgr -d
sif slot bif u m p ifname     host-name  remote-addr
   local-addr
-------------------------------------------------------------------
   ---------------
000 0:00 000 *     pb0        -          0.0.0.0/32
   0.0.0.0/32
001 1:09 030 *     vlan1                 0.0.0.0/32
   0.0.0.0/32
002 1:09 031 *     vlan2                 0.0.0.0/32
   0.0.0.0/32
003 1:09 032 *     vlan3                 0.0.0.0/32
   0.0.0.0/32
004 1:09 033 *     vlan4                 0.0.0.0/32
   0.0.0.0/32
005 1:09 034 *     vlan5                 0.0.0.0/32
   0.0.0.0/32
019 1:09 037 *     wan19      jk-aggr-11 0.0.0.0/32
   0.0.0.0/32
049 1:09 029 *     ie1-11-49             0.0.0.0/32
   0.0.0.0/32
<end>
video-vdsl2-1/11> info filter rule 11 19

Sl.#    ip filter rule <src/dest/protocol/sport/dport
   accept/deny
-------------------------------------------------------------------
   ------------
 01  192.1.1.1/255.255.255.255 0.0.0.0/0.0.0.0    0    0    0
   deny
 02  0.0.0.0/0.0.0.0 0.0.0.0/0.0.0.0    6    0 2222 deny
 03  0.0.0.0/0.0.0.0 0.0.0.0/0.0.0.0    0    0    0 accept

video-vdsl2-1/11>
```

Bridge port statistics

This release provides of statistics support per call. You can retrieve the statistics for a call from the statistics associated with the bridge port for that call. The statistics can be retrieved as follows:

Example: To view statistics :

```
video-vdsl2-1/11> stats traffic bridge 11 37
Bridge port statistics :
Rx frames                      : 0
Rx broadcast frames            : 0
Rx multicast frames            : 0
Forwarded unicast frames       : 0
Forwarded broadcast frames     : 0
Forwarded multicast frames     : 0
Discard - VLAN filter          : 0
Discard - ingress filter       : 0
Discard - bridge classifier    : 2611 <==== Filter discards
Discard - unknown source       : 0
Discard - deny source address: 0
Discard - deny dest address    : 0
```

Ethernet Filter Bridge Port Stats:

```
Rx frames                      : 2611
Rx broadcast frames            : 0
Rx multicast frames            : 0
Forwarded unicast frames       : 0
Forwarded broadcast frames     : 0
Forwarded multicast frames     : 0
Discard - VLAN filter          : 0
Discard - ingress filter       : 0
Discard - bridge classifier    : 0
Discard - unknown source       : 0
Discard - deny source address: 0
Discard - deny dest address    : 0
```

Base Bridge Port Stats:

```
Rx frames                      : 2611
Rx broadcast frames            : 0
Rx multicast frames            : 0
Forwarded unicast frames       : 0
Forwarded broadcast frames     : 0
Forwarded multicast frames     : 0
Discard - VLAN filter          : 0
Discard - ingress filter       : 0
Discard - bridge classifier    : 0
Discard - unknown source       : 0
Discard - deny source address: 0
Discard - deny dest address    : 0
```

Important! There is no bridge port corresponding to a PPPOE call. So the bridge port statistics of PPPOE call is made available in the corresponding base connection of PPPOE call.

DHCP snooping

This feature adds support for the DHCP snooping functionality on the Video VDSL LIM. This feature can be enabled and disabled on per bridge group basis. At present this support is only added for ATM drop

Field upgradable Boot ROM on Video and CR VDSL2 LIMs

This feature enables the capability of field programming the boot prom on VIDEO (1471) and CR VDSL2 (1473) LIMs.

romUpdate command

The "`romUpdate`" command is used to upgrade the Boot rom on 1471 and 1473 LIMs.

```
romUpdate <-b| -c | -v>
```

Command Element	Description
b <flash filename>	updates with a binary image.
c	calculates ROM checksum and prints checksum and version.
v	shows ROM flash vendor and device IDs .

Example to show ROM flash vendor and device ID:

```
video-vdsl2-1/1> romUpdate -v
Flash Vendor 20
Flash ID E3
```

Example to calculate ROM checksum and print checksum and version.

```
video-vdsl2-1/1> romUpdate -c
ROM Checksum 783F
ROM version 1.2
```

Upgrading Boot ROM

Example to show using cli command `romUpdate` to upgrade BOOT ROMs:

```
video-vdsl2-1/1> rom -b 1/current/videolim913.bin
   Trying to get binary flash file 1/current/videolim913.bin
   Downloaded File Checksum = 8053
   You are about to attempt PROGRAMMING THE BOOTPROM
   If not handled properly this could PERMANENTLY DAMAGE your
   hardware
   Do you want to quit? [y/n] n
   Are you authorized to do this? [y/n] y
   !! WARNING !!
   !! WARNING !!
   Do not power off or bounce this card while
   the programming is in progress or the pack will have
   to be sent back to the factory for repairs!!!
   !! WARNING !!
   !! WARNING !!
   existing Checksum 8053
   Please Wait Erasing Existing ROM
```

```
ROM Erased in 5 seconds
Flash Programmed Successfully Attempt 1
video-vdsl2-1/1> rom -c
ROM Checksum 8053
ROM version 1.3
video-vdsl2-1/1> rom -v
Flash Vendor 20
Flash ID E3
video-vdsl2-1/1>
```

Port blocking on transparent bridging for Video LIM

In this release, support is available for port blocking on transparent bridging for Video LIM - for atm and ether drop.

Port blocking on transparent bridging

This feature is similar to the Port-Blocking feature currently supported on Stinger.

In transparent bridging, traffic forwarding between the members occurs in the following sequence:

1. Broadcast traffic is flooded to all the members.
2. Traffic to unknown unicast Mac is also flooded to all the members.
3. Multicast traffic is treated as broadcast traffic when IGMP snooping is disabled for that Bridge Group. If IGMP snooping is enabled, traffic is forwarded only to the interested members.
4. Known unicast traffic is forwarded to the member it belongs to.

These rules apply to all members in the Bridge Group, except in case of IGMP snooping. With IGMP snooping, only the mbone interface can forward traffic to the clients. Otherwise, any member can forward traffic to any other member.

However, in certain cases you need to disable direct traffic forwarding between the WAN connections. This could be to ensure that the clients do not communicate with each other without the knowledge of BRAS. To enable this, Port Blocking feature is introduced.

With Port Blocking, that bridge group has two interfaces:

- Router Interface: Forwards traffic to any member of its group.
- Non-Router Interface: Forwards traffic only to the Router interface.

Router to Non-Router traffic forwarding remains unchanged. Non-Router to Router interface traffic behavior changes as follows:

- Broadcast Traffic: Is forwarded only to the Router Interface.
- Unknown Unicast Traffic: Is forwarded only to the Router Interface.
- Known Unicast traffic: If it belongs to Router interface it is forwarded, otherwise it is discarded.
- Mcast traffic: If IGMP snooping is disabled, this traffic is forwarded to the Router interface. If, IGMP snooping is enabled, the traffic gets discarded.

Port blocking specific to Video LIM

On Video LIM, the router interface can only belong to Gigabit Ethernet. No interface connected onto the DSL side can be considered as Router interface.

On Video LIM, in a given bridge group there can only exist a single Vlan interface.

Therefore, the Vlan interface in the Bridge Group, is considered as the Router interface.

No configuration changes are required for this in the `BridgeGroup` profile. The `lan-router-interface-address` parameter in the `BridgeGroup` profile is ignored and not considered for Port-Blocking related configuration at all.

So, for Video LIM can create BridgeGroup profile without specifying `lan-router-interface-address.`

While creating a `BridgeGroup` profile, if the Slot for which the profile is being created is not present (and so cannot be confirmed as Video LIM or GE-OLIM), then the configuration of the `lan-router-interface-address` is required for the port-blocking feature.

Line testing

Support for Single end line testing (SELT) and Dual end line testing (DELT) on VDSL2 LIM is available.

For complete details, refer Chapter 10, “Line testing”.

9 VDSL2 CR LIM

Overview

Purpose

This chapter decsribes about the new feature, VDSL2 CR LIM and its associate fetaures.

Contents

This chapter covers these topics.

VDSL2 LIM circuit packs

The 9.10 release introduces the GEB VDSL2 LIM (0800-STGRCR-ELIM-V2-48) for Stinger:

- The modem section of the LIM provides 48 ports of VDSL2 (Very High Bit-Rate Digital Subscriber Line) line coding. The Ikanos SL9450 transceiver chipset enables line coding.
- The processor section is based on the Wintegra WinArrow-1 series Network Processor.
- The Wintegra software provides the IP-to-ATM SAR function when ATM over ADSL2+ line coding is used.

VDSL2 LIM features

The following table illustrates the features of VDSL2 LIMs:

	GEB VDSL2 LIM (STGRCR-ELIM-V2-48)
Stinger Shelf Applications	Hosted GE-CR low-power applications
Line Interfaces and Coding	Supports 48 ports of VDSL2-over-POTS and ADSL/ADSL2+-over-POTS
Line Drive	Supports up to 17.5 dBm aggregate downstream transmit power.
Trunk Traffic Interface	Gigabit Ethernet backplane interface of the GE-Compact Remote (1.25Gbps differential CML)
Backplane control interface to CM	Standard Stinger Control Bus
Rate/reach to support the following DS/US throughputs	Downstream: up to 1 Gbps shared across 48 ports Upstream: up to 105 Mbps shared across 48 ports
	Supports 12 MHz design with U0 Band HW ready to support ETH-over-VDSL Bonding HW ready to support Network Timing Reference (NTR)
Input DC Voltage	-36 VDC to -75 VDC
Total Power Dissipation	80 Watts max

Multiple calls per VDSL port in ethernet mode

This release supports multiple VLANs on a single VDSL port for VLAN circuits.

Profile changes

The read-only parameter `vlan-id` in the `ether-options` subprofile is now editable. This can be used only for GE CR VDSL2 LIM and not for VDSL-24 port LIM.

Sample VLAN circuit call on a VDSL port

```
new CONNECTION
set station = tt-vlanC-6-0
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 34590
set bridging-options bridge = yes
set ether-options nailed-group = 251
set ether-options vlan-id = 0 << This parameter is now
  editable
write -f
```

Sample VLAN circuit call on a VDSL port

```
new CONNECTION
set station = tt-vlanC-6-0
set active = yes
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 34590
set bridging-options bridge = yes
set ether-options nailed-group = 251
set ether-options vlan-id = 0 < This parameter is now editable
write -f
```

Viewing VDSL VLANs on a nailed group

The `vdslngvlanmap` command display the VDSL VLANs on a nailed group. The following example shows VLANs for nailed group 251 and 252.

```
admin>vdslngvlanmap
ng    251 :  0   333   400   600   700   800
ng    252 :   500
```

Debugging VDSL VLANs

Use the `vdsldebug` command to debug the VDSL VLANs. The following example shows how to debug the VLANs.

```
admin>vdsldebug
 DCLCALL:Vdsl debug is now on
admin>

admin>
admin>read conn st-vlan
CONNECTION/st-vlan read
admin>lis
[in CONNECTION/st-vlan]
station* = st-vlan
active = no
encapsulation-protocol = ethernet
called-number-type = national
dial-number = ""
clid = ""
auto-profiles = yes
ip-options = { no no { no 0 15 global } 0.0.0.0/0 0.0.0.0/0 ""
   1 60 120 no 0
0.+
bridging-options = { 111 yes no stacked-vlan 1000 0 "" 16 none
   0 no "" }
session-options = { "" "" no no "" 120 no-idle 120 "" 0
   disabled autobaud
78400+
telco-options = { ans-and-orig no ft1 4104 no no 56k-clear 0
   "" "" no 0
any }
ppp-options = { no-ppp-auth none "" none "" "" "" "" stac 1524
   no 600 600 0
4 n+
mp-options = { 1 1 2 }
mpp-options = { "" quadratic transmit 1 1 15 5 10 70 }
fr-options = { "" 16 "" transparent-link no "" 16 "" }
tcp-clear-options = { "" 0 "" 0 "" 0 "" 0 no "" 256 20 }
answer-options = { }
usrRad-options = { global 0.0.0.0 1646 "" 1 acct-base-10 }
calledNumber = ""
shared-prof = no
max-shared-users = 0

admin>
admin>save c conn st-vlan
; configuration
; saved from stngrcm21 9.10a0e0
; saved Fri Aug 25  6:36:46 2006
```

```
new CONNECTION
set station = st-vlan
set encapsulation-protocol = ethernet
set ip-options ip-routing-enabled = no
set bridging-options bridging-group = 111
set bridging-options bridge = yes
set bridging-options bridge-type = stacked-vlan
set bridging-options vlan-stack-user-vlan-id = 1000
set telco-options nailed-groups = 4104
set mp-options enabled = no
set atm-options nailed-group = 4104
set ether-options nailed-group = 4104
set ether-options vlan-id = 104
write -f
;
admin>set act=y
admin>wr
DCLCALL-VDSL: vdslDuplicateVlan ng 4104 vlan 104 : does not
  exist
DCLCALL-VDSL: _allocNewVlanVciNgMap ng 4104  getbuff ok
DCLCALL-VDSL : _vdslGetInternalVci ng 4104 vlanId 104  alloc
  new vci map
okay
DCLCALL-VDSL : _vdslGetInternalVci ng 4104 vlanId 104
  returning vci 35
count is now 1
CONNECTION/st-vlan written
admin>
```

New pool Vlan Vci Ng

A new pool `Vlan Vci Ng` is added in this release. The following example shows how to display the pool details:

```
admin>pools vlan vc
Pool Name           Size limit   inUse  InUseSize   hiWat  free
Vlan Vci Ng Pool    44     0       1         64        1     0
```

Important! VLANID must be 'unique' on a set of 'active' connections on a VDSL nailed group or else the connection profile write will fail with the appropriate error message.

Sample error message:

```
"error: duplicate vlan ID with profile tt-vlan-400"
```

This is when the current profile we are trying to write uses a vlan id which is already being used by an active conection tt-vlan-400

Important! VLANID can be a value between 0 and 4095.

Important! Use 'vdslngvlanmap' to find existing active vlans on a nailed group.

Sample error message:

"error: Reached maximum vlan's on nailed group 251"

This is when there are already eight active vlans on nailed group 251.

Updates in bandwidth parameters

VDSL2 LIM PPPoE calls now supports the following bandwidth parameters:

- Committed Burst Size (CBS)
- Excess Information Rate (EIR)
- Excess Burst Size (EBS)

The bandwidth parameters are used to define Committed Information Rate (CIR) and Excess Information Rate (EIR).

Committed Rate

Committed Rate specifies the rate at which traffic has been committed to be sent. The Committed Rate is described in terms of the CIR and CBS traffic parameters.

CIR

CIR is defined as the average rate (in bits per unit of time) up to which the network is committed to transfer frames and meets performance objectives.

CBS

CBS defines a limit on the maximum number of information units available for a burst of frames sent at the interface speed to remain CIR-conformant.

Excess Rate

Excess Rate defines the extent by which the traffic sent can exceed the committed rate. The Excess Rate is described in terms of the EIR and EBS traffic parameters.

EIR

EIR is defined as the average rate (in bits per unit of time), in excess of the CIR, up to which the network transfers frames without any performance objectives.

EBS

EBS defines a limit on the maximum number of information units available for a burst of frames sent at the interface speed to remain EIR-conformant. [*]

Call control for ATM-over-ADSL drop

This release makes available support for call control for ATM-over-ADSL drop on VDSL2 card. The DSL ports of the VDSL2 card support both ADSL and VDSL.

The user interface for VDSL2 card for ATM-over-ADSL drop case is same as IP LIM card.

Viewing the active channels on a DSL port

The `winpath-call` command lets you view the number of active channels on a DSL port. It is a debug command.

```
admin > winpath-call

gebwikvdsl2-2/2> ? winpath-call
winpath-call winpath-call <port>

gebwikvdsl2-2/2> winpath-call 0
No. of channels on Port 1: 1

gebwikvdsl2-2/2> winpath-call 1
No. of channels on Port 3: 0
```

Because PPPoE call is UP on DSL port 1, the command `winpath-call 0` displays number of channels as 1. As no call is up on DSL port 2, the channel count shown by the command is 0.

The DSL port numbers for this command start from 0 instead of 1.

Line testing

Support for Single end line testing (SELT) and Dual end line testing (DELT) on VDSL2 LIM is available.

For complete details, refer Chapter 10, “Line testing”.

10 Line testing

Overview

Purpose

This chapter describes how single end line testing (SELT) is used on the Stinger VDSL LIM. Dual end line testing (DELT) is also mentioned and can be used on other ADSL2+ LIMs in a stinger unit.

Contents

This chapter describes information for these topics.

SELT DELT in VDSL LIMs

Support for SELT, DELT is now available for the VDSL and VDSL2 LIMs.

Similarities when compared to SELT DELT in ADSL LIMs

- The test launch and retrieval of data use the same interface that exists for ADSL LIMs.
- All tests follow the paradigm and SNMP/profile used by the Conexant ADSL/ADSL2/ADSL2+ packs.

Differences when compared to SELT DELT in Conexant LIMs

- Port control limitations
- Time required to complete SELT DELT
- Data format and analysis

Port control limitation

The port control limitation is because of the SELT DELT processing on the Ikanos DSP. When the SELT DELT is running, other not-under-test ports on that DSP (DSP groupings 1-8, 9-16, 17-24) have port enables, disables and provisionings queued for processing after SELT DELT completes.

Time required to complete SELT DELT

The time required to complete SELT DELT for the VDSL LIMs could be significantly longer than for the ADSL LIMs. The ADSL LIMs typically complete SELT DELT in under a minute. The VDSL LIMs can take up to two minutes. The time required to transfer the results data using tftp is equivalent.

Data format and analysis

The Ikanos test result data varies in format from Conexant. It uses different analysis tools. The SELT result data format is in non-readable binary. You need to use an Ikanos provided tool to process the data and then generate readable graphs and values. The DELT result data format is in readable ASCII.

Ikanos will provide details of how to process this data under separate cover.

SELT and DELT uses

Introduction

SELT and DELT are subscriber loop tests used for fault detection and loop characterization.

Environmental

SELT operates best in an environment where the subscriber loop is un-terminated.

DELT requires that the subscriber loop be terminated by a modem that supports ADSL2 or ADSL2+.

Primary SELT use

SELT is primarily used to estimate the length of the subscriber loop. This is done by sending an electrical impulse down the line then measuring the echo delay, which is directly proportional to loop length.

Secondary SELT uses

SELT can also be used to perform the following tests.

- Detection of cable breaks
- Detection of electrical shorts
- Analysis of echo delay and shape
- Estimation of inband noise vs. frequency
- Estimation of margin vs. rate
- Estimation of termination response vs. loop length.

DELT uses

DELT uses a diagnostic handshake defined by ADSL2 standards. It requires an ADSL2+ modem. This handshake requires supporting hardware on both ends of the subscriber loop. It can be used to gather estimates of subscriber loop characteristics including current attenuation, attainable rate, and signal-to-noise ratio per bin. DELT is run in 512-bin mode with the line code is set to `adsl2plus` or `vdsl2`.

□

SELT and DELT procedures

Overview

Use the following steps to perform a successful SELT or DELT operation:

1. Identify and disable the port being tested using standard Stinger notation of shelf number, slot number, port number.
2. For DELT tests, set the line-code to either ADSL2+ or VDSL2 settings. For 512 bin testing, set line-code to ADSL2+ settings.
3. Initiate the SELT or DELT test.

   Important! There are two methods for initiating the tests.
4. Wait for test to complete (up to three minutes).
5. Re-enable the port.
6. Transfer the raw test results using TFTP to an external host for analysis.
7. Analyze the data using external tools.

SELT and DELT initiation

You can initiate and monitor a SELT or DELT operation and transfer test results using one of two methods:

- Setting parameters in the `line-diag` and `selt-delt-params` profiles either through the command-line interface or SNMP commands.
- Using the `seltcmd` and `deltcmd` commands.

The two methods are mutually exclusive. If you launch a SELT or DELT from the `line-diag` profile and the operation is running, you cannot launch another SELT or DELT using the command line. The profiles should be used as the primary method of running SELT or DELT operations.

SELT and DELT caveats

Concurrent Operations

Only one SELT or DELT running per slot can be running at a time.

When you launch SELT or DELT on a slot that already has an active SELT or DELT (either a test in progress or a test has completed, with pending TFTP transfer), the `selt-delt-operation-state` parameter reports `selt-delt-running-other`.

A maximum of 20 SELT plus DELT operations can be running on a Stinger system at a time.

File transfer of results

One TFTP file transfer can be running on Stinger system at a time.

You must transfer test results within the period specified by the setting of the `timeout-tftp` parameter in the `selt-delt-params` profile.

If the results are not transferred within this period, then the `selt-delt-operation-state` parameter will report `stopped` and you will have to rerun SELT or DELT.

Ports being tested

For both SELT or DELT, the port to be tested must be disabled.

For DELT, the `line-code` parameter, reported in the `line-diag` profile for the port, must be an ADSL2 or VDSL protocol.

Aborting an operation

There is no SELT or DELT abort operation.

Although there is no command to stop a running SELT or DELT operation, clearing the TFTP timer will allow you to immediately re-launch SELT or DELT on the slot where the timer was cleared without waiting up to 30 minutes for the timer to expire.

Subscriber loop

SELT tests are best performed on an un-terminated loop, without a modem attached at the subscriber location.

DELT tests require an appropriate modem supporting either ADSL2+ or VDSL2 attached to the loop at the subscriber location.

Log messages

The system generates info-level and error-level log messages for start, stop and error events.

Using profile parameters for SELT

Overview

You can launch a SELT or TFTP transfer using the `selt-delt-enable` parameter in the `line-diag` profile.

You can obtain test status and TFTP transfer by monitoring the `selt-delt-operation-state` parameter in the line-diag-stat profile.

The profile, `selt-delt-params` contains the following parameters used for the TFTP transfer of results.

- The TFTP server IP address
- The TFTP port number
- The filename to under which results are stored on the server
- The amount of time allowed for the actual TFTP transfer after a SELT or DELT test.

The system creates `line-diag` and `line-diag-stat` profiles for each DSL port in the Stinger system. There is only one instance of the `selt-delt-params` profile per Stinger system.

Parameter descriptions

Following is a summary of the parameters relevant to SELT operations with descriptions of the values to which they can be set.

Parameter	Specifies
`line-diag: selt-delt-enable`	Initiate SELT, DELT, TFTP file transfer, or clear the TFTP timer. After you set the `selt-delt-enable` parameter and save the `line-diag` profile, the setting for the `selt-delt-enable` parameter reverts to the default, `no-selt-delt-test`. Specify one of the following values: • `no-selt-delt-test` (the default)—Take no action. • `selt-test`—Initiate a SELT operation. • `delt-test`—Initiate a DELT operation. (Not currently supported on the VDSL LIM) • `tftp`—Initiate transfer of SELT or DELT results. • `clear-timer`—Clear the TFTP timer associated with this slot. For information about setting this command, see “Clearing the TFTP timer” (p. 10-12).

Parameter	Specifies
`line-diag-stat: selt-delt-operation-state`	Status of a SELT, DELT, TFTP, or clear timer operation. This parameter is updated only if a SELT, DELT, TFTP, or clear timer operation is initiated on this port. Operation running on other ports or execution of the `seltcmd` or `deltcmd` commands do not affect the value reported by this parameter. On test completion or failure, the `selt-delt-operation-state` parameter retains its reported value. The `selt-delt-operation-state` parameter reports one of the following states: • `stopped` (the default value)—No SELT, DELT, or TFTP operation is in progress. • `selt-test-running`—SELT is in progress. • `delt-test-running`—DELT is in progress. • `selt-delt-tftp-running`—File transfer of test results via TFTP is in progress. • `selt-test-error`—SELT failed. • `delt-test-error`—DELT failed. • `selt-delt-tftp-error`—TFTP transfer failed. • `selt-test-done`—SELT successfully completed. • `delt-test-done`—DELT successfully completed. • `selt-delt-tftp-done`—Test results have been successful transferred. • `selt-delt-running-other`—SELT or DELT operation is currently running on another port in this slot. • `selt-delt-no-data`—TFTP operation was attempted with corrupted or no data.
`selt-delt-params: ip-tftp`	IP address, in dotted decimal notation, of the TFTP server used as the repository for the SELT or DELT results data files. The default setting is `192.168.1.1`.
`selt-delt-params: port-tftp`	TFTP port number which the TFTP server daemon listens to for TFTP transfers. Valid range of values is from 0 through 4294967297. The default value is 69.

Parameter	Specifies
`selt-delt-params: results-filename`	Name of the destination file on the host to which data results will be saved. Specify a text string of up to 254 characters. By default, the system saves tests results to a file called `SeltDelt.dat`. A null setting results in an error upon TFTP launch.
`selt-delt-params: timeout-tftp`	After a successful SELT or DELT, the length of time within which a successful TFTP transfer must occur. Specify a value from 60 to 1800 seconds. The default value is 300 seconds.

Example test

The following example shows commands that use the profile settings to launch SELT on port 12 of a VDSL LIM in slot 13 of shelf 1:

```
read line-diag {1 13 12}
set selt-delt-enable = selt-test
write -f
```

Example transfer of results

After successful test completion, the following commands configure and launch the transfer of test results via TFTP, saving results to the default file `SeltDelt.dat` on the host at 135.1.65.121.

```
read selt-delt-params
set ip-tftp 135.1.65.121
write -f

read line-diag {1 13 12}
set selt-delt-enable = selt-delt-tftp
write -f
```

Using the seltcmd command

Overview

The `seltcmd` command can be used from the command line, or from an application utilizing SNMP to conduct SELT tests.

Command syntax

To launch SELT, use the following syntax:

`seltcmd` ***`shelf slot port`***

To TFTP test results for analysis, use the following syntax:

`seltcmd -t [-p` ***`tftp-port`***`]` ***`host shelf slot port`*** `[`***`remote-file`***`]`

Syntax element details

Syntax element	Specifies
`shelf` ***slot port***	Logical address of the port to be tested.
`-p` ***`tftp-port`***	TFTP port number which the TFTP server daemon listens to for TFTP transfers. If no port number is specified, the default port is 69.
`host`	IP address of a TFTP host.
`remote-file`	File name on the remote host. If no file name is specified, the file name is derived from address of the port being tested. For example, if the logical address of the port being tested is {1 14 3}, test results are saved in a file called `selt-1-14-3` on the remote host.

Example test

After disabling the port, the following example shows commands that launch SELT on port 12 of an VDSL LIM in slot 13 of shelf 1:

```
seltCmd 1 13 12
SELT operation started
```

A test can take up to three minutes to complete. When testing is completed, the system displays the following message:

```
SELT complete on {1 13 12}
```

Example transfer of results

After test completion, and re-enabling the port, the following command transfers the results from the previous test via TFTP, to a host with an IP address of 135.17.134.96:

```
seltcmd -t 135.17.134.96 1 13 12
SELT data transfer: sending selt-1-13-12 to 135.17.134.96
SELT data transfer: 5000 bytes sent
SELT data transfer completed
```

In this example, because no file name was specified, the system will derive the filename `selt-1-13-12` from the logical address of the port being tested {1 13 12}.

□

Test results

Transfer overview

After a successful SELT or DELT operation, the systems caches the results data in RAM. You must then transfer you must transfer the test results to a TFTP server for analysis. This transfer is possible only if the `selt-delt-operation-state` parameter reports `selt-test-done` or `delt-test-done`, or `selt-delt-tftp-error`.

Transfer time limit

You must transfer test results within the period specified by the setting of the `timeout-tftp` parameter in the `selt-delt-params` profile.

If the results are not transferred within this period, then the `selt-delt-operation-state` parameter will report `stopped` and you will have to rerun the SELT or DELT operation.

Transfer failures

When TFTP transfer fails and the `selt-delt-operation-state` parameter reports `selt-delt-tftp-error`, you can retry the TFTP transfer. The number of retries is limited only by the number of launches possible before the TFTP timer expires.

Clearing the TFTP timer

There is no command to stop a running SELT or DELT operation. However, clearing the TFTP timer will allow you to immediately re-launch SELT or DELT on the slot where the timer was cleared without waiting up to 30 minutes for the timer to expire.

seltcmd considerations

Overview

Profile settings are the primary means for conducting SELT tests from the command line. When choosing the `seltcmd` command as a secondary method for launching SELT manually, you can consider several items.

Parameter settings not affected

The `line-diag`, `line-diag-stat`, and `selt-delt-params` parameter settings are not affected by use of the `seltcmd` command.

Status information not displayed

Only test start, stop, or error events are displayed to the CLI. No status information is provided there.

Test results can be overwritten

No TFTP timer is available to protect overwriting of test data from one test to the next. Running back-to-back tests will cause the second test results to overwrite the first.

Concurrent test limits

One SELT operation per slot can be running at a time. Up to 20 SELT plus DELT operations per Stinger system can be running at a time.

Error conditions related to SELT

Error conditions during testing

The system generates error messages when you attempt to initiate a SELT operation under one of the following conditions:

- The port is disabled.
- The port is active (in the `line-diag` profile for the port, `enabled` is set to `yes`).
- A previous SELT or a TFTP transfer is still in progress on the slot.
- The a legacy ADSL LIM that is not capable of supporting SELT operations.
- A built-in self-testing (BIST) operation is running the port.
- SELT test results are waiting for TFTP transfer on the slot. (The TFTP timer is still running.)

Error conditions during transfer of results

The system generates error messages when you attempt TFTP transfers under the following conditions:

- A SELT or DELT test is in progress.
- A previous TFTP transfer is in progress on this Stinger system (shelf).
- The TFTP server is unreachable.
- File creation was blocked on the TFTP server.
- No test result data was available.

Test data analysis

Introduction

The raw data from a completed SELT operation is transferred to an analysis engine on an external host for analysis.

SELT analysis requirements

The analysis engine must be provided with the following information to process raw SELT data:

- Cable type (DLS90, DLS400, Real Loop)
- Wire gauge (0.4mm/26AWG or 0.6mm/24AWG)
- Type of analog front-end (always EL1528 for ADSL2+ LIMs)

SELT analysis outputs

Provided with the proper information and the SELT results, a capable analysis engine can determine the following information for the customer loop:

- The loop length
- The data rate capacity at a given SNR margin
- The termination status of the loop (open or closed)
- An in-band noise plot of magnitude vs. frequency
- A termination response plot of magnitude vs. distance
- A signal-to-noise (SNR) margin plot of margin vs. rate
- The signal-to-noise ratio per sub-carrier SNR(f)—ratio of received signal power and received noise power per sub-carrier or bin. This information provides a view of the capacity of the channel.
- Maximum attainable data rate—possible maximum rate that the DELT algorithm has calculated after channel characterization.
- The last state that successfully completed during the previous initialization attempt.

Built in self testing (BIST)

Introduction

You can run this test using the command-line interface or SNMP.

The port test runs for less than 15 seconds.

BIST on VDSL

BIST control on Ikanos VDSL LIM is the same as Conexant ADSL LIMs. However, the functionality covered in the test is different. BIST on the Ikanos VDSL LIM does not test the data path.

This functionality was left out because Ikanos requires the DSP to be reset on a data path test. Doing this would have impacted the service on ports not under test in the same DSP grouping as the port under test.

Enabling BIST

To enable the BIST test, set the new `bist-enabled` parameter in `line-diag` profile to `yes`. For example:

```
[in LINE-DIAG/{ shelf-1 slot-1 1 }]
set bist-enabled = yes
```

BIST test limitation

You cannot run the test on a line that is enabled. If you attempt to run the BIST test while a line is enabled, the system generates the following error message:

```
LOG error, Shelf 1, Slot 14, Time: 17:07:03--
  Line cannot be enabled during line diag
```

Checking BIST status and result parameters

The `bist-operation-state` and `bist-result` parameters in the `line-diag-stat` profile report the status and result of the port test, respectively. For example:

```
get line-diag-stat {1 14 1}
[in LINE-DIAG-STAT/{ shelf-1 slot-14 1 }]
...
bist-operation-state = active
bist-result = none
```

BIST status and result parameter details

Parameter	Specifies
`bist-operation-state`	Status of the built-in self test. Possible values are: • `active`—BIST operation is active • `stopped`—BIST operation is stopped
`bist-result`	Result of the built-in self test. Possible values are: • `none`—BIST is disabled. • `pass`—the port test was successful. • `fail`—the port test failed.

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