

IES-2000/IES-3000

Multi-Service IP DSLAM

The importance of IP has been demonstrated by the year-after-year increase of new and innovative Internet applications. The adaptation of IP gives service providers much more flexibility and efficiency than with traditional ATM infrastructure. New advances in IP networking technologies have been introduced, which have changed the landscape of broadband service offerings.

For the pervasive DSL technologies in last mile access applications, ZyXEL's IES-2000/IES-3000 are the ideal choice for IP-based DSLAMs which terminate all ATM circuits and convert the traffic directly onto the Internet. IP-based DSLAMs provide a distinct advantage over typical ATM-based DSL access systems, due to the fact that IP is the most natural approach for data transmission. It offers better bandwidth utilization, ease of use, and provides a low-cost advantage.

The IES-2000 and IES-3000 use identical line and control cards. The common design enhances the product's flexibility and reduces the complexity of provisioning. The differing port density designs in the IES-2000 and IES-3000 gives service providers alternatives for different size and access technology applications.

The IES-2000/IES-3000 also offer service providers extensive management capabilities. Both the IES-2000 and IES-3000 are managed using ZyXEL's NetAtlas, an element management system (EMS). Information on configuration control, system status, performance index, alarm trap, etc. are forwarded from the IES-2000/IES-3000 to NetAtlas, which delivers to the service providers a comprehensive service results report. In addition to remote management capability, a console port is available for local management on either version of the IES.

The advanced designs in ZyXEL's IES-2000/IES-3000 enable service providers to deploy broadband service to more customers quickly and at a lower cost than previously possible.



IES-2000



IES-3000

B e n e f i t s

IP-based DSL Service

Most DSL services are based on ATM infrastructure. Compared to ATM, IP is more efficient and cost-effective for data service delivery. ZyXEL's IES-2000/IES-3000, the IP-based DSLAMs, terminate all ATM circuits and convert the traffic directly onto the Internet. The deployment of IES-2000/IES-3000 can save a lot of effort and cost relative to the investment and maintenance of an ATM backbone.

Flexible Uplink Connections

The modular uplink design in the MSC1000 (Management and Switch Card) for the IES-2000/IES-3000, gives service providers a wide-ranging uplink alternative including optical interfaces of 1000Base-SX, 1000Base-LX and copper-based 10/100/1000Base-Tx. Port trunking allows greater bandwidth and better protection for uplinks. The integration of IES-2000/IES-3000 with existing copper wire infrastructure or a newly deployed fiber backbone becomes a much easier proposition than what was previously available.

Full-range DSLs Offering

ZyXEL's IP DSLAM offers G.SHDSL, ADSL and VDSL technology. Ranging in speeds from 128 Kbps up to 15 Mbps and loop-reach up to 18,000 feet (5.5km), broadband services can be offered using the existing infrastructure of copper wires which allows new revenue to be generated with minimum installation time and expense. With the high port density design, the IES-2000/IES-3000 are the best solutions for service providers to deliver various DSL services from their central offices.

Redundancy and Automatic Fail-over

The IES-3000 provides a redundant power module, control module and redundant protection for its uplink connection, which greatly improves system reliability. Its fully hot-swappable design ensures continuous operation of existing services while adding or removing modules.

VLAN Offers Both Security and Performance

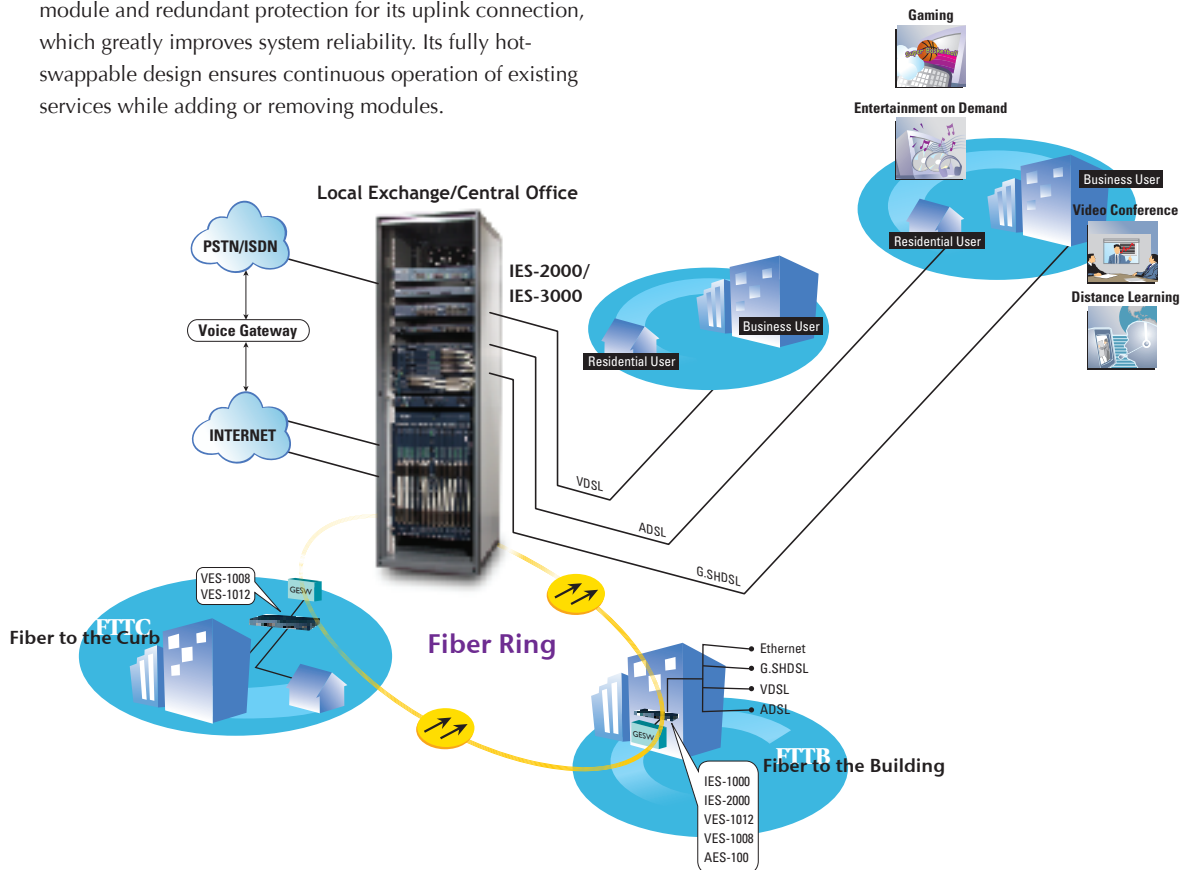
The VLAN feature of the IES-2000/IES-3000 offers the benefits of both security and performance. VLAN is used to isolate traffic between different users and thus provides improved security. Performance is also enhanced by limiting the broadcast traffic within the same VLAN broadcast domain.

Multicasting Optimizes Bandwidth Utilization

The IGMP snooping feature forwards traffic to only those subscribers that request multicast traffic. This prevents the unnecessary forwarding of multicast traffic to all subscribers and optimizes bandwidth utilization for bandwidth-consuming application, such as broadcast video.

End-to-End Management Minimizes the Operation Cost

Besides basic configuration, fault, security and performance management, NetAtlas also provides powerful and advanced remote management which helps service providers to minimize daily operation cost. Loop-back design helps to isolate network problems. New firmware and configuration for both IES-2000 and IES-3000 can be remotely changed, thus eliminating the need for "truck rolls" to provision new customers or to reconfigure services for existing customers. Status and alarm reports from the IES-2000/IES-3000 can be collected at the touch of a button.



Features & Specifications

MSC1000 (Management and Switch Card) for IES-2000M & IES-3000M

Network Interface

- 802.3ad port trunking
- 2 slots for uplink modules, the interface types are as follows:
 - 1000Base-SX
 - Wavelength: 850±50 nm
 - Multi-mode
 - Connector: Dual SC
 - 1000Base-LX:
 - Wavelength: 1310±50 nm
 - Single-mode
 - Connector: Dual SC
 - 10/100/1000Base-Tx:
 - Cable: a. 10Base-T 2-pair UTP Cat. 3, 4, 5, up to 100 m
 - b. 100Base-Tx 2-pair UTP Cat. 5, up to 100 m
 - c. 1000Base-T 4-pair UTP Cat. 5, up to 100 m
 - Connector: RJ-45
 - 100Base-FX:
 - Wavelength: 1310±50 nm
 - Single-mode
 - Connector: Dual SC

Subtending Interface

- 2 slots for subtending link modules with the same interfaces as uplink modules

Switching

- Switching fabric capability: 12.8 Gbps, non-blocking
- Packet forwarding rate: 96 Mpps
- Frame size: 1522 bytes
- Forwarding frame: 802.3, 802.1q, Ethernet II, PPPoE
- Prevent the forwarding of corrupted packets

Network Management

- RS-232C (DB-9) port for local management
- 10/100M Ethernet interface for out-of-band management
- CLI through console port and telnet
- Web-based management
- HP OpenView support (after ver. 6.1)
- Support SNMPv1, SNMPv2 and SNMPv2c
- Status display and event report from web-based management
- RMON: four RMON groups 1, 2, 3, 9 (history, statistics, alarms, and events) for enhanced traffic management, monitoring and analysis
- S/W upgrade and download from EMS (through FTP/TFTP)
- Provide fault, performance, configuration, and security managements

Physical and Environment

IES-2000M

- 442.7 mm (W) x 268 mm (D) x 178 mm (H)
- Rack mountable enclosure, 19" or 23" rack
- 6-slot chassis: 1 for management and switch card (MSC1000) and 5 for DSL line cards

IES-3000M

- 442.7 mm (L) x 268 mm (D) x 482.8 mm (H)
- Rack mountable enclosure, 19" or 23" rack
- 16-slot chassis: 1 for MSC1000 and 15 for DSL line cards; or 2 for MSC1000 and 14 for DSL line cards

IES-2000 ST/SW

- 442.7 mm (W) x 280 mm (D) x 89 mm (H)
- Rack mountable enclosure, 19" or 23" rack
- 6-slot chassis for DSL splitter/extension cards

IES-3000 ST/SW

- 442.7 mm (W) x 280 mm (D) x 222.5 mm (H)
- Rack mountable enclosure, 19" or 23" rack
- 15-slot chassis for DSL splitter/extension cards

VLAN

- Port-based and Tag-based
- No. of VLAN IDs: 4096

Port Trunking

- Static port trunking for bandwidth aggregation
- Support 802.3ad (*)

QoS

- 802.1p
- 4-priority queues

Spanning Tree

- 802.1d for redundant backbone connections and loop free networks

Multicast

- Support IGMP snooping, GVRP
- Broadcast storm control

Bridging

- 16K MAC addresses
- MAC address filtering(*)

MIB

- SNMP MIB II (RFC1213)
- RFC1493 Bridge MIB
- RFC1643 Ethernet MIB
- RFC1757 Four group of RMON
- RFC2674 (Q-MIB)
- RFC2662 (ADSL line MIB)
- VDSL line MIB
- SHDSL line MIB

Reliability

- Redundant design
- Hot-swappable

Temperature

- Operating: 0 ~ 50°C
- Storage: -25 ~ 70°C

Humidity

- 5 ~ 95% (non-condensing)

Power

- -37 ~ -56VDC
- Redundant design in IES-3000

Certification

- Safety
 - UL1950
 - CSA C22.2 No. 950
 - EN60950, EN41003
- EMC
 - FCC Part 15 Class A
 - EN55022 Class A

Line Cards for IES-2000M/IES-3000M

	ALC1024-61 (Annex A over POTS) ALC1024-63 (Annex B over ISDN)	SLC1024 -22	VLC1012
Interface	<ul style="list-style-type: none"> • 24-port ADSL over POTS/ISDN • Maximum transmission rate: 8 Mbps downstream, 800 Kbps upstream • One Telco-50 connector to splitter chassis • ADSL compliance <ul style="list-style-type: none"> ■ ANSI T1.413, issue 2 ■ G.DMT (ITU G.992.1) ■ G.LITE (ITU G.992.2) ■ G.HS (ITU G.994.1) ■ Auto-negotiation rate adaptation • ADSL protocol <ul style="list-style-type: none"> ■ Multiple protocol over AAL5 (RFC1483) • Front panel access • Hot-swappable 	<ul style="list-style-type: none"> • 24-port G.shdsl • Transmission rate: 192 k ~ 2.3 Mbps at 64 Kbps increment over single copper pair • One Telco-50 connector to splitter chassis • Compliant with ITU-T G.991.2 • TC-PAM modulation • Front panel access • Hot-swappable 	<ul style="list-style-type: none"> • 12-port VDSL • Ethernet over VDSL • One Telco-50 connector to splitter chassis • Transmission rate: 5, 10, 15 Mbps for symmetric/asymmetric • Power back-off algorithm • Front panel access • Hot-swappable
Maximum Power Consumption	ALC1024-61: 43 W ALC1024-63: 40 W	25 W	33 W
LED	<ul style="list-style-type: none"> • Power (PWR) <ul style="list-style-type: none"> ■ Light off: power off ■ Light on: power on • Status (SYS) <ul style="list-style-type: none"> ■ Light off: line card not in service ■ Light on: line card in service ■ Light flashing: line card booting 	<ul style="list-style-type: none"> • DSL <ul style="list-style-type: none"> ■ Light on: link on ■ Light off: link is not ready or no connection • Alarm <ul style="list-style-type: none"> ■ Light on: alarm state 	
OAM & P	<ul style="list-style-type: none"> • Alarm/status surveillance <ul style="list-style-type: none"> ■ Automatic alarm and status report ■ Alarm/event history ■ LED indication for alarm and system status • Performance monitoring <ul style="list-style-type: none"> ■ Line rate • Configuration <ul style="list-style-type: none"> ■ VLAN setting ■ DSL line rate setting (bandwidth control) ■ Software upgrade and download from EMS (through FTP/TFTP) • Default configuration • BOOTP/DHCP client 	<ul style="list-style-type: none"> • Security and memory backup <ul style="list-style-type: none"> ■ Support login authorization and security levels ■ Provide non-volatile memory to back-up system database ■ Support port mirroring ■ Keep previous system parameters during re-booting • Self diagnostics <ul style="list-style-type: none"> ■ FLASH memory ■ DRAM ■ LAN port ■ Line interface loop-back test • Remote reset 	

Splitter/Extension Cards for IES-2000/IES-3000 ST/SW

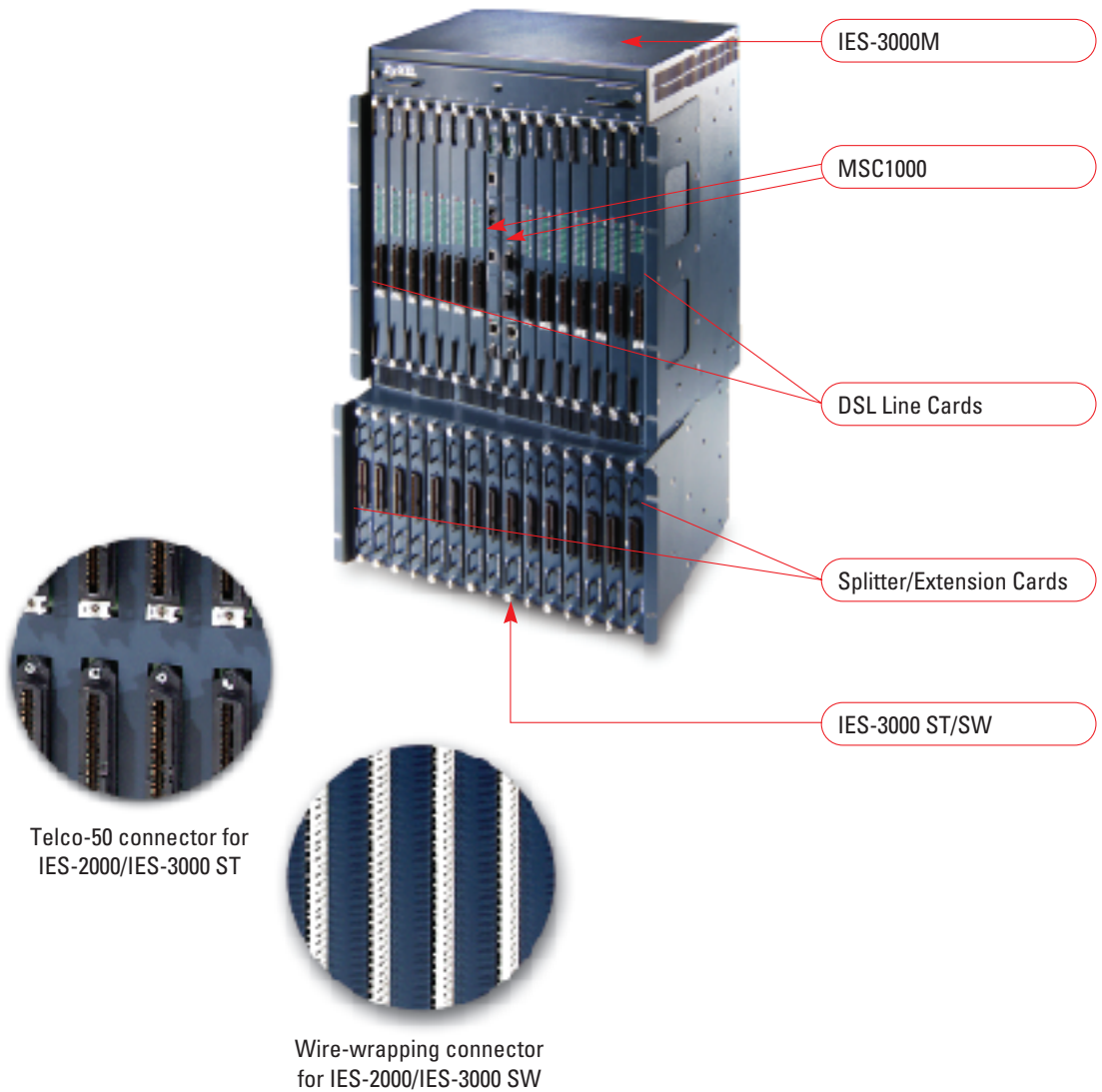
	ASC1024-61	ASC1024-63	VSC1012	SEC1024 G.shdsl
Description	ADSL Annex A splitter card	ADSL Annex B splitter card	VDSL splitter card	Extend G.shdsl in splitter shelves for consistent interface with other DSL services
No. of channel per card	24	24	12	-
Splitter bandwidth	DC to 3.4 KHz	DC to 99 KHz	DC to 700 KHz	-
DSL band	30 KHz to 1104 KHz	140 KHz to 1104 KHz	1.1 to 7.9 MHz; could be configured to comply to plan 997, 998	-
DSL impedance	100 ohm	100 ohm	100 ohm	-
Loop current	<100 mA	<100 mA	<100 mA	-
DC Resistance	<=20 ohm	<= 20 ohm	<= 20 ohm	-
Isolation resistance tip/ring	> 1 Mohm	> 1 Mohm	> 1 Mohm	-
Insertion loss	< 1.0 dB	< 2.0 dB	< 2.0 dB	-
Return loss	> 14 dB	> 15 dB	> 9 dB	-
Longitudinal	> 58 dB at 300-1 KHz	> 40 dB at 16-300 Hz	> 40 dB at 16-300 Hz	-
Conversion loss	> 53 dB at 1-3 KHz	> 46 dB at 300-600 Hz > 52 dB at 600-3400 Hz	> 46 dB at 300-600 Hz > 52 dB at 600-3400 Hz	-
Stop band attenuation	> 55 dB at 30-300 KHz > 65 dB at 300 K-1104 KHz	> 55 dB at 140 K-300 KHz > 65 dB at 300 K-1104 KHz	> 55 dB at 700 KHz+	-

Full Load Configuration

Fully-loaded IES-3000

		ADSL Annex A	ADSL Annex B	G.shdsl	VDSL
IES-3000M	IES-3000 main chassis, 10.5U	1	1	1	1
IES-3000ST/SW	IES-3000 splitter chassis (ST: Teco-50 connector, or SW: wire wrapping), 5U	1	1	1	1
MSC1000	Management Switch card with one or two 100FX/1000BT/1000B SX/1000B LX for uplinks, and one or two 100FX/1000BT/1000B SX/1000B LX for subtending	1 or 2*	1 or 2*	1 or 2*	1 or 2*
ALC1024-61	24-port Annex A ADSL line card (over POTS)	15 or 14*			
ASC1024-61	24-port Annex A ADSL splitter card (over POTS)	15 or 14*			
ALC1024-63	24-port Annex B ADSL line card (over ISDN)		15 or 14*		
ASC1024-63	24-port Annex B ADSL splitter card (over ISDN)		15 or 14*		
SLC1024-22	24-port G.shdsl line card			15 or 14*	
SEC1024	24-port G.shdsl extension card			15 or 14*	
VLC1012	12-port VDSL line card				15 or 14*
VSC1012	12-port VDSL splitter card				15 or 14*

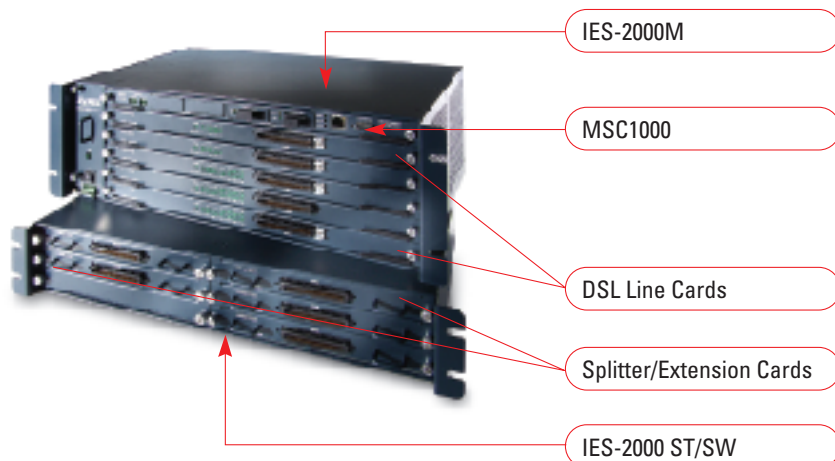
* IES-3000 supports protection in uplink. You can have one MSC1000 with fifteen DSL line cards, or two MSC1000 with fourteen DSL line cards.



Full Load Configuration

Fully-loaded IES-2000

		ADSL Annex A	ADSL Annex B	G.shdsl	VDSL
IES-2000M	IES-2000 main chassis, 4U	1	1	1	1
IES-2000ST/SW	IES-2000 splitter chassis (ST: Teco-50 connector, or SW: wire wrapping), 2U	1	1	1	1
MSC1000	Management switch card with one or two 100FX/1000BT/1000B SX/1000B LX for uplinks, and one or two 100FX/1000BT/1000B SX/1000B LX for subtending	1	1	1	1
ALC1024-61	24-port Annex A ADSL line card (over POTS)	5			
ASC1024-61	24-port Annex A ADSL splitter card (over POTS)	5			
ALC1024-63	24-port Annex B ADSL line card (over ISDN)		5		
ASC1024-63	24-port Annex B ADSL splitter card (over ISDN)		5		
SLC1024-22	24-port G.shdsl line card			5	
SEC1024	24-port G.shdsl extension card			5	
VLC1012	12-port VDSL line card				5
VSC1012	12-port VDSL splitter card				5



PWR-2000M

The PWR-2000M is a power converter that converts AC power to 300W DC power for the IES-2000. The PWR-2000M is needed when installing the IES-2000 in the environment where only AC power is available, since the power input of IES-2000 is DC power. The PWR-2000M is 1U high, mountable in the 19" or 23" rack. It has two load sharing modules, increasing availability of IES-2000.



TOTAL INTERNET ACCESS SOLUTION



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