



Configure VDSL and G.SHDSL



Note To achieve simplification and consistency, the Cisco SD-WAN solution has been rebranded as Cisco Catalyst SD-WAN. In addition, from Cisco IOS XE SD-WAN Release 17.12.1a and Cisco Catalyst SD-WAN Release 20.12.1, the following component changes are applicable: **Cisco vManage to Cisco Catalyst SD-WAN Manager, Cisco vAnalytics to Cisco Catalyst SD-WAN Analytics, Cisco vBond to Cisco Catalyst SD-WAN Validator, Cisco vSmart to Cisco Catalyst SD-WAN Controller, and Cisco Controllers to Cisco Catalyst SD-WAN Control Components.** See the latest Release Notes for a comprehensive list of all the component brand name changes. While we transition to the new names, some inconsistencies might be present in the documentation set because of a phased approach to the user interface updates of the software product.

This chapter provides usage information and guidelines for configuring very-high-data-rate DSL (VDSL) and G.symmetric high bit rate DSL (G.SHDSL) in SD-WAN mode.

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Configure VDSL

The following table provides usage information and guidelines for configuring asymmetric DSL (ADSL2/2+) and VDSL for supported Integrated Services Router Network Interface Modules (ISR NIMs) in SD-WAN mode. VDSL2 and ADSL2/2+ provide highly reliable WAN connections for remote sites.

For related information, see [VDSL Commands](#).

Function	Command	Guidelines
Configure operating mode	<pre>Device# configure terminal Device(config)# controller VDSL slot/subslot/port Device(config)# operating mode auto</pre>	<p>To switch from operating mode auto adsl1 (adsl2+ or vdsl2) to operating mode auto ads2+ (adsl1 or vdsl2), switch to operating mode auto first.</p> <p>Before you change the operating mode, ensure that line-mode is changed to line-mode single-wire line 0.</p>

Function	Command	Guidelines
Enable DSL on a line	Device(config)# line-mode single-wire line <i>line-number</i>	This command is supported only on DSL NIM-VAB-A.
Enable bonding	Device(config)# line-mode bonding	This command is supported only on DSL NIM-VAB-A.
Load firmware on a device	Device# configure terminal Device(config)# controller VDSL <i>slot/subslot/port</i> Device(config-controller)# firmware phy filename <i>filename</i>	The Cisco Catalyst SD-WAN CLI template does not support specifying the file location. Prepend the file name with flash: or with bootflash:, depending on its location.
Enable or disable SRA	Device(config-controller)# sra	The Cisco Catalyst SD-WAN CLI template does not support the <i>sra line number</i> command. In line-mode bonding, sra enables sra on both lines and no sra disables sra on both lines.
Enable or disable bitswap	Device(config-controller)# bitswap	The Cisco Catalyst SD-WAN CLI template does not support the <i>bitswap line number</i> command. In line-mode bonding, bitswap enables bitswap on both lines and no bitswap disables bitswap on both lines.
Enable modem features	Device(config-controller)# modem <i>keyword</i>	–
Display a description of a controller	Device(config-controller)# description <i>string</i>	–
Enable dual ended line testing	Device(config-controller)# diagnostics DELT	–
Modify the file in which the training log is stored	Device(config-controller)# training log filename flash: <i>filename</i>	The Cisco Catalyst SD-WAN CLI template does not support specifying the file location. Prepend the file name with flash: or with bootflash:, depending where the file should be stored.
Enable sync mode	Device(config-controller)# sync mode <i>mode</i>	To switch from one sync mode to another, delete the existing sync mode, then configure the new one.

Function	Command	Guidelines
Enable sync interval	Device(config-controller)# sync interval seconds	–

Command Examples

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config)# operating mode auto
```

```
Device# config-transaction
Device(config)# line-mode single-wire line 1
```

```
Device# config-transaction
Device(config)# line-mode bonding
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# firmware phy filename flash:IDC_1.7.2.6_DFE_FW_BETA_120111A.pkg
```

```
Device# config-transaction
Device(config-controller)# sra
```

```
Device# config-transaction
Device(config-controller)# bitswap
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# modem customUKAnnexM
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# description to ISP 1
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# diagnostics DELT
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# training log filename bootflash:VDSLLOG.log
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# sync mode ansi previous
```

```
Device# configure terminal
Device(config)# ptp clock ordinary domain 0
Device(config-ptp-clk)# clock-port slave slaveport
Device(config-ptp-port)# sync interval -4
Device(config-ptp-port)# end
```

Configuration Example

```

Device(config)# show controllers vdSL 0/2/0
Controller VDSL 0/2/0 is UP

Daemon Status:          UP

                        XTU-R (DS)          XTU-C (US)
Chip Vendor ID:         'BDCM'              'BDCM'
Chip Vendor Specific:   0x0000              0xA39A
Chip Vendor Country:    0xB500              0xB500
Modem Vendor ID:        'CSCO'              'BDCM'
Modem Vendor Specific:  0x4602              0x0000
Modem Vendor Country:   0xB500              0xB500
Serial Number Near:     FGL2149956Y C1117-4P 16.7.20180
Serial Number Far:
Modem Version Near:     16.7.20180709:09395
Modem Version Far:      0xA39a

Modem Status:          TC Sync (Showtime!)
DSL Config Mode:       AUTO
Trained Mode:          G.993.2 (VDSL2) Profile 17a

TC Mode:               PTM
Selftest Result:       0x00
DELT configuration:    disabled
DELT state:            not running

Failed full inits:     0
Short inits:           0
Failed short inits:    0

Modem FW Version:      4.14L.04
Modem PHY Version:     A2pv6F039t.d26d

Line 0:

                        XTU-R (DS)          XTU-C (US)
Trellis:               ON                  ON
SRA:                   enabled              enabled
SRA count:              0                  0
Bit swap:               enabled              enabled
Bit swap count:         1                  3
Line Attenuation:       18.4 dB              0.0 dB
Signal Attenuation:     0.0 dB              0.0 dB
Noise Margin:           5.2 dB              6.0 dB
Attainable Rate:        46022 kbits/s        18866 kbits/s
Actual Power:           14.5 dBm             10.4 dBm
Per Band Status:        D1    D2    D3    U0    U1    U2    U3
Line Attenuation(dB):   13.9  32.7  50.1  N/A   25.6  37.7  42.3
Signal Attenuation(dB): 13.5  32.4  N/A   N/A   25.0  36.9  41.9
Noise Margin(dB):       5.3   5.1   N/A   N/A   6.0   6.0   5.9
Total FECC:             446                0
Total ES:                3                  0
Total SES:               0                  0
Total LOSS:              0                  0
Total UAS:               50                 50
Total LPRS:              0                  0
Total LOFS:              0                  0
Total LOLS:              0                  0

                        DS Channel1    DS Channel0    US Channel1    US Channel0
Speed (kbps):           NA            47610          NA              18859
SRA Previous Speed:     NA            0              NA              0
Previous Speed:         NA            0              NA              0

```

```

Reed-Solomon EC:      NA          446          NA          0
CRC Errors:           NA          51           NA          0
Header Errors:        NA         3935          NA          0
Interleave (ms):      NA          1.00          NA          1.00
Actual INP:           NA          0.00          NA          0.00

```

```

Training Log : Stopped
Training Log Filename : flash:vdslllog.bin

```

Configure G.SHDSL

Overview

G.SHDSL is an international standard that allows devices to send and receive high-speed symmetrical data streams over a single pair of copper wires. This section provides information about the Cisco G.SHDSL EFM/ATM NIM and provides guidelines for configuring G.SHDSL in SD-WAN mode.

For related information, see [Configuring Cisco G.SHDSL HWICs in Cisco Access Routers](#) and [VDSL Commands](#).

Cisco G.SHDSL EFM/ATM NIM

The Cisco G.SHDSL EFM/ATM NIM connects Cisco 4000 Series Integrated Services Routers with central office Digital Subscriber Line Access Multiplexers (DSLAMs) and supports up to four DSL pairs. The DSL pairs are bundled in groups and configured in the Cisco IOS CLI by using the `dsl-group` command. Use the mode command to choose the mode (ATM or EFM).

The NIM supports the following configuration:

- You can configure up to four DSL groups.
- You can configure auto mode on only one DSL group. For example, DSL group 0.
- In ATM Mode, you can configure the lines to use 2-wire, 4-wire (standard or enhanced), or m-pair.
- In EFM mode, you can configure a DSL group with any one of the lines in 2-wire non-bonding mode or with multiple lines in bonding mode.
- Depending on the mode (ATM or EFM), the corresponding interface (ATM or EFM) is automatically created.

Cisco G.SHDSL Configuration Guidelines

The following table provides usage information and guidelines that apply when you configure the Cisco G.SHDSL EFM/ATM in CPE or CO mode.

Function	Command	Guidelines
Configure a device with the <code>dsl-group auto</code> command	Device(config-controller)# dsl-group auto	Use customer premises equipment (CPE) mode when configuring a device with the <code>dsl-group auto</code> command. If you use this command in Central Office (CO) mode, the configuration does not take effect.

Function	Command	Guidelines
Add or delete a link	—	The <code>efm-grp</code> command is not supported. To add or delete a link to a dsl-group, delete the dsl-group, then create a new dsl-group.
Load firmware on a device	Device(config-controller)# firmware phy filename <i>location</i>	File name location options are not supported when using the <code>firmware phy</code> command. Prepend the file name with <code>flash:</code> or with <code>bootflash:</code> , depending on the location.
Create or delete an annex	Device(config-controller-dsl-group)# no shdsl annex Device(config-controller-dsl-group)# no shdsl rate rate	To avoid Cisco IOS and Cisco Catalyst SD-WAN configuration from going out of sync when you create or delete an annex, create or delete the rate in the same transaction.
Enable SHDSL to use enhanced mode	(config-controller-dsl-group)# shdsl 4-wire mode enhanced	To enable SHDSL to use the enhanced mode in a 2-pair digital subscriber line (DSL) group, use the <code>shdsl 4-wire mode enhanced</code> command in configuration controller DSL group mode.
Ignore CRC errors	(config-controller-dsl-group)# ignoreseconds	To configure a device to ignore CRC errors, use the <code>ignore</code> command. Replace <i>timeout</i> with a value from 0 through 60, which indicates the number of seconds that the device ignores CRC errors that do not resolve before the device terminates an action.
Shutdown a DSL group	(config-controller-dsl-group)# shutdown	To shut down a DSL group, use the <code>shutdown</code> command.

Examples

```
Device# config-transaction
Device(config)# controller SHDSL 0/0/0
Device(config-controller)# dsl-group auto
```

```
Device# config-transaction
Device(config)# controller VDSL 0/0/0
Device(config-controller)# firmware phy filename bootflash:IDC_1.1.1.0_DFE_1.1-1.8.1__001.pkg
```

```
Device# config-transaction
Device(config)# controller SHDSL 0/0/0
Device(config-controller)# dsl-group 0 pairs 0
```

```
Device(config-controller-dsl-group)# no shdsl annex
Device(config-controller-dsl-group)# no shdsl rate 5696
```

```
Device# config-transaction
Device(config)# controller SHDSL 0/0/0
Device(config-controller)# termination cpe
Device(config-controller)# dsl-group 0 pairs 0
(config-controller-dsl-group)# shdsl 4-wire mode enhanced
```

```
Device# config-transaction
Device(config)# controller SHDSL 0/0/0
Device(config-controller)# termination cpe
Device(config-controller)# dsl-group 0 pairs 0
config-controller-dsl-group)# ignore 30
```

```
Device# config-transaction
Device(config)# controller SHDSL 0/0/0
Device(config-controller)# termination cpe
Device(config-controller)# dsl-group 0 pairs 0
config-controller-dsl-group)# shutdown
```

Configuration Example

```
Device# sh controllers shDSL 0/1/0
Controller SHDSL 0/1/0 is UP
  Hardware is NIM-SHDSL-EA, on slot 0,bay 0
  Capabilities: EFM: 2-wire, EFM-Bond, Annex A, B, F & G
                 ATM: 2-wire, Mpair, Annex A, B, F & G
  CPE termination
  cdb=0x7F7EB723D8A8
  Vendor: Intel, Chipset: SOCRATES-4e
  PHY Source: System
  IDC Firmware version: 0.0.0.0
  DFE Firmware version:
  Group 0 info:
    Type: EFM Auto status: Down
    Ethernet Interface: Ethernet0/1/0, hwidb: 0x7F7EB723B648
    ATM Interface: ATM0/1/0, hwidb: 0x7F7EB724CE08
    Configured/active num links: 4/0, bit map: 0xF/0x0
    Line termination: CPE, Annex: auto
    PMMS disabled,Line coding: AUTO-TCPAM
    Configured/actual rate: AUTO/0 kbps
    Dying Gasp: Present
    SHDSL wire-pair (0) is in DSL DOWN state
      LOSWS Defect alarm: none
      SNR Margin alarm: none
      Loop Attenuation alarm: none
      Termination: CPE, Line mode: EFM Auto, Annex: auto
      Line coding: AUTO-TCPAM
      Configured/actual rate: AUTO/0 kbps
      Modem status: DOWN_NOT_READY,Condition: NO_COND_
  DSL Stats:
    Power Back Off: 0dB
    LoopAttn: 0dB, SnrMargin: 0dB
    Current 15 minute statistics (Time elapsed 1 seconds)
      ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
    Previous 15 minute statistics
      ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
    Current 24 hr statistics
      ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
    Previous 24 hr statistics
```

```

          ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
EFM Stats:
  EFM-TC Tx: data frames: 0
  EFM-TC Rx: data frames: 0
SHDSL wire-pair (1) is in DSL DOWN state
  LOSWS Defect alarm: none
  SNR Margin alarm: none
  Loop Attenuation alarm: none
  Termination: CPE, Line mode: EFM Auto, Annex: auto
  Line coding: AUTO-TCPAM
  Configured/actual rate: AUTO/0 kbps
  Modem status: DOWN_NOT_READY,Condition: NO_COND_
DSL Stats:
  Power Back Off: 0dB
  LoopAttn: 0dB, SnrMargin: 0dB
  Current 15 minute statistics (Time elapsed 1 seconds)
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Previous 15 minute statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Current 24 hr statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Previous 24 hr statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
EFM Stats:
  EFM-TC Tx: data frames: 0
  EFM-TC Rx: data frames: 0
SHDSL wire-pair (2) is in DSL DOWN state
  LOSWS Defect alarm: none
  SNR Margin alarm: none
  Loop Attenuation alarm: none
  Termination: CPE, Line mode: EFM Auto, Annex: auto
  Line coding: AUTO-TCPAM
  Configured/actual rate: AUTO/0 kbps
  Modem status: DOWN_NOT_READY,Condition: NO_COND_
DSL Stats:
  Power Back Off: 0dB
  LoopAttn: 0dB, SnrMargin: 0dB
  Current 15 minute statistics (Time elapsed 1 seconds)
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Previous 15 minute statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Current 24 hr statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Previous 24 hr statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
EFM Stats:
  EFM-TC Tx: data frames: 0
  EFM-TC Rx: data frames: 0
SHDSL wire-pair (3) is in DSL DOWN state
  LOSWS Defect alarm: none
  SNR Margin alarm: none
  Loop Attenuation alarm: none
  Termination: CPE, Line mode: EFM Auto, Annex: auto
  Line coding: AUTO-TCPAM
  Configured/actual rate: AUTO/0 kbps
  Modem status: DOWN_NOT_READY,Condition: NO_COND_
DSL Stats:
  Power Back Off: 0dB
  LoopAttn: 0dB, SnrMargin: 0dB
  Current 15 minute statistics (Time elapsed 1 seconds)
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Previous 15 minute statistics
    ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
  Current 24 hr statistics

```



```
          ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
Previous 24 hr statistics
          ES:0, SES:0, CRC:0, LOSWS:0, UAS:0
EFM Stats:
  EFM-TC Tx: data frames: 0
  EFM-TC Rx: data frames: 0
Group 1 is not configured
Group 2 is not configured
Group 3 is not configured
```

