



IES-5000
6.5U MSAN/DSLAM with DC Power



IES-5005
3.5U MSAN/DSLAM with DC Power

- Non-blocking Gigabit backplane
- Multi-service Interfaces including ADSL2/2+, G.SHDSL.BIS, VDSL2, VOIP (SIP & H.248), Fiber-based FE and E1 IMA
- Comprehensive QoS to enhance triple play users' experience
- Field proven IGMP snooping and proxy for IPTV deployment
- Flexible ACL, VLAN-aware DHCP and anti-IP/MAC address spoofing to prevent malicious attack
- DHCP option 82 and PPPoE IA features support versatile IP address assignment

Removing the Obstacles of Service Provisioning Mid-size Multi-Service Access Platform for Smoothly Migrating to Next Generation Network

Benefits

Service aware

The IES-5000/5005 Series is equipped with non-blocking gigabit backplane, failover-enabled Management Switch Cards (MSC), dual power modules, high-port density DSL line cards and VoIP line cards. With embedded IP-centric QoS, security and multicasting features, the IES-5000/5005-chassis-based system facilitates Telco/ISP delivering high degree of quality of experience to today's demanding residential and business customers, and achieving its infrastructure provisioning criteria of reliability, flexibility and scalability at competitive CAPEX/OPEX. The IES-5000/5005 Series is temperature-hardened and can be installed in street cabinet, suitable for outside plant deployment.

Scalability

The IES-5000 is a 6.5U height and 10-slot chassis-based system with separated 5U splitter frame. Two of the 10 slots are reserved for Management Switch Cards (MSC) and the remaining 8 slots are for DSL, VoIP and Ethernet line cards. The compact design of IES-5005 offers a 3.5U height and 5-slot chassis-based system with a separated 3U splitter frame. One slot is reserved for MSC card and the remaining 4 slots are for DSL, VoIP and Ethernet line cards.

The MSC has 4 GE ports for uplink and subtending. With the subtending feature, the IES-5000/5005 Series can be cascaded in the rack at a central office, or be connected to remote IES products in the form of a tree, ring, or daisy-chained as needed. The uplinks can be used as a traffic aggregation and can be plugged in trunk or set to work in 1+1 redundant mode. Additionally, two Management Switch Cards (MSC) for link redundancy and failover support. In case when one MSC fails, the second MSC takes over control within 1 second.

The ADSL2/ADSL2+ line cards have two options: 48-ports and 72-ports. G.SHDSL.bis/VoIP line cards have 48 ports, the VDSL2 line card comes with 24/48 ports and 20 ports for fiber-based Fast Ethernet line card.

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6.5U/3.5U MSAN/DSLAM
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Multiple standard DSL services

ADSL line card provides 48/72 ports with transmission bandwidth up to 25 Mbps/2.4 Mbps. ADSL line cards also provide G.bond port bonding to increase service range or double transmission bandwidth. VDSL line cards provide with a ADLS2+ fallback function (Annex A and Annex B) allows Telco operators migrating existing ADSL2+ services to VDSL2 services seamlessly. SHDSL line cards provide 48 ports with transmission bandwidth up to 5.69 Mbps/22.76 Mbps/45.52 Mbps in ATM/EFM mode. VDSL line cards provides 24/48 ports with transmission bandwidth up to 100 Mbps/100 Mbps. All DSL cards are hot swappable to ensure system stability.

Advanced triple play functionality

The IES-5000/5005 provides complete ATM QoS (UBR/VBR/CBR) and Ethernet L2 QoS on the line cards. The IP QoS (Packet classification/Rate Limiting/Queue Scheduling) is provided on the Network Termination cards as well. Sophisticated PVC to VLAN bridging and aggregation enables end-to-end QoS and various service allocation and provisioning. In addition, the IES-5000/5005 supports non-blocking traffic forwarding and multicast features with up to 256 multicast groups. For security, the IES-5000/5005 provides anti MAC/IP address spoofing, broadcast storm prevention, MAC count limiting, and policy-based packet filtering. All these features allow ISPs/Telco operators to provide High Speed Internet access, VoIP, Near VOD, Broadcast TV and TV on demand, and other features easily.

Robust physical safety design

The IES-5000/5005 guarantees physical safety by embedding voltage, temperature and FAN speed sensors. When an abnormal condition is detected, the LED displays and/or the corresponding alarms will come up to alert the operators. In cases when the system temperature goes higher than the configured threshold, thermal cutoff protection kicks into action and the system will shut down automatically.

Sophisticated OAM&P Element Management System (EMS)

The IES-5000/5005 provides various management methods: local console port, Web-based configuration, Telnet, and SNMP v1/v2/v3-based EMS (NetAtlas Access EMS). Included management functions are Alarm and Status Surveillance, Configuration management, Performance management, and Fault management. The IES-5000/5005 allows operators to create multiple administrative accounts and 3 levels of access rights. Accounts with the first-level privilege have full access rights. Second-level privilege accounts have the same access rights as first-level accounts except for account management. Third-level accounts can only view configuration settings and performance statistics. NetAtlas Access EMS also provides view-based MIB management and XML-based north bound interface. These features allow Telco operators to provide wholesale service to smaller CLECs and ISPs.

Distributed and QoS-assured media gateway

The IES-5000/5005 provides a parallel and distributed media gateway architecture to empower VoIP services taking advantage of POTS voice signals, in addition to FAX and modem services. With the architecture, each media gateway serves up to 48 POTS ports and operates independently with each other. As part of the benefit, there is no throughput bottleneck or single-point failure issue in this architecture, the performance and reliability of the VoIP/fax/modem services are outstanding as well. The media gateway provides G.711, G.723, G.726, G.729a/b and T.38 codecs while RFC3261 SIP and H.248 network signaling protocols are supported as well.

Specifications

System Specifications

DSL Compliant

- ADSL:
 - G.992.1 Annex A, G.992.3 Annex A, G.992.5 Annex A
 - G.992.1 Annex B, G.992.3 Annex B, G.992.5 Annex B
 - Support G.992.3 and G.992.5 spectral mask
 - Support Annex M and Annex L in G.992.3 and G.992.5
 - Support EOC and overhead channel access
 - Support the latency path function
 - Support loop diagnostic function specified
 - Support the power management capability
 - Support the capability of the Seamless Rate Adaptation (SRA) on-line configuration
 - Single and dual end loop test
 - G.998.1 port bonding
- SHDSL: G.991.2, G.991.2.bis, G.998.1
- VDSL2: G.993.2, G.994.1, G.997.1

ATM Traffic Management

- Support 8 PVC per DSL port
- Support UBR, CBR, rt-VBR, nrt-VBR, QoS mechanisms
- Support ATM Forum TM 4.0 peak cell rate traffic parameter
- Support downstream traffic shaping function per ATM PVC
- Support ATM F5 OAM cells for end-to-end loop back test (ITU-T Rec. I.610)

Performance

- Eight queues with packet priority scheduling (SPQ, WRR)
- Support 256 IGMP multicast groups
- The maximum channel zapping processing time is 250 ms
- DSCP to 802.1p mapping

Security

- Per port and per VLAN isolation
- IEEE 802.1x (authentication)
- Rule-based packet filtering (L2 ~ L4 ACL)
- MAC count limiting
- ARP broadcast filtering

- DHCP broadcast filtering
- VLAN aware DHCP snooping
- NetBIOS filtering
- IGMP filtering
- Anti IP/MAC address spoofing
- Support TACACS+ remote authentication

VLAN

- 4094 IEEE 802.1Q compliant VLAN tagging
- VLAN stacking (Q-in-Q)
- VLAN bridge function (multiple PVCs to one VLAN)(N:1)
- PVC and VLAN one to one mapping (1:1)
- VLAN trunking (single PVC join multiple VLAN)(1:N)
- Support GVRP function

Traffic Management

- Bandwidth control and broadcast/multicast/unknown unicast control on Gigabit Ethernet ports
- STP: IEEE 802.1d, IEEE 802.1w, IEEE 802.1s
- IP bridge
- IEEE 802.3ad (Link aggregation control protocol)
- IP multicast forwarding
- IGMP v1, v2, v3 snooping/proxy
- IGMP multicasting channel limiting
- VLAN aware DHCP snooping
- DHCP relay option 82 with sub-option 1 & 2
- TR-101 compliant PPPoE intermediate agent
- Multicast bandwidth control
- L2 ~ L4 ACL
- IGMP group count/filtering profile

VoIP Features

- Codes: G.711, G.726, G.729a/b, G.723.1
- Network signaling protocols: ITU-T H.248 v2, SIP v2 (RFC 3261)
- RTP (RFC 1889)
- RTCP (RFC 1890)
- FAX/Modem pass through (T.38) via RTP
- Tone detection and generation (bi-directional)- RFC2833 RTP Payload for DTMF
- Echo cancellation and auto gain control (G.165, G.168)
- VAD (Voice Activity Detection)

- CNG (Comfort Noise Generation)
- Caller ID generation and detection
- Supplementary services
 - Local dial available
 - Emergency call local route
 - Do not disturb
 - Selective/anonymous call rejection
 - Call waiting
 - Call transfer (blind and attended transfer)
 - Call return and call back on busy
 - Off hook warning tone

Network Management

- Local management through a craft terminal
- Web-based management interface
- Cluster management (up to 8 cluster members)
- View-based network management
- Support XML-based North Bound Interface NetAtlas Access EMS
- In-band and out-of-band IP interface for management (SSH, SFTP)
- SNMP management (through ZyXEL NetAtlas Access EMS)
 - SNMPv1/v2c/v3 agent/traps
 - Standard MIBs
 - RFC 1213 MIB II
 - ADSL line MIB (RFC 2662)/extension line MIB (RFC 3440)
 - SHDSL line MIB (RFC 3276)
 - VDSL line MIB (RF 3728)
 - Bridge MIB/extension MIB
 - RMON MIB (RFC 1757)
 - Vendor specific MIBs, e.g.,
 - Chassis management MIB (fan speed, voltage, temperature)

Hardware Specifications

IES-5000M

- 10-slot rack mountable enclosure, 19" or 23" chassis
- 8 slots for line termination cards
- 2 slots for management and switch cards
- 2 DC power input module and filter
- One FAN and dust filter module

IES-5005M

- 5-slot rack mountable enclosure, 19" or 23" chassis
- 4 slots for line termination cards
- 1 slots for management and switch cards
- 2 DC power input module and filter
- One FAN and dust filter module

ALC1248G-51/ALC1272G-51

- Hot swappable 48-port/72-port ADSL2/ADSL2+ Annex A line card
- Maximum transmission rate up to 25 Mbps/2.4 Mbps for ADSL2+
- One mini-RJ11 console port
- One gigabit backplane
- Support G.992.3 and G.992.5 spectral mask
- Support EOC and overhead channel access defined in G.992.3 and Rec.G.997.1
- Support the latency path function specified in G.992.3 and G.992.5
- Support Annex L and Annex M specified in G.992.3 and G.992.5
- Support loop diagnostic function specified in G.992.3 and G.992.5
- Support the power management capability specified in G.992.3 and G.992.5
- Support the capability of the seamless rate Adaptation (SRA) on-line configuration specified in G.992.3 and G.992.5
- Support ADSL2+ 2-port bonding (G.998.1)

ALC1248G-53

- Hot swappable 48-port ADSL2/ADSL2+ Annex B line card
- Support Annex M and Annex L specified in G.992.3 and G.992.5
- Maximum transmission rate up to 25 Mbps/2.4 Mbps for ADSL2+
- One mini-RJ11 console port
- One gigabit backplane

SLC1348G-22

- Hot swappable 48-port SHDSL/SHDSL.bis line card
- Support ETSI TS 101 524 V 1.2.1, ITU-T G.991.2, ITU-T G.991.2.bis
- ATM-based multi-pair bonding (G.998.1) up to 8 ports
- Symmetric transmission rate of 5.69 Mbps/port
- One mini-RJ11 console port
- One gigabit backplane
- Support IEEE EFM

VLC1324G-51/VLC1324G-53/ VLC1348G-51/VLC1348G-53

- Hot swappable 24-port/48-port VDSL2 line card over POTS and over ISDN
- Support G.993.2, G.994.1, G.997.1
- Maximum transmission rate up to 100 Mbps/50 Mbps
- One mini-RJ11 console port
- Two gigabit backplane
- Support VDSL2 profiles 8a, 8b, 8c, 8d, 12a, 12b and 17a
- Support frequency allocation bandplan 998 and 997
- Support U0 band, customer PSD, RFI notch, single latency in PTM mode and INP
- Support UPBO and DPBO, Reed Solomon and trellis coding
- Support ADSL fall back with ADSL/ADSL2/ADSL2+ CPE in Annex A, M, L modes
- Support IEEE 802.1ag Connectivity Fault Management (CFM)

ELC1220G-55

- Support 20 open slots for Fast Ethernet SFP (100Base-FX/BX/LX/EX)
- One mini-RJ-11 console
- Aggregates layer-2 traffic from Fast Ethernet subscribers to the chassis system
- Support multicast VLAN, IGMP snooping, IGMP filter and static multicast functions for MoD services
- Support DHCP relay, option82 and snooping functions
- Support ACL, anti-IP address spoofing and anti-MAC address spoofing security functions

MSC1000G

- Failover-enabled network termination card (IES-5000 only)
- Embedded 24G, non-blocking full duplex switching fabric
- Two 1000M interface modules (SFP + copper) for subtending
- Two 1000Base-SX/LX/EX/ZX (mini-GBIC, SFP) interface for uplink
- One RS232 (DB-9) serial console port
- One 10/100M out-of-band Mgmt interface
- One external alarm IO port

VOP1248G-61

- 48-port VoIP line card
- Support H.248 version 2 or SIP singling protocol
- Compatible CPE including POTS phone, Fax, analog modem and pay phone
- Support G.711 a/μ, G.726, G.729 a/b G.723.1
- 20K Busy Hour Call Attempts (BHCA)
- Configurable jitter buffer
- Support the generation of dial tone, second dial tone, ringing tone (ring-back tone), busy tone, off-hook warning tone
- Support call waiting, call hold, call transfer, return and call back on busy
- Emergency call local route
- Local dial available
- MLT (Metallic Loop Testing for subscriber lines) and GR-909 loop diagnostic
- Ringer Max output power: 15 Watt

IMA1408G-81

- Hot swappable 8-port E1 IMA card, 8 groups per card
- Support G.703, G.704
- Full-duplex bandwidth up to 16M
- One mini-RJ11 console port
- Two gigabit backplane
- Support RFC1483/1577/2364/2684
- Support ATM Forum Rec UNI 3.0, UNI 3.1, UNI 4.0
- Support ITU-TI.361, I.371, G.804

VLC1424G-56

- Hot swappable 24-port VDSL2 line card
- Support G.993.2, G.994.1, G.997.1
- Maximum transmission rate up to 100 Mbps/100 Mbps
- One mini-RJ11 console port
- Two gigabit backplane
- Support VDSL2 profiles 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a
- Support frequency allocation bandplan 998 and 997
- Support customer PSD, RFI notch, single latency in PTM mode and INP
- Support trellis coding
- Support IEEE 802.1ag Connectivity Fault Management (CFM)

Physical Specifications

IES-5000M

- Dimensions: 440 (W) x 285 (D) x 289 (H) mm
- Weight: 10 Kg

IES-5005M

- Dimensions: 440 (W) x 250 (D) x 152 (H) mm
- Weight: 5 Kg

ALC1248G-51

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

ALC1272G-51

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.7 Kg

ALC1248G-53

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

SLC1348G-22

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 1 Kg

VLC1324G-51/VLC1324G-53

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 1 Kg

VLC1348G-51

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 1.3 Kg

ELC1220G-55

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

MSC1000G

- Dimensions: 267.4 (W) x 240 (D) x 37.55 (H) mm
- Weight: 0.4 Kg

VOP1248G-61

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.5 Kg

IMA1408G-81

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 0.8 Kg

VLC1424G-56

- Dimensions: 390.6 (W) x 240 (D) x 13.8 (H) mm
- Weight: 1 Kg

Environmental Specifications

- Operating temperature: -40°C ~ 65°C
- Storage temperature: -40°C ~ 85°C
- Humidity: 10% ~ 95% (non-condensing)
- Power supply: -48 V DC
- Full load power consumption:
 - IES-5000M: 30 W
 - IES-5005M: 15 W
 - ALC1248G-51/53: 70 W
 - ALC1272G-51: 110 W
 - SLC1348G-22: 45 W
 - VLC1324G-51: 90 W
 - VLC1324G-53: 70 W
 - VLC1348G-51/53: 93 W
 - ELC1220G-55: 40 W
 - MSC1000: 30 W
 - VOP1248G-61: 95 W
 - IMA1408G-81: 32 W
 - VLC1424G-56: 66 W

Certification

- CE
- UL 60950, CSA 60950
- FCC part 15 class A
- ITU-T K.20
- ETSI 300 019
- EN55022 class A
- EN55024 class A
- ETSI 300 386

System Architecture



IES-5000M

Control Card



MSC1000G

E1 IMA Card



IMA1408G-81

ADSL Line Card



ALC1248G-51



ALC1248G-53



ALC1272G-51



IES-5005M

Ethernet Line Card



ELC1220G-55

G.SHDSL Line Card



SLC1348G-22

VDSL2 Line Card



VLC1324G-51



VLC1324G-53



VLC1424G-56



VLC1348G-51



VLC1348G-53

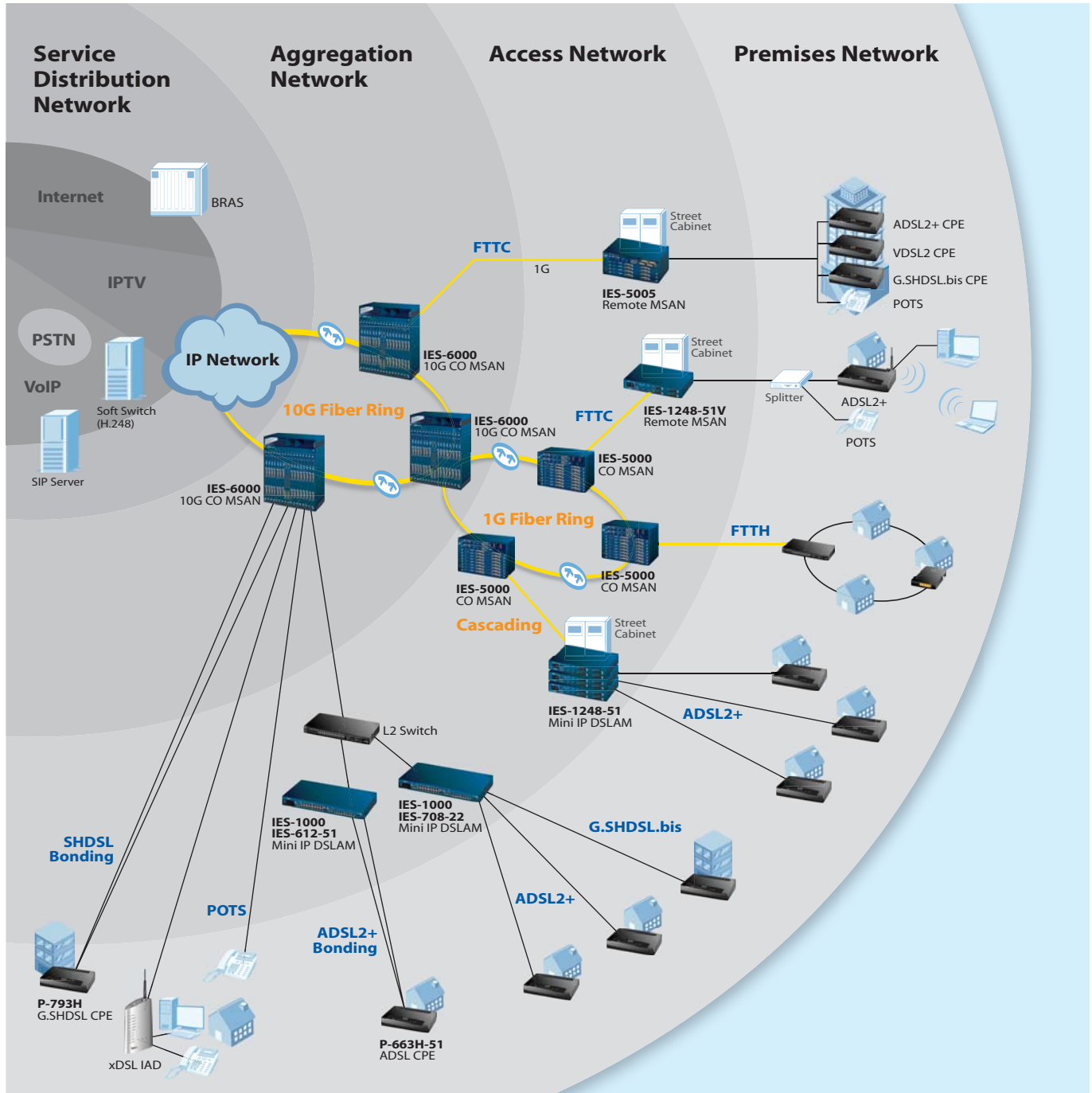
VoIP Line Card



VOP1248G-61

Application Diagram

Network Topology for MSAN/DSLAM Products





For more product information, visit us on the web at www.ZyXEL.com



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