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Configuring CPE Back-to-Back Through G.SHDSL Ports

Document ID: 25900

Introduction

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- Components Used
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- Network Diagram
- Configurations

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- dsl operating-mode (g.shdsl)

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Introduction

This document provides a sample configuration for the configuration of two routers back-to-back through the Multirate Symmetric High-Speed Digital Subscriber Line (G.SHDSL) ports. It describes how a G.SHDSL Cisco router can be configured to work as a Central Office (CO) DSL device that terminates a connection from another remote G.SHDSL CPE device.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on these software and hardware versions:

- 828 Customer Premises Equipment (CPE) running Cisco IOS® Software Release 12.2(8)T1
- 2612 router running Cisco IOS Software Release 12.2(8)T
- 2612 router using a WAN Interface Card (WIC)-1SHDSL

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Configure

In this section, you are presented with the information to configure the features described in this document.

Note: Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

Network Diagram

This document uses this network setup:



Configurations

This document uses these configurations:

Note: In this configuration the 828A is configured with the equipment type "CO," which simulates the signaling from the CO. While the 2612 with the G.SHDSL WIC is configured with the equipment type "CPE."

- DSL5-828A
- DSL4-2612A

```
DSL5-828A(Cisco 828 CPE Acting as a CO)
DSL5-828A#show run
Building configuration...

Current configuration : 769 bytes
!
version 12.2
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname DSL5-828A
!
!
ip subnet-zero
!
!
!
!
```

```
interface Ethernet0
  ip address 192.168.1.1 255.255.255.0
  hold-queue 100 out
!
interface ATM0
  no ip address
  no atm ilmi-keepalive
  pvc 0/35
    encapsulation aal5snap
  !
  pvc 8/35
    encapsulation aal5mux ppp dialer
    dialer pool-member 1
  !
  dsl equipment-type CO
  dsl operating-mode GSHDSL symmetric annex A
  dsl linerate AUTO
!
interface Dialer0
  ip address 1.1.1.1 255.255.255.0
  encapsulation ppp
  dialer pool 1
  dialer-group 1
!
ip classless
ip http server
ip pim bidir-enable
!
!
dialer-list 1 protocol ip permit
!
line con 0
  stopbits 1
line vty 0 4
!
scheduler max-task-time 5000
end
```

DSL4-2612A (Cisco 2612 Router acting as CPE)

```
dsl4-2612a#show run
Building configuration...

Current configuration : 927 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname dsl4-2612a
!
!
ip subnet-zero
!
!
!
!
!
!
!
```

```

!
fax interface-type fax-mail
mta receive maximum-recipients 0
!
!
!
!
interface ATM0/0
no ip address
no atm ilmi-keepalive
pvc 0/35
    encapsulation aal5snap
!
pvc 8/35
    encapsulation aal5mux ppp dialer
    dialer pool-member 1
!
dsl equipment-type CPE
dsl operating-mode GSHDSL symmetric annex A
dsl linerate AUTO
!
interface Ethernet0/0
ip address 172.16.1.2 255.255.255.0
shutdown
half-duplex
!
interface TokenRing0/0
no ip address
shutdown
ring-speed 16
!
interface Dialer0
ip address 1.1.1.2 255.255.255.0
encapsulation ppp
dialer pool 1
dialer-group 1
!
ip classless
ip http server
ip pim bidir-enable
!
!
dialer-list 1 protocol ip permit
!
call rsvp-sync
!
!
mgcp profile default
!
dial-peer cor custom
!
!
!
!
line con 0
line aux 0
line vty 0 4
!
!
end

```

Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Software Release 12.2 command reference publications.

Modified Commands

- **dsl equipment-type**
- **dsl linerate**
- **dsl operating-mode (g.shdsl)**

dsl equipment-type

Issue the **dsl equipment-type** command in ATM interface mode to configure the DSL ATM interface to function as CO equipment or CPE. Use the **no** form of this command to restore the default equipment type.

- **dsl equipment-type {co | cpe}**
- **no dsl equipment-type**

The syntax descriptions for these commands are:

- **co** Configures the DSL ATM interface to function as CO equipment.
- **cpe** Configures the DSL ATM interface to function as CPE.

Defaults

The DSL ATM interface functions as CPE.

Interface Command Mode

The ATM interface for the G.SHDSL WIC was integrated into these Cisco IOS Software releases:

- 12.2(4)XL on the Cisco 2600 series routers
- 12.2(8)T on the Cisco 2600 series and Cisco 3600 series routers

Usage Guidelines

This configuration command applies to a specific ATM interface. You must specify the ATM interface before you issue this command. The ATM interface must also be in the **shutdown** state before you issue this command. This example shows how to configure DSL ATM interface 1/1 to function as CO equipment.

```
Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 1/1
Router(config-if)#dsl equipment-type co

Router(config-if)#end
Router# clear interface atm 0/1

Router#
```

Related Commands

- **dsl linerate** Specifies a line rate for the DSL ATM interface.
- **dsl operating-mode (g.shdsl)** Specifies an operating mode of the DSL ATM interface.

dsl linerate

Issue the **dsl linerate** command in ATM interface mode to specify a line rate for the DSL ATM interface. Use the **no** form of this command to restore the default line rate.

- **dsl linerate {kbps | auto}**
- **no dsl linerate**

The syntax descriptions for these commands are:

- **kbps** Specifies a line rate in kilobits per second for the DSL ATM interface. Allowable entries are 72, 136, 200, 264, 392, 520, 776, 1032, 1160, 1544, 2056, and 2312.
- **auto** Configures the DSL ATM interface to automatically train for an optimal line rate by negotiating with the far-end DSL Access Multiplier (DSLAM) or WIC.

Defaults

The DSL ATM interface automatically synchronizes its line rate with the far-end DSLAM or WIC.

Interface Command Mode

The ATM interface for the G.SHDSL WIC was integrated into these Cisco IOS Software releases:

- 12.2(4)XL on the Cisco 2600 series routers
- 12.2(8)T on the Cisco 2600 series and Cisco 3600 series routers

Usage Guidelines

This configuration command applies to a specific ATM interface. You must specify the ATM interface before you issue this command. The ATM interface must also be in the **shutdown** state before you issue this command. This example shows how to configure DSL ATM interface 0/1 to operate at a line rate of 1040 kbps:

```
Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 0/1
Router(config-if)#dsl linerate 1040

Router(config-if)#end
Router#clear interface atm 0/1

Router#
```

Related Commands

- **dsl equipment-type** Configures the DSL ATM interface to function as CO equipment or CPE.
- **dsl operating-mode (g.shdsl)** Specifies an operating mode of the DSL ATM interface. Use the **no** form of this command to restore the default operating mode.

dsl operating-mode (g.shdsl)

Issue the **dsl operating-mode** ATM interface command to specify an operating mode of the DSL for an ATM interface. Use the **no** form of this command to restore the default operating mode.

- **dsl operating-mode gshdsl symmetric annex {A | B}**
- **no dsl operating-mode**

The syntax descriptions for these commands are:

- **gshdsl** Configures the DSL ATM interface to operate in multirate high-speed mode per ITU G.991.2.
- **symmetric** Configures the DSL ATM interface to operate in symmetrical mode per ITU G.991.2.
- **annex {A | B}** Specifies the regional operating parameters. Enter **A** for North America and **B** for Europe. The default is A.

Defaults

The default operating mode is G.SHDSL symmetric annex A.

Interface Command Mode

The ATM interface for the G.SHDSL WIC was introduced in Cisco IOS Software Release 12.1(3)X, and integrated into these Cisco IOS Software releases.

- 12.2(2)T on the Cisco 1700 series routers
- 12.2(4)XL on the Cisco 2600 series routers
- 12.2(8)T on the Cisco 2600 series and Cisco 3600 series routers

Usage Guidelines

This configuration command applies to a specific ATM interface. You must specify the ATM interface before you issue this command. The ATM interface must also be in the **shutdown** state before you enter this command. This example shows how to configure DSL ATM interface 0/0 to operate in G.SHDSL mode.

```
Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 0/0
Router(config-if)#dsl operating-mode gshdsl symmetric annex A

Router(config-if)#end
Router#clear interface atm 0/1

Router#
```

Related Commands

- **dsl equipment-type** Configures the DSL ATM interface to function as CO equipment or CPE.
- **dsl linerate** Specifies a line rate for the DSL ATM interface.

Verify

You should see this output going across the console session. Issue the **term mon** command, if you are Telneted into the routers, to view the console messages.

```
00:51:25: %GSI-6-RESET: Interface ATM0/0, bringing up the line.
It may take several seconds for the line to be active.
00:52:09: %ATM-5-UPDOWN: Changing VC 0/35 VC-state to PVC activated.
00:52:09: %ATM-5-UPDOWN: Changing VC 8/35 VC-state to PVC activated.
00:52:10: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up
00:52:10: %DIALER-6-BIND: Interface Vi1 bound to profile Di0
00:52:11: %LINK-3-UPDOWN: Interface ATM0/0, changed state to up
00:52:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface ATM0/0, changed state to up
00:52:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up
```

This section provides information you can use to confirm your configuration is working properly.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

- **show running-config** Verifies the current configuration, and views the status for all controllers.
- **show controllers atm slot/port** Views ATM controller statistics.
- **show atm vc** Verifies the Permanent Virtual Circuit (PVC) status.
- **show dsl interface atm** Views the status of the G.SHDSL modem
- **show interface atm** Views the status of the ATM interface.

This is example output from the **show atm vc** command. Make sure that the active PVCs are up.

```
dsl4-2612a#show atm vc
          VCD /
Interface Name      VPI  VCI  Type  Encaps  SC   Peak Kbps  Avg/Min Kbps  Burst Cells  Sts
0/0              1      0   35  PVC    SNAP   UBR    2304
0/0              2      8   35  PVC    MUX    UBR    2304
```

This is example output from the **show dsl interface atm** command. If the line is down, the Line is not active. Some of the values may not be accurate. statement appears. You can also verify whether the equipment type and operating mode configuration are correct for your application.

```
dsl4-2612a#show dsl interface atm 0/0
Globespan G.SHDSL/SDSL Chipset Information

Equipment Type:      Customer Premise
Operating Mode:      G.SHDSL Annex A
Clock Rate Mode:     Auto rate selection Mode
Reset Count:         1
Actual rate:         2312 Kbps
Modem Status:        Data (0x1)
Received SNR:        39 dB
SNR Threshold:       23 dB
Loop Attenuation:    -0.3400 dB
Transmit Power:      7.5 dBm
Receiver Gain:       4.3900 dB
Last Activation Status: No Failure (0x0)
CRC Errors:          33372
Chipset Version:     1
Firmware Version:    R1.5
```

```
dsl4-2612a#show dsl interface atm 0/0
```

Globespan G.SHDSL/SDSL Chipset Information

Line is not active. Some of the values printed may not be accurate.

```
Equipment Type:      Customer Premise
Operating Mode:      G.SHDSL Annex A
Clock Rate Mode:     Auto rate selection Mode
Reset Count:         1
Actual rate:         2312 Kbps
Modem Status:        Idle (0x0)
Received SNR:        38 dB
SNR Threshold:       23 dB
Loop Attenuation:    -0.3400 dB
Transmit Power:      7.5 dBm
Receiver Gain:       4.3900 dB
Last Activation Status: No Failure (0x0)
CRC Errors:          33372
Chipset Version:     1
Firmware Version:    R1.5
```

If you are unable to ping across the ATM circuit, verify that the ATM interface is UP/UP by issuing the **show interface** command for the ATM interface on both routers. Issue the **show interface atm** command to view the status of the ATM interface. Make sure that the ATM slot, port, and the line protocol are up, as this example shows.

```
DSL5-828A#show interfaces atm0
ATM0 is up, line protocol is up
  Hardware is PQUICC_SAR (with Globespan G.SHDSL module)
  MTU 1500 bytes, sub MTU 1500, BW 2312 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback not set
  Encapsulation(s): AAL5, PVC mode
  10 maximum active VCs, 2 current VCCs
  VC idle disconnect time: 300 seconds
  Last input never, output 00:00:08, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: None
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    261 packets input, 11170 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    264 packets output, 11388 bytes, 0 underruns
    0 output errors, 0 collisions, 2 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

Troubleshooting

This section provides information you can use to troubleshoot your configuration.

Troubleshooting Commands

Note: Refer to Important Information on Debug Commands before you use **debug** commands.

- **debug atm events** Identifies ATM related events as they are generated.
- **debug atm errors** Indicates which interfaces have trouble.

This is sample debug information from an ATM interface, running the debugs listed in this section, and coming online (keep in mind that it might take 30 seconds or more for the circuit to come up).

```

01:07:15: ATM0/0 dslsar_la_reset: PLIM type is 19, Rate is 2304Mbps
01:07:15: ATM0/0 dslsar_la_shutdown: state=4
01:07:15: dslsar disable ATM0/0

01:07:15: %GSI-6-RESET: Interface ATM0/0, bringing up the line.
It may take several seconds for the line to be active.
01:07:15: Resetting ATM0/0
01:07:15: dslsar_la_config(ATM0/0)
01:07:15: dslsar_la_enable(ATM0/0)
01:07:15: ATM0/0: dslsar_init(825AD084,FALSE)
01:07:15: dslsar disable ATM0/0

01:07:16: ATM0/0 dslsar_init: DSLSAR TXRX disabled

01:07:16: ATM0/0 dslsar_la_enable: restarting VCs: 0
01:07:16: (ATM0/0)la_enable,calling atm_activate_pvc, vcd = 1, vc = 0x82A17BE0adb->flags =
01:07:16: (ATM0/0)la_enable,calling atm_activate_pvc, vcd = 2, vc = 0x82A1863Cadb->flags =
dsl4-2612a#
dsl4-2612a#
01:07:16: %SYS-5-CONFIG-I: Configured from console by console
01:07:19: dslsar disable ATM0/0

01:08:03: ATM0/0 dslsar_MatchSARTxToLineSpeed(): usbw 2304, clkPerCell 6360 prev_clkPerCel
01:08:03: ATM0/0 dslsar_update_us_bandwidth(): upstream bw =2304 Kbps
01:08:09: dslsar_periodic: ENABLING DSLSAR

01:08:09: dslsar enable ATM0/0

01:08:09: dslsar_la_setup_vc(ATM0/0): vc:1 vpi:0 vci:35 state 2
01:08:09: ATM0/0 dslsar_vc_setup: vcd 1, vpi 0, vci 35, avgrate 0
01:08:09: CONFIGURING VC 1 (0/35) IN TX SCHEDULE TABLE SET 0
01:08:09: Forcing Peakrate and Avgrate to: 2304
01:08:09: Requested QoS: Peakrate = 2304, Avgrate = 2304, Burstsize =0
01:08:09: Configuring VC 1: slot 0 in TST 5
01:08:09: SUCCESSFUL CONFIGURATION OF VC 1 (0/35), QOS Type 4
01:08:09: ATM0/0: vcd = 1, bw = 2304, tbd_per_tsi = 15, max_pkt_len = 4470,
max_tx_time = 1862ATM0/0 last_address 0x12E14

01:08:09: %ATM-5-UPDOWN: Changing VC 0/35 VC-state to PVC activated.
01:08:09: dslsar_la_setup_vc(ATM0/0): vc:2 vpi:8 vci:35 state 2
01:08:09: ATM0/0 dslsar_vc_setup: vcd 2, vpi 8, vci 35, avgrate 0
01:08:09: CONFIGURING VC 1 (0/35) IN TX SCHEDULE TABLE SET 1
01:08:09: Forcing Peakrate and Avgrate to: 2304
01:08:09: Requested QoS: Peakrate = 2304, Avgrate = 2304, Burstsize =0
01:08:09: Configuring VC 1: slot 0 in TST 5
01:08:09: SUCCESSFUL CONFIGURATION OF VC 1 (0/35), QOS Type 4
01:08:09: ATM0/0: vcd = 1, bw = 1152, tbd_per_tsi = 15, max_pkt_len = 4470, max_tx_time =
01:08:09: CONFIGURING VC 2 (8/35) IN TX SCHEDULE TABLE SET 1
01:08:09: Forcing Peakrate and Avgrate to: 2304
01:08:09: Requested QoS: Peakrate = 2304, Avgrate = 2304, Burstsize =0
01:08:09: Configuring VC 2: slot 1 in TST 5
01:08:09: SUCCESSFUL CONFIGURATION OF VC 2 (8/35), QOS Type 4
01:08:09: ATM0/0: vcd = 2, bw = 1152, tbd_per_tsi = 15, max_pkt_len = 4470, max_tx_time =

01:08:09: %ATM-5-UPDOWN: Changing VC 8/35 VC-state to PVC activated.
01:08:09: CONFIGURING VC 1 (0/35) IN TX SCHEDULE TABLE SET 0
01:08:09: Forcing Peakrate and Avgrate to: 2304
01:08:09: Requested QoS: Peakrate = 2304, Avgrate = 2304, Burstsize =0
01:08:09: Configuring VC 1: slot 0 in TST 5
01:08:09: SUCCESSFUL CONFIGURATION OF VC 1 (0/35), QOS Type 4
01:08:09: ATM0/0: vcd = 1, bw = 1152, tbd_per_tsi = 15, max_pkt_len = 4470, max_tx_time =
01:08:09: CONFIGURING VC 2 (8/35) IN TX SCHEDULE TABLE SET 0
01:08:09: Forcing Peakrate and Avgrate to: 2304
01:08:09: Requested QoS: Peakrate = 2304, Avgrate = 2304, Burstsize =0

```

```

01:08:09: Configuring VC 2: slot 1 in TST 5
01:08:09: SUCCESSFUL CONFIGURATION OF VC 2 (8/35), QOS Type 4
01:08:09: ATM0/0: vcd = 2, bw = 1152, tbdts_per_tsi = 15, max_pkt_len = 4470, max_tx_time =

01:08:10: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up
01:08:10: %DIALER-6-BIND: Interface Vii bound to profile Di0
01:08:11: %LINK-3-UPDOWN: Interface ATM0/0, changed state to up
01:08:11:  dslsar_atm_lineaction(ATM0/0): state=4
01:08:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface ATM0/0, changed state to up
01:08:13: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up

```

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NetPro Discussion Forums – Featured Conversations for DSL
Network Infrastructure: Remote Access
Service Providers: VPN Service Architectures

Related Information

- **DSL Technical Support**
- **Installing the G.SHDSL ATM WIC on the Cisco 1700/2600/3600 Series Router**
- **Cisco DSL Router Configuration and Troubleshooting Guide**
- **Network Scenarios for Cisco 826/827/828/831/837 and SOHO 76/77/78/91/96**
- **Advanced Configuration for Cisco 826/827/828/831/837 and SOHO 76/77/78/91/96**
- **Troubleshooting Cisco 826/827/828/831/837 and SOHO 76/77/78/91/96**
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