Multiple Bearer Support For VDSL Platforms

For BCM963xx DSL Linux

Version 3.10 and beyond

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REVISION HISTORY

Revision Number	*Date*	*Change Description*
V1.0	2/21/2007	Initial Release.

1.0 INTRODUCTION

This document serves as an application note on the details of the multiple bearer feature that is supported in Linux releases (3.10 and beyond) of BCM963xx platforms. This feature is currently applicable for all VDSL platforms. This is also called as **dual latency** support.

There are 2 different paths are supported in VDSL, namely fast and interleaved.

2.0 MULTIPLE BEARER SUPPORT

The support allows concurrent paths supporting different latencies in the VDSL platform. The fast path can be used for Voice/Video traffic and the interleaved path can be used for Data/non-critical applications.

In Linux platform, each of these paths are represented by means of interface/port identifier. For each VC that is configured, there will be a port configuration denoting which path the VC corresponds to. Existing WAN ID, which was a <vpi,vci> combination, has been extended to include <port, vpi, vci> for all configuration purposes.

For ex,

WAN setup screen looks as follows:

Choose Add, Edit, or Remove to configure WAN interfaces.
Choose Save/Reboot to apply the changes and reboot the system.

Port/Vpi/Vci	VLAN Mux	Con. ID	Category	Service	Interface	Protocol	Igmp	QoS	State	Remove
0/0/35	Off	1	UBR	br_0_0_35	nas_0_0_35	Bridge	N/A	Disabled	Enabled	☐
1/0/35	Off	1	UBR	br_1_0_35	nas_1_0_35	Bridge	N/A	Disabled	Enabled	☐

All throughout the WEBUI/CLI interfaces, the port identifier is added to the WAN Id, Services, interfaces etc., along with VPI/VCI.

So, the nas_0_35 becomes nas_0_0_35 on the port 0.

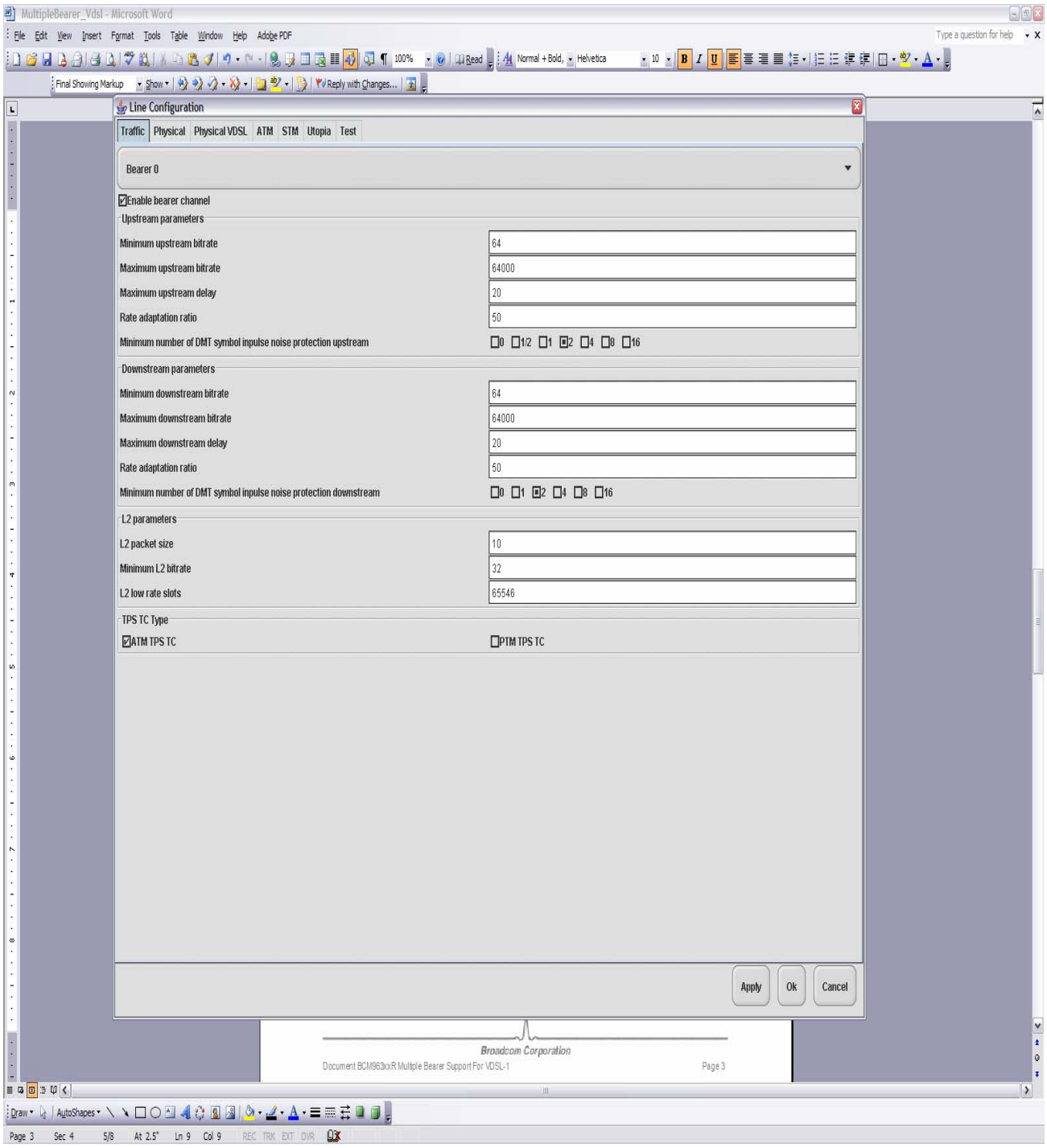
nas_0_35 on port1 becomes nas_1_0_35 and so on.

2.1 CO Configuration

The multiple bearer for VDSL line is driven by CO. Some sample CO configuration GUI screens as of 9_1_17 GUI are given below for a configuration of multiple bearers. Basically, 2 bearers (bearer 0 and bearer 1) needs to be enabled for a given line and the following criteria must be met.

First bearer must be interleaved with some min INP and the second bearer must be fast (mdelay = 0, minINP=0).
The ratio_BC is the % you wan to allocate to B0 and to B1 (how to allocate the excessive capacity between B0 and B1).

2.1.1 Bearer 0


MultipleBearer_Vdsl - Microsoft Word
Line Configuration
Traffic
Physical
Physical VDSL
ATM
STM
Utopia
Test
Bearer 0
Enable bearer channel
Upstream parameters
Minimum upstream bitrate
64
Maximum upstream bitrate
64000
Maximum upstream delay
20
Rate adaptation ratio
50
Minimum number of DMT symbol inpulse noise protection upstream
0 1/2 1 2 4 8 16
Downstream parameters
Minimum downstream bitrate
64
Maximum downstream bitrate
64000
Maximum downstream delay
20
Rate adaptation ratio
50
Minimum number of DMT symbol inpulse noise protection downstream
0 1 2 4 8 16
L2 parameters
L2 packet size
10
Minimum L2 bitrate
32
L2 low rate slots
65546
TPS TC Type
ATM TPS TC
PTM TPS TC
Apply
Ok
Cancel
Broadcom Corporation
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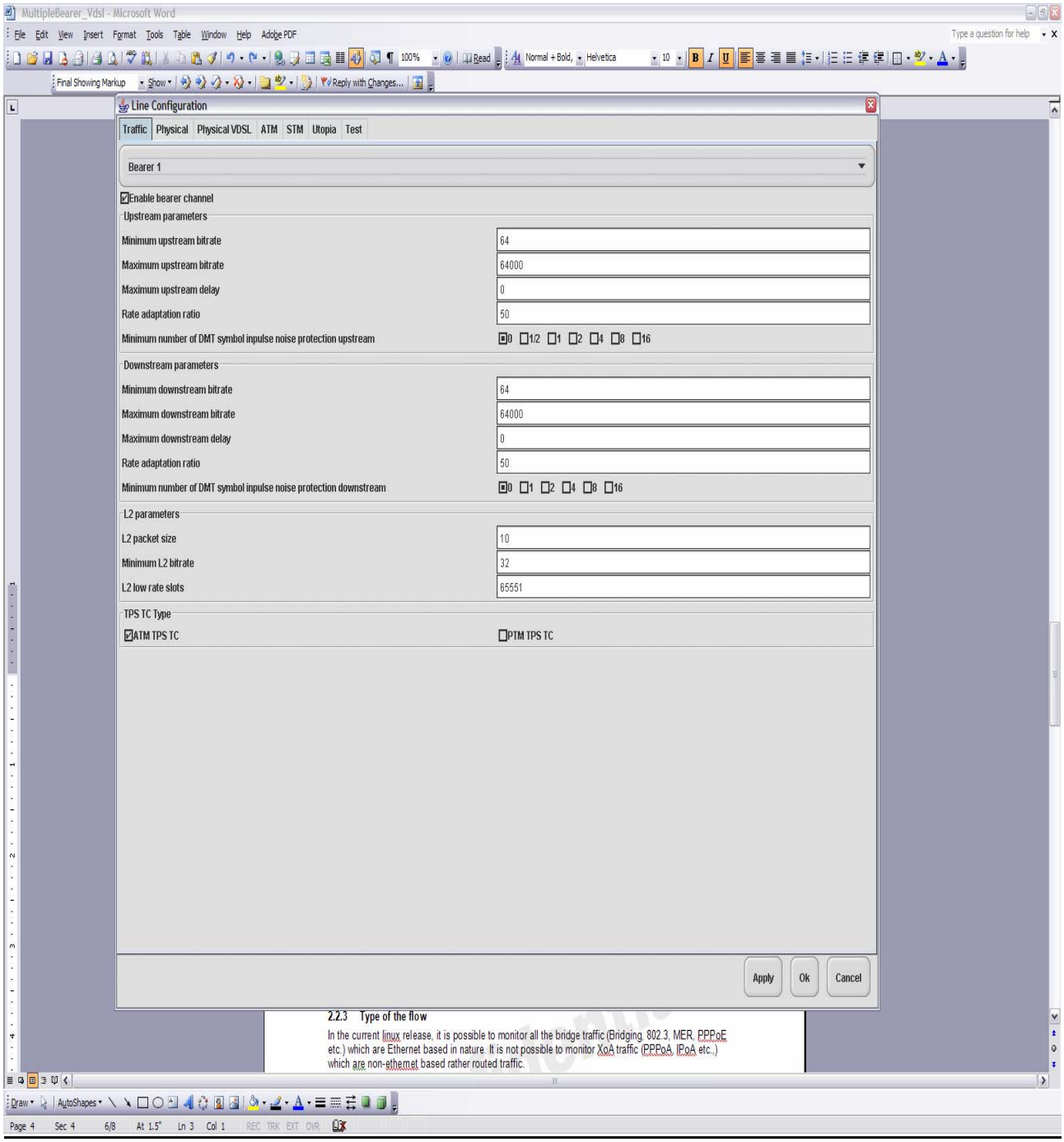
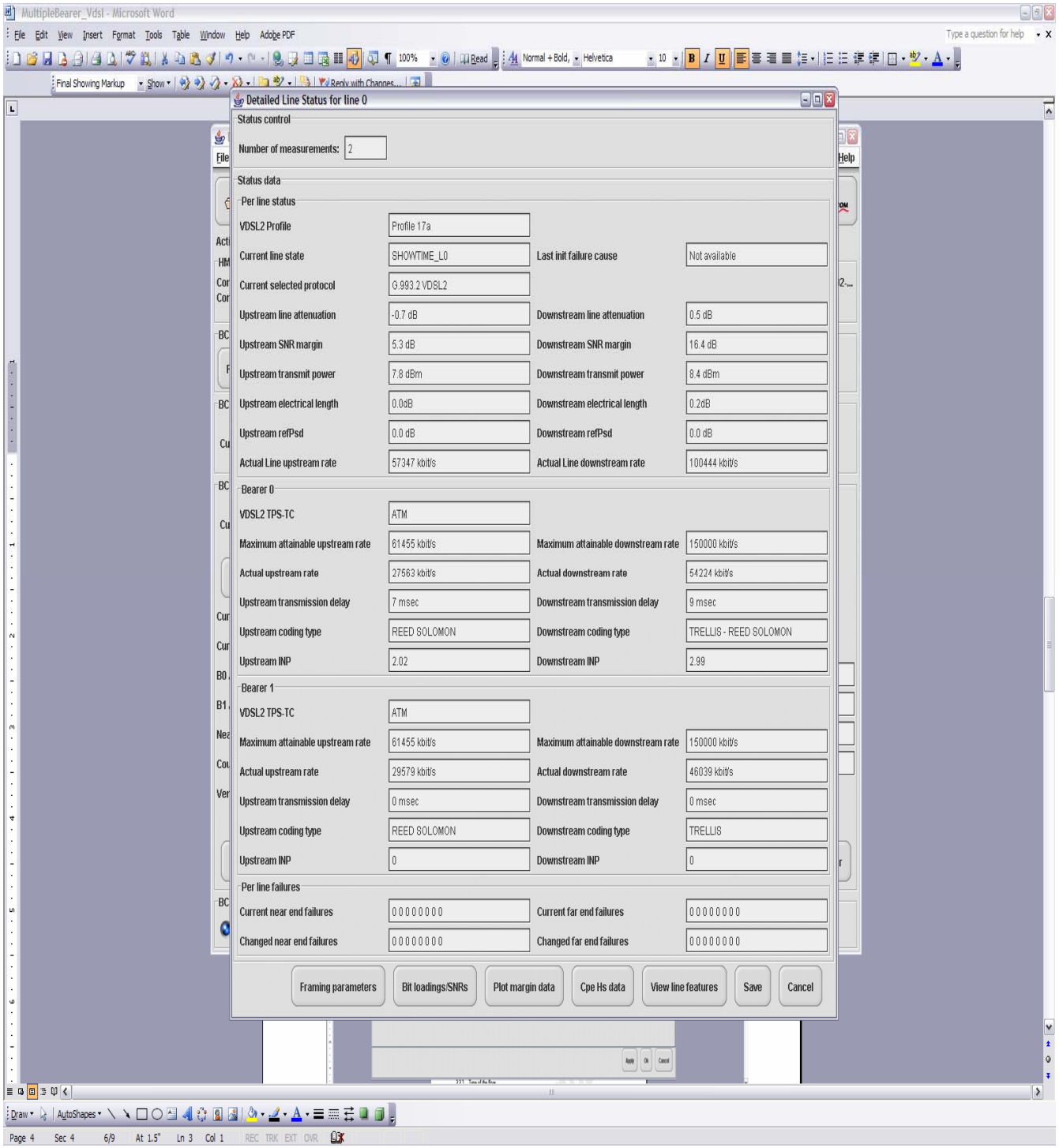
2.1.2 Bearer 1



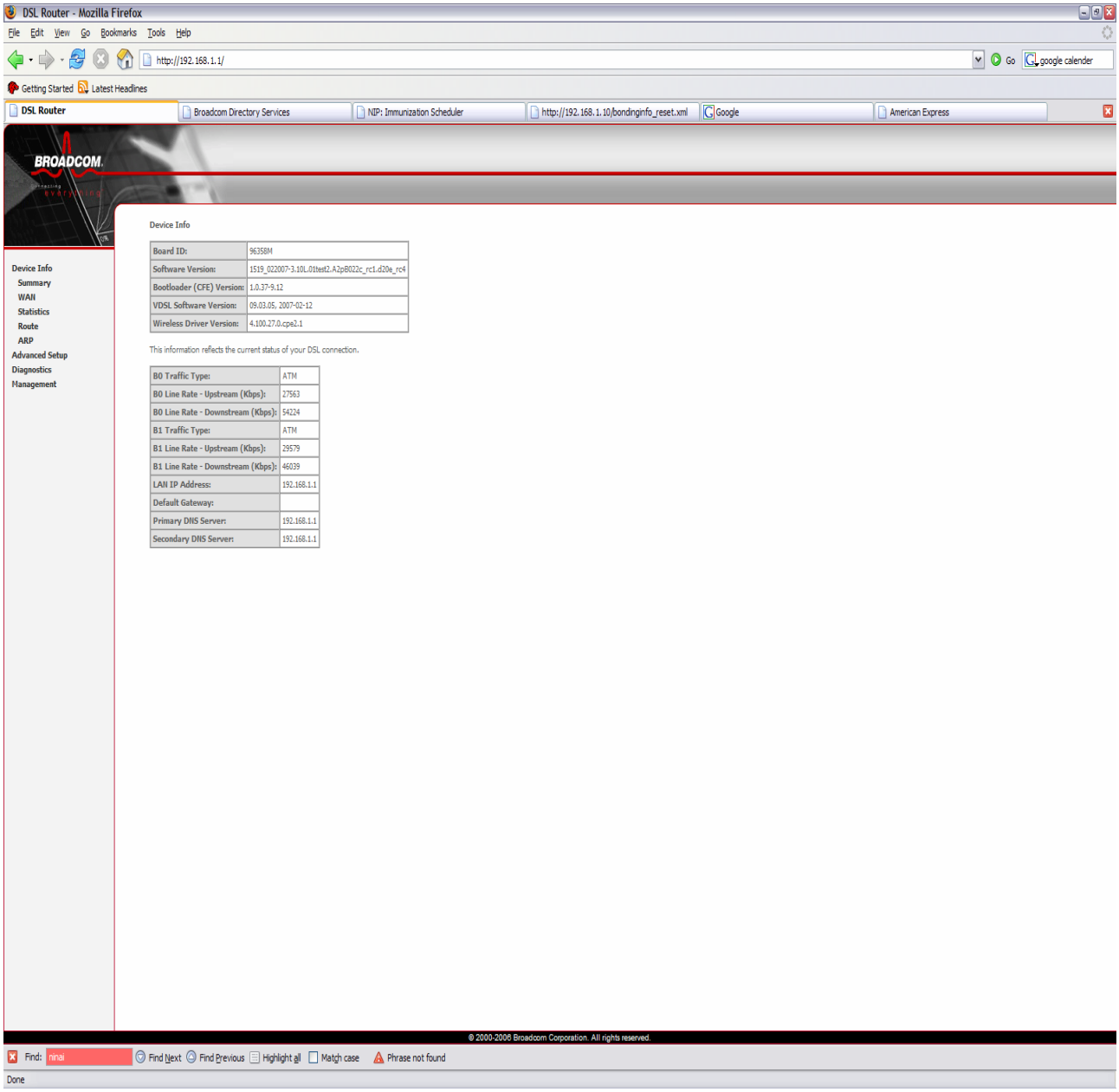
2.1.3 Detailed Status

Upon the line trained to Showtime, the detailed status page displays both the paths being active and usable.


MultipleBearer_Vdsl - Microsoft Word
Detailed Line Status for line 0
Status control
Number of measurements: 2
Status data
Per line status
VDSL2 Profile: Profile 17a
Current line state: SHOWTIME_L0
Last init failure cause: Not available
Current selected protocol: G.993.2 VDSL2
Upstream line attenuation: -0.7 dB
Downstream line attenuation: 0.5 dB
Upstream SNR margin: 5.3 dB
Downstream SNR margin: 16.4 dB
Upstream transmit power: 7.8 dBm
Downstream transmit power: 8.4 dBm
Upstream electrical length: 0.0dB
Downstream electrical length: 0.2dB
Upstream refPsd: 0.0 dB
Downstream refPsd: 0.0 dB
Actual Line upstream rate: 57347 kbit/s
Actual Line downstream rate: 100444 kbit/s
Bearer 0
VDSL2 TPS-TC: ATM
Maximum attainable upstream rate: 61455 kbit/s
Maximum attainable downstream rate: 150000 kbit/s
Actual upstream rate: 27563 kbit/s
Actual downstream rate: 54224 kbit/s
Upstream transmission delay: 7 msec
Downstream transmission delay: 9 msec
Upstream coding type: REED SOLOMON
Downstream coding type: TRELLIS - REED SOLOMON
Upstream INP: 2.02
Downstream INP: 2.99
Bearer 1
VDSL2 TPS-TC: ATM
Maximum attainable upstream rate: 61455 kbit/s
Maximum attainable downstream rate: 150000 kbit/s
Actual upstream rate: 29579 kbit/s
Actual downstream rate: 46039 kbit/s
Upstream transmission delay: 0 msec
Downstream transmission delay: 0 msec
Upstream coding type: REED SOLOMON
Downstream coding type: TRELLIS
Upstream INP: 0
Downstream INP: 0
Per line failures
Current near end failures: 00000000
Current far end failures: 00000000
Changed near end failures: 00000000
Changed far end failures: 00000000
Framing parameters
Bit loadings/SNRs
Plot margin data
Cpe Hs data
View line features
Save
Cancel

2.1.4 CPE Status

Upon Showtime in VDSL multiple bearer mode, the CPE displays the following in the device info page for both the channels.



In the VDSL platform, the port/interface 0 is interleaved path and port/interface 1 is fast path. Traffic can be sent/received on each of these paths in an independent manner and in concurrent fashion.

2.1.5 Traffic

Traffic can be distributed onto each of the port/vpi/vci based on various criteria in Linux platform. Some of them are mentioned here, however it is not limited to the following list alone.

1. Mac Address based forwarding/filtering.
2. Port Mapping
3. VLAN based.

3.0 CONCLUSION

This support in Linux is generic enough to scale for different platforms, be it ADSL or VDSL. VDSL PHY supports multiple bearer as of today and when ADSL PHY starts supporting this feature, this support will extend itself automatically.