



G.SHDSL Symmetric DSL Support for Cisco IAD2420 Series IAD

This document describes the Multirate Symmetrical High-Speed Digital Subscriber Line (G.SHDSL) feature supported on the Cisco IAD2420 series integrated access devices (IADs) in Cisco IOS Release 12.2(8)T.

G.SHDSL is ATM-based, multirate, high-speed (up to 2.3 MB), symmetrical digital subscriber line technology for data transfer between a single customer premises equipment (CPE) subscriber and a central office (CO). G.SHDSL refers to the approved standard officially designated in ITU-T G.991.2.

The Cisco IAD2420 series IADs support G.SHDSL in the following models: IAD2424-8FXS, IAD2424-16FXS, IAD2424-16FXS8FXO, and IAD2424-1T1. These models are compatible with the Cisco 6160 and Cisco 6260 Digital Subscriber Line Access Multiplexers (DSLAM). The DSLAM must be equipped with compatible G.SHDSL line cards.

The Cisco IAD2424 IAD supports ATM Adaption Layer 2 (AAL2), ATM Adaption Layer 5 (AAL5), and quality of service (QoS) features for both voice and data services.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To

find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for G.SHDSL Symmetric DSL Support

A compatible G.SHDSL line card must be installed in the DSLAM.

Restrictions for G.SHDSL Symmetric DSL Support

The wetting current function is not supported as part of G.SHDSL.

Information About G.SHDSL Symmetric DSL Support

Benefits

- Enables business class broadband service with voice integration, scalable performance, flexibility, and security.
- Aggregates G.SHDSL and other transport options into a single box.
- Provides G.SHDSL high-speed digital data transmissions between CPE and the CO.
- Supports AAL2 and AAL5 services and applications (including voice), ATM class of service (constant bit rate [CBR], variable bit rate-nonreal time [VBR-nrt], variable bit rate-real time [VBR-rt], and unspecified bit rate [UBR and UBR+]).
- Provides ATM traffic management and quality of service (QoS) features to enable service providers to manage their core ATM network infrastructures.

How to Configure G.SHDSL Symmetric DSL Support

Configuring G.SHDSL on Cisco IAD2420 Series IADs

To configure G.SHDSL service on the Cisco IAD2420 series IAD that supports G.SHDSL, complete the following steps, beginning in global configuration mode:

SUMMARY STEPS

1. **controller shdsl 0**
2. **mode atm**
3. **annex {a | b}**
4. **line-rate auto | rate**
5. **exit**
6. **interface atm 0**
7. **ip address***Ip-address*
8. **atm ilmi-keepalives***seconds*
9. **pvc [name] vpi/vci**
10. **protocol ip***IP-address*
11. **vbr-rt***peak-rate average-rate burst*
12. **encapsulation aal1 | aal2 | aal5cisco | aal5mux | aal5nlpid | aal5snap**
13. **exit**
14. **shutdown**
15. Router(config-if)# **no shutdown**
16. Router(config-if)# **exit**
17. Router(config)# **exit**
18. Router> **show interface atm 0**

DETAILED STEPS

	Command or Action	Purpose
Step 1	controller shdsl 0 Example: Router(config)# controller shdsl 0	Enters controller configuration mode and the controller number.
Step 2	mode atm Example: Router(config-ctrl)# mode atm	Enables ATM encapsulation and creates logical ATM interface 0. Controller framing is automatically set to Extended SuperFrame (ESF). The line code is automatically set to B8ZS.
Step 3	annex {a b} Example: Router(config-ctrl)# annex a	Specifies the regional operating parameters. Enter a for North America and b for Europe. The default is a .
Step 4	line-rate auto rate Example: Router(config-ctrl)# line-rate auto 1160	Specifies the DSL line rate for the SHDSL port. The range is 192 to 2312 kbps. The default is auto (negotiated between the SHDSL port and the DSLAM). Note If different DSL line rates are configured at opposite ends of the DSL uplink, the actual DSL line rate is always the lower rate.

	Command or Action	Purpose
		Note The maximum peak cell rate is 8 kbps less than the line rate.
Step 5	exit Example: Router(config-ctrl)# exit	Exits from controller configuration mode.
Step 6	interface atm 0 Example: Router(config)# interface atm 0	Enters ATM configuration mode for interface ATM 0.
Step 7	ip address <i>ip-address</i> Example: Router(config-if)# ip address 10.1.0.1 255.255.255.0	Assigns an IP address to the DSL ATM interface.
Step 8	atm ilmi-keepalives <i>seconds</i> Example: Router(config-if)# atm ilmi-keepalive 10	(Optional) Enables Integrated Local Management Interface (ILMI) keepalives. If you enable ILMI keepalives without specifying the number of seconds, the default time interval is 3 seconds.
Step 9	pvc [<i>name</i>] <i>vpi/vci</i> Example: Router(config-if)# pvc 110/110	Enters atm-virtual-circuit (interface-atm-vc) configuration mode, and configures a new ATM PVC by assigning a name (optional) and VPI/VCI numbers. The default traffic shaping is UBR; the default encapsulation is AAL5+LLC/SNAP.
Step 10	protocol ip <i>IP-address</i> Example: Router(config-if-vc)# protocol ip 10.1.0.2	(Optional) Enables IP connectivity and creates a point-to-point IP address for the VC.
Step 11	vbr-rt <i>peak-rate average-rate burst</i> Example: Router(config-if-vc)# vbr-rt 2304 2304 65535	(Optional) Configures the PVC for real-time variable bit rate (VBR) traffic shaping. • Peak rate = peak information rate (PIR) • Average rate = average information rate (AIR) • Burst = burst size in cells
Step 12	encapsulation aal1 aal2 aal5cisco aal5mux aal5nlpid aal5snap Example: Router(config-if-vc)# encapsulation aal2	(Optional) Configures the ATM adaptation layer (AAL) and encapsulation type. • Use the aal2 keyword for AAL2 • Use the aal5cisco keyword for Cisco PPP over AAL5

	Command or Action	Purpose
		• Use the aal5mux keyword for AAL5+MUX • Use the aal5nlpid keyword for AAL5+NLPID • Use the aal5snap keyword for AAL5+LLC/SNAP (the default)
Step 13	exit Example: Router(config-if-vc) # exit	Exits from interface-ATM-VC configuration mode.
Step 14	shutdown Example: Router(config-if) # shutdown	Ensures that the ATM interface is shut down.
Step 15	Router(config-if) # no shutdown Example: Router(config-if) # no shutdown	Activates the ATM interface.
Step 16	Router(config-if) # exit Example: Router(config-if) # exit Exits from ATM interface configuration mode.	
Step 17	Router(config) # exit Example: Router(config) # exit	Exits from global configuration mode.
Step 18	Router> show interface atm 0 Example: Router> show interface atm 0	Verifies the ATM interface configuration.

Verifying ATM Configuration

You can verify the ATM interface configuration by doing the following:

- To verify the ATM interface configuration, enter the **show interface atm 0** command in EXEC mode.

```
Router# show interface atm 0
ATM0 is up, line protocol is up
Hardware is DSLSAR (with Globespan G.SHDSL Module)
```

```

MTU 4470 bytes, sub MTU 4470, BW 800 Kbit, DLY 2560 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback not set
Keepalive not supported
Encapsulation(s):AAL5 AAL2, PVC mode
24 maximum active VCs, 256 VCs per VP, 2 current VCCs
VC idle disconnect time:300 seconds
Last input never, output 00:00:01, output hang never
Last clearing of "show interface" counters 03:16:00
Queueing strategy:fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
30 second input rate 0 bits/sec, 0 packets/sec
30 second output rate 0 bits/sec, 0 packets/sec
  2527 packets input, 57116 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
  10798 packets output, 892801 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out

```

- For an SHDSL port, to verify the SHDSL controller status and view the statistics, enter the **show controller shdsl 0** command in EXEC mode.

```

Router# show controller shdsl 0
SHDSL 0 controller UP
SLOT 3: Globespan xDSL controller chipset
Frame mode: Serial ATM
Configured Line rate: 1160Kbps
Line Re-activated 0 times after system bootup
LOSW Defect alarm: None
CRC per second alarm: None
Line termination: CPE
FPGA Revision: 9
  Current 15 min CRC: 0
  Current 15 min LOSW Defect: 0
  Current 15 min ES: 0
  Current 15 min SES: 0
  Current 15 min UAS: 7
  Previous 15 min CRC: 0
  Previous 15 min LOSW Defect: 0
  Previous 15 min ES: 0
  Previous 15 min SES: 0
  Previous 15 min UAS: 7
Chipset Version: 1
Firmware Version: R1.2
Modem Status: Data
Line rate: 1160 Kbps
Framer Sync Status: In Sync
Rcv Clock Status: In the Range
Loop Attenuation: 0.0 dB
Transmit Power: 13.5 dB
Receiver Gain: 11.420 dB
SNR Sampling: 40
Last Fail Mode: No Failure

```

- To verify the SHDSL controller status and view the statistics, change state to administratively down and enter the **show controller shdsl 0** command in EXEC mode.

```

Router#
Router# conf t
Enter configuration commands, one per line. End with CNTL/Z.
iad1(config)#contr shds 0
iad1(config-controller)#shut
iad1(config-controller)#
01:30:46: %CONTROLLER-5-UPDOWN: Controller SHDSL 0, changed state to administratively down
01:30:49: %LINEPROTO-5-UPDOWN: Line protocol on Interface ATM0, changed state to down
iad1(config-controller)#end
Router# show controller shdsl 0

```

```

SHDSL 0 controller ADMINDOWN
SLOT 3: Globespan xDSL controller chipset
Frame mode: Serial ATM
Configured Line rate: 1160Kbps
Line Re-activated 2 times after system bootup
LOSW Defect alarm: None
CRC per second alarm: None
Line termination: CPE
FPGA Revision: 9
    Current 15 min CRC: 0
    Current 15 min LOSW Defect: 0
    Current 15 min ES: 0
    Current 15 min SES: 0
    Current 15 min UAS: 7
    Previous 15 min CRC: 0
    Previous 15 min LOSW Defect: 0
    Previous 15 min ES: 0
    Previous 15 min SES: 0
    Previous 15 min UAS: 0
Chipset Version: 1
Firmware Version: R1.2
Modem Status: Idle

```

Verifying Your Configuration

You can perform the following tests at any time to verify the hardware or software configuration of the Cisco IAD2420 series IADs:

- Display the hardware configuration with the **show version** command.
- Display T1 and SHDSL controllers with the **show controllers** command.
- Display the running configuration with the **show running-config** command

Display the configuration stored in NVRAM using the **show startup-config** command.

Configuration Examples for G.SHDSL Symmetric DSL Support

The following example shows a typical running configuration with the initial configuration tasks completed:

```

Router#
Router# show running config
Building configuration...
Current configuration : 1654 bytes
!
version 12.2
no service single-slot-reload-enable
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
boot system flash:c2420-a2i8sv5-mz.1.0.9
logging rate-limit console 10 except errors
!
network-clock base-rate 56k
ip subnet-zero
!
!
!
ip audit notify log
ip audit po max-events 100

```

```

no ip dhcp-client network-discovery
lcp max-session-starts 0
!
!
!
no voice confirmation-tone
voice-card 0
!
!
!
controller SHDSL 0
mode atm
!
controller T1 1
mode cas
framing esf
clock source loop-timed
linecode b8zs
ds0-group 1 timeslots 1-24 type e&m-immediate-start
!
!
!
interface Loopback0
ip address 3.3.3.3 255.255.0.0
!
interface Ethernet0
ip address 1.3.95.50 255.255.0.0
no ip mroute-cache
!
interface Serial0
bandwidth 10000000
ip address 180.100.9.11 255.255.255.0
no keepalive
!
interface ATM0
no ip address
ip mroute-cache
atm idle-cell-format itu
atm enable-payload-scrambling
no atm ilmi-keepalive
pvc 110/110
vbr-rt 2304 2304 65535
vcci 2
encapsulation aal2
!
!
router eigrp 10
network 10.0.0.0
network 180.100.0.0
no auto-summary
no eigrp log-neighbor-changes
!
ip classless
ip route 0.0.0.0 0.0.0.0 1.3.0.1
ip route 2.2.2.2 255.255.255.255 10.10.10.2
no ip http server
!
call rsvp-sync
!
voice-port 1:1
!
mgcp
mgcp call-agent 1.4.173.1 service-type mgcp version 0.1
mgcp tse payload 100
no mgcp timer receive-rtcp
mgcp timer net-cont-test 3000
!
mgcp profile default
!
dial-peer cor custom
!
!
!

```



```

!
dial-peer voice 1 pots
  application mgcpapp
  port 1:1
!
!
line con 0
  exec-timeout 0 0
line aux 0
line 2 3
line vty 0 4
  login
!
end

```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Broadband Access Aggregation and DSL commands	Cisco IOS Broadband Access Aggregation and DSL Command Reference

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for G.SHDSL Symmetric DSL Support

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [http://www.cisco.com/cisco/web/featurenavigator](#). An account on Cisco.com is not required.

Table 1: Feature Information for G.SHDSL Symmetric DSL Support

Feature Name	Releases	Feature Information
G.SHDSL Symmetric DSL Support	12.2(4)T3 12.2(8)T	In Cisco IOS Release 12.2(4)T3, the Multirate Symmetrical High-Speed Digital Subscriber Line (G.SHDSL) feature was supported on the G.SHDSL one-port WAN interface on the Cisco 2600 series and Cisco 3600 series routers. In Cisco IOS Release 12.2(8)T, the G.SHDSL feature was expanded to the Cisco IAD2420 series IADs. The following commands were introduced or modified: controller shdsl 0, mode atm, show controller shdsl 0.

Glossary

ADSL--Asymmetric DSL (ADSL) available through several telecommunications carriers to accommodate the need for increased bandwidth for Internet access and telecommuting applications.

ATM--Asynchronous Transfer Mode. International standard for cell relay in which multiple service types (such as voice, video, or data) are conveyed in fixed-length (53-byte) cells. Fixed-length cells allow cell processing to occur in hardware, thereby reducing transit delays. ATM is designed to take advantage of high-speed transmission media such as E3, SONET, and T3.

CLI--command line interface.

CO--central office. Local exchange (local switch) that terminates individual local telephone subscriber lines for switching and connects to the public network. Known as a class 5 switch office. For example, 5ESS by Lucent and DMS 100 by Nortel.

CPE--customer premises equipment. Devices such as channel service units, data service units, modems, and ISDN terminal adapters, required to provide an electromagnetic termination for wide-area network circuits before connecting to the router or access server. This equipment was historically provided by the telephone company, but is now typically provided by the customer in North American markets.

DSL--Digital Subscriber Line available through several telecommunications carriers to accommodate the need for increased bandwidth for Internet access and telecommuting applications.

FXO--Foreign Exchange Office. An FXO interface connects to a central office.

FXS--Foreign Exchange Station: An FXS interface connects directly to a standard telephone, supplying ring voltage, dial tone, and so on.

G.SHDSL--Multirate Symmetrical High-Speed Digital Subscriber Line.

IAD--integrated access device. A CPE device used to combine services from various sources onto a common platform for transmission on a common transport span. Typically, an IAD combines various voice and data

services such as circuit-based services like traditional telephone service and packet-switched services such as frame relay or ATM.

