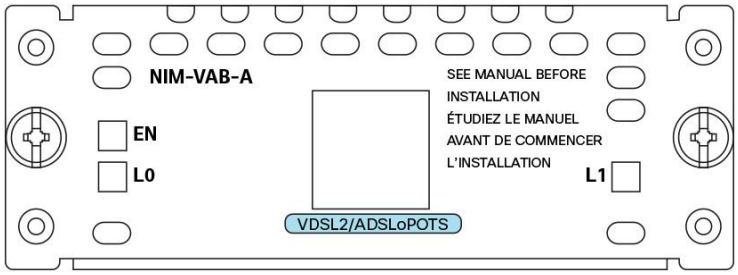
Cisco Multimode VDSL2 and ADSL2/2+ Network Interface Module

The Cisco® 4000 Integrated Services Router Family Network Interface Module (NIM) supports VDSL2 and ADSL2/2+ on a single WAN interface. The solution provides a secure, cost-effective solution for customers ranging from teleworkers and small businesses to large enterprise branch offices.

Product Overview

The Cisco Multimode VDSL2 and ADSL2/2+ NIM (part number NIM-VAB-A) provides single-port multimode VDSL2 and ADSL2/2+ WAN connectivity (Figure 1).

Figure 1. Single-Port NIM Supports VDSL2 and ADSL2/2+ for WAN Connectivity



In combination with Cisco 4000 Integrated Services Routers (ISRs), this NIM provides high-speed digital data transmission between customer premises equipment (CPE) and the central-office DSL access multiplexer (DSLAM), usually located on the telephone company premises. Service providers and resellers can offer additional services such as business-class security; voice, video, and data; differentiated classes of service (CoS); and managed network access with Cisco IOS® Software over existing telephony infrastructure.

With Cisco IOS XE Software Release 3.14 and later releases, the single-port multimode VDSL2 and ADSL2/2+ NIM is supported on the following Cisco 4000 routers: Cisco 4321, 4331, 4351, 4431, and 4451.

DSL Specifications

Tables 1 through 4 list the DSL feature specifications and DSLAM interoperability support for the Cisco Multimode VDSL2 and ADSL2/2+ NIM WAN card. For more information and details about DSLAM and NIM interoperability, please refer to the following document: Cisco ISR4000 xDSL Interoperability. Table 5 lists the product dimensions.

Table 1. DSL Features Specifications

DSL Specifications	
Multimode DSL (VDSL2 and ADSL2/2+)	• Broadcom chipset • One RJ-11 VDSL2 interface • Dying gasp • IEEE 802.1q VLAN tagging • Independent DSL firmware loading

	VDSL2: ● ITU G.993.2 (VDSL2) ● 997- and 998-band plans ● VDSL2 profiles: 8a, 8b, 8c, 8d, 12a, 12b, and 17a ● U0 band support (25 to 276 kHz) ● Ethernet packet transfer mode (PTM) based only on IEEE 802.3ah 64/65 octet encapsulation ● Support for double-ended line testing (DELT) diagnostics mode ● DSL Forum TR-067 and TR-114 compliance ● Support for downstream speeds up to 100 Mbps in Ethernet PTM and up to 50 Mbps upstream ● *Support for 2-pair bonded 17a VDSL profile on the Annex A (NIM-VAB-A) and Annex M (NIM-VAB-M) ● *Support for single-pair 30a VDSL profile on the Annex A (NIM-VAB-A) and Annex M (NIM-VAB-M) ● Support for G.993.5 Vectoring capabilities on the NIMs **ADSL2/2+:** ● ADSL over POTS with Annex A and Annex B ITU G. 992.1 (ADSL), G.992.3 (ADSL2), and G.992.5 (ADSL2+) ● ADSL over POTS with Annex M (extended upstream bandwidth) G.992.3 (ADSL2) and G.992.5 (ADSL2+) ◦ Cisco Multimode VDSL2 and ADSL2/2+ NIM (NIM-VAB-M) is optimized for power-spectrum-density (PSD) mask EU-64 M9. ◦ Cisco Multimode VDSL2 and ADSL2/2+ NIM (NIM-VAB-M) supports UK Annex M. ● G.994.1 ITU G.hs ● Reach-extended ADSL2 (G.922.3) Annex L for increased performance on loop lengths greater than 16,000 feet (4.88 km) from central office ● T1.413 ANSI ADSL DMT issue 2 compliance ● DSL Forum TR-067 and TR-100 conformity ● Impulse noise protection (INP) and extended INP ● Downstream power backoff (DPBO) ● ATM only

* Two-pair bonded 17a VDSL profile and single-pair 30a VDSL profile is not supported on the Annex B (NIM-VA-B) variant of the NIM.

Table 2. VDSL2 over ISDN DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ NIMs (NIM-VA-B)

DSLAM	VDSL2 over ISDN and Basic Telephone Service Line-Card Chipset
ZTE 9806	Broadcom
Alcatel ISAM 7302	Ikanos
Alcatel ISAM 7302	Conexant
Huawei 5603	Broadcom
Huawei 5616	Broadcom

Table 3. ADSL over ISDN DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ NIMs (NIM-VA-B)

DSLAM	ADSL2/2+ over ISDN Line-Card Chipset
Alcatel ASAM7300	Broadcom
ECI Hi-Focus 480	Infineon
Ericsson ECN320	Broadcom
Siemens HiX 5300	Infineon

Table 4. ADSL over POTS DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ NIMs (NIM-VAB -A and NIM-VAB -M)

DSLAM	ADSL2/2+ over Basic Telephone Service Line-Card Chipset
Alcatel ASAM7300	Broadcom
Alcatel ISAM 7302	Broadcom
Ericsson EDA2.1	Broadcom
ECI Hi-Focus 480	Infineon

DSLAM	ADSL2/2+ over Basic Telephone Service Line-Card Chipset
Fujitsu FDX Hub 1000	Infineon
Fujitsu FDX Hub 1000	Texas Instruments
Huawei MA5600	Conexant
Lucent Stinger	Conexant
Nokia D500	Globespan

Table 5. Cisco Multimode DSL (VDSL2 and ADSL2/2+) NIM Dimensions and Weight

	NIM-VA
Width	3.50 in. (8.89 cm)
Height	1.25 in. (3.18 cm)
Depth	7.24 in. (18.39 cm)
Weight	0.40 lb (181g)

Applications

Business-Class DSL with WAN Backup

The Cisco 4300 and 4400 Series ISRs offer multiple WAN slots. These routers can be configured with a Network Interface Module card for primary WAN access, providing redundancy for mission-critical applications. The WAN flexibility in these platforms enables the DSL cards with part numbers VDSL2 or ADSL2/2+ Network Interface Module for Annex A (NIM-VAB-A), VDSL2 or ADSL2/2+ Network Interface Module for Annex B/J (NIM-VA-B), and VDSL2 or ADSL2/2+ Network Interface Module for Annex M (NIM-VAB-M) to be used based on the VDSL2 or ADSL2/ADSL2+ supported technology.

Banking

In this scenario, a bank branch office uses the Cisco 4331 with an VDSL2 or ADSL2/2+ Network Interface Module for Annex A (NIM-VAB-A) card and Ethernet connectivity through the front-panel Gigabit Ethernet ports to provide primary and backup WAN access. In addition, the Cisco SM-X 24-Port Layer 2/3 EtherSwitch Service Module is used for connectivity for local bank branch-office servers and teller and ATM machines. This scenario uses the versatility of the Cisco 4331 to enable banking databases to synchronize banking and ATM transactions without any interruption of WAN access, and it provides redundancy for other mission-critical applications.

Business-Class Security

The Cisco 4300 and 4400 Series ISRs with the Network Interface modules can be optimized for Internet security with the Cisco IOS Firewall, supporting stateful-inspection-firewall and Cisco Cloud Web Security (CWS) Connector features. With an always-on DSL connection, Internet security and VPN capabilities are crucial to protecting corporate resources from malicious network attacks. You can enable these features on the Cisco 4000 Series ISRs by purchasing the optional Security Technology License or the AX feature set.

These platforms can also be optimized for VPN to secure the Internet for communications with the same policies and levels of security and performance as a private network. VPNs provide security through encryption tunneling, and the Cisco routers support hardware-based Triple Data Encryption Standard (3DES), IP Security (IPsec), and Advanced Encryption Standard (AES).These advanced encryption features can be enabled on Cisco ISRs by purchasing the optional Security Technology License or the AX feature set.

Application-Aware Networking with IP Quality of Service

Using Cisco quality-of-service (QoS) features, including Class-Based Weighted Fair Queuing (CBWFQ), Low-Latency Queuing (LLQ), Weighted Random Early Detection (WRED), and others, Cisco 4000 Series routers with the Cisco Multimode VDSL2 and ADSL2/2+ NIM can help service providers and resellers offer services that can differentiate bandwidth based on the specific application or specific user. For example, network administrators can give traffic from a customer order entry priority over regular internal network traffic.

Performance

VDSL2 and ADSL2/2+ performance is a function of many variables, including the DSLAM line card, DSLAM software version, VDSL profile and band plan, line-noise conditions, loop length, and other environmental factors.

Software Support

The single-port Cisco Multimode VDSL2 and ADSL2/2+ NIM is supported on Cisco IOS XE Software Release 3.14 and later releases on Cisco 4321, 4331, 4351, 4431, and 4451 ISRs.

The VDSL2 and ADSL2/2+ features are supported with the IP Base technology package license for the Cisco 4300 and 4400 Series ISRs.

Platform Support

Multimode DSL (VDSL2 and ADSL2/2+) NIMs are supported only in the onboard NIM slots of the modular Cisco 4000 router platforms. Table 6 provides platform support details.

Table 6. Platform Support and Maximum Number of NIMs per Platform

Platform Part Numbers	Maximum Number of NIMs
Cisco 4321 and 4331 ISRs	2
Cisco 4351, 4431, and 4451 ISRs	3

Part Number and Ordering Information

Table 7 gives ordering information for the Cisco Multimode VDSL2 and ADSL2/2+ NIM over ISDN and basic telephone service.

Table 7. Multimode DSL (VDSL2 and ADSL2/2+) Ordering Information

Product Number	Description
NIM-VAB-A	1-port VDSL2/ADSL2+ NIM over POTS with Annex A
NIM-VA-B	1-port VDSL2/ADSL2+ NIM over ISDN with Annex B/J
NIM-VAB-M	1-port VDSL2/ADSL2+ NIM over POTS with Annex M
NIM-VAB-A=	1-port VDSL2/ADSL2+ NIM over POTS with Annex A spare
NIM-VA-B=	1-port VDSL2/ADSL2+ NIM over ISDN with Annex B/J spare
NIM-VAB-M=	1-port VDSL2/ADSL2+ NIM over POTS with Annex M spare

Cable Information

To accommodate external splitters, a crossover cable might be required; it can be ordered separately (part number CAB-ADSL-RJ11X=).

Cisco 4000 Series Routers Regulatory Approvals

When installed in the Cisco 4000 ISRs (Cisco 4321, 4331, 4351, 4431, and 4451), the VDSL2 and ADSL2/2+ NIM does not change the router standards (regulatory compliance, safety, EMC, and telecom).

Refer to the Cisco 4000 Series platform-specific links for regulatory compliance, safety, EMC, and telecom standards at: http://www.cisco.com/go/isr4000

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For More Information

For more information, please reference the Cisco Multimode VDSL2 and ADSL2/2+ NIM Q&A at: http://www.cisco.com/en/US/prod/collateral/routers/ps10536/qa_c67-644632.html.

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