



Removing Obstacles for Mid-size Multi-Service Access Platform for Smooth Migration to the Next-generation Network

- **Non-blocking Gigabit backplane with 10G Ethernet uplinks**
- **Multi-service interfaces including ADSL2/2+, SHDSL, VDSL2, VoIP (SIP & H.248), fiber-based GbE 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**
- **All front access**

Benefits

Future-proof architecture

The ZyXEL IES-5112/IES-5106 Series is equipped with non-blocking Gigabit backplane, failover-enabled Management Switch Cards (MSC), dual input power modules and various high-port density, multi-purpose line cards. With comprehensive IP-centric firmware features, the IES-5112/IES-5106 Series is a high-capacity system that facilitates telcos/ISPs to deliver high-quality residential or business services at competitive CAPEX/OPEX as well as to satisfy their need for reliability, flexibility and scalability for the current and future infrastructure.

Easy & reused logistics

The IES-5112 Series is an 8U-height, 12-slot chassis-based multi-service access node and the IES-5106 Series is a 5U-height, 6-slot chassis-based multi-service access node capable of adopting the same line cards as those for the IES-6000 systems. The MSC1024GB Management Switch Card with four 1G uplinks is designed to plug into slot 6 and/or slot 7 in IES-5112M and slot 6 in IES-5106M.

The MSC1224GB Management Switch Card comes with two 10G and four 1G Ethernet uplinks to support even higher bandwidth requirements. Both MSC1024GB and MSC1224GB are IPv6 capable. The supported line cards include 72-port ADSL2+ line cards that provide subscribers with asymmetric transmission bandwidths of up to 25 Mbps/2.4 Mbps, the 48-port SHDSL line card with symmetric transmission bandwidth of 5.69 Mbps per port, the 24-port and 48-port VDSL2 line cards that offer up to profile 30a (100/100 Mbps) high-speed connectivity per port over copper wires, along with the 20-port fiber-based Gigabit Ethernet line card that supports 1000 Mbps transmission speed per port and 8-port E1 IMA card.

The new 48-port ADSL2+/VoIP combo card with built-in ETSI/ANSI POT splitter can be managed by the new MSC1024GC Management Switch Signaling Card. MSC1024GC is able to support IP aggregation for all the combo cards in the same chassis.

Advanced Triple Play and mass deployment functionality

The IES-5112/IES-5106 Series inherits all the Layer 2 and Layer 3 QoS, security and multicast functionalities from the IES-6000, while the following new features are added to satisfy the requirements for massive field deployments: (1) IP bridge functionality that alleviates the Layer 2 access network deployment restrictions resulted from MAC address table limitation and security attack issues; (2) ARP Proxy which minimizes the ARP broadcast requests to all subscribers; (3) TACACS+ mechanism to support remote authentication with TACACS+ servers; (4) VLAN-aware DHCP snooping which adds VLAN information into DHCP snooping tables; (5) DHCP option 82 sub-option 2 for providing remote client ID information to DHCP servers for flexible IP address assignment.

IES-5112 Series
IES-5106 Series
8U 12-slot Chassis MSAN
5U 6-slot Chassis MSAN

Robust physical safety design

The IES-5112 Series supports 1+1 MSC redundancy with a failover switching time of less than 1 second. For both IES-5112/IES-5106 Series, the voltage, temperature and fan speed sensors are fitted into the system. When an abnormal condition is detected, the LED displays and/or the corresponding alarms will alert the administrators of the situation. In case the system temperature rises over the preset threshold, thermal cutoff protection will kick in to shut down the system automatically.

Sophisticated OAM&P features

The IES-5112/IES-5106 Series provides various management methods: local console port, Web-based configuration, Telnet and SNMP v1/v2c/v3-based EMS (NetAtlas EMS). The management functions include Alarm and Status Surveillance, Configuration Management, Performance Management and Fault Management. Both Series allows multiple administrative accounts with 3-level access privileges. Accounts with the first-level privilege have full access to all management objects on the Management Information Base (MIB). Second-level accounts have similar access rights except creating new administrative accounts, while the third-level accounts are granted read-only access rights to the MIB objects. NetAtlas EMS also provides view-based MIB management that partial MIB objects can be defined and accessed for customization and security reasons.

System Architecture



IES-5112M



IES-5106M

Management Switch Cards



MSC1224GB



MSC1024GB

Management Switch Signaling Card with VoIP support



MSC1024GC

E1 IMA Card



IMA1408G-81

Gigabit Ethernet Line Card

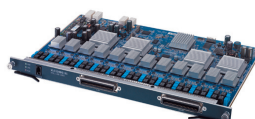


GLC1320G-55

VDSL Line Cards



VLC1424G-56



VLC1348G-51



VLC1348G-53

ADSL Line Card



ALC1372G-51

ADSL Combo Line Card



ALC1348G-51C

SHDSL Line Card



SLC1348G-22

VoIP Line Card



VOP1372G-61

Specifications

System Specifications

DSL Compliant

- ADSL:
 - G.992.1 Annex A, B, G.dmt and Embedded Operations Channel (EOC)
 - G.992.2 G.lite
 - G.992.3 Annex A, I, J, L, M, ATM Transmission Convergence (ATM-TC), Embedded Operations Channel (EOC), Impulse Noise Protection (INP), latency path, loop diagnostic, overhead channel access, power management, Seamless Rate Adaptation (SRA) on-line configuration and spectral mask
 - G.992.5 Annex A, B, I, J, M, L, ATM Transmission Convergence (ATM-TC), Impulse Noise Protection (INP), latency path, loop diagnostic, power management, Seamless Rate Adaptation (SRA) on-line configuration and spectral mask
 - G.996.2 single & dual ended loop test (SELT & DELT)
 - G.997.1 Embedded Operations Channel (EOC) and spectral mask
 - ANSI T1.413 issue 2
- SHDSL:
 - G.991.2 and G.991.2bis
- VDSL2:
 - G.993.2
 - G.996.2 single & dual ended loop test
 - G.997.1 Embedded Operations Channel (EOC) and spectral mask
- G.994.1 G.hs
- G.998.1 port bonding

Standard Compliant

- RFC1483, 1577, 2364 and 2684
- ATM Forum Rec UNI 3.0, 3.1 and 4.0
- ITU-T I.361 and I.371
- G.703, G.704 and G.804

IPTV

- IGMP v1, v2, v3 snooping and proxy
- IGMP multicasting channel limiting
- IGMP group count/filtering profile
- IGMP filtering
- Multicast VLAN (MVLAN)
- 1024 IGMP multicast groups
- Maximum channel zapping processing time: 250 ms
- Multiple set-top box per DSL port

Security

- Per port and per VLAN isolation
- IEEE 802.1X authentication
- Rule-based packet filtering (L2 ~ L4 access control list)

- PPTP, LT2P, IP SEC and GRE pass through
- IPoE and PPPoE per VC session
- MAC count limiting
- ARP broadcast filtering
- DHCP broadcast filtering
- VLAN aware DHCP snooping
- NetBIOS filtering
- Anti IP/MAC address spoofing
- TACACS+ remote authentication
- Accounting and Radius server authorization

Traffic Management

- 8 PVC per DSL port
- UBR, CBR, rt-VBR, nrt-VBR, QoS mechanisms
- ATM Forum TM 4.0 peak cell rate traffic parameter
- Downstream traffic shaping per ATM PVC
- ATM F5 OAM cells for end-to-end loop back test (ITU-T Rec. I.610)
- 8 queues with packet priority scheduling (SPQ, WRR)
- DSCP to 802.1p mapping
- Double-Tag PVC
- Bandwidth and broadcast/multicast/unknown unicast control on Gigabit Ethernet ports
- STP: IEEE 802.1d, IEEE 802.1w, IEEE 802.1s
- IP bridge
- Link aggregation control protocol (IEEE 802.3ad)
- IP QoS CoS
- IP multicast forwarding
- DHCP relay option 82 with sub-option 1 and 2
- PPPoE intermediate agent (TR-101)
- Multicast bandwidth control
- L2 ~ L4 ACL per VLAN
- Broadcast storm control
- Static multicast
- Unknown multicast flooding
- Loop guard
- MAC aging & rate limit
- DHCP LAN to LAN

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)
- GVRP function

VoIP

- Codes: G.711 (μ -law and A-law), G.726, G.729a/b, G.723.1
- ITU-T H.248 v2 and RFC3261 SIP v2

- RTP (RFC1889)
- RTCP (RFC1890)
- FAX pass through via RTP (T.38)
- Modem dial-up via G.711
- RTP Payload for DTMF Digits (RFC2833)
- Echo cancellation and auto gain control (G.165, G.168)
- Voice Activity Detection (VAD)
- Comfort Noise Generation (CNG)
- Caller ID generation and detection
- Metallic Loop Testing (MLT) for subscriber lines
- Configurable jitter buffer
- Compatible CPE including POTS phone, FAX, analog dial-up modem and pay phone
- Dial tone, second dial tone, ringing tone (ring-back tone), busy tone, off-hook warning tone
- 20K Busy Hour Call Attempts (BHCA)
- Supplementary services:
 - Local dial (SIP)
 - Emergency call local route
 - Do not disturb
 - Selective/anonymous call rejection
 - Call waiting and call hold
 - 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
- View-based network management
- Daylight saving
- IEEE 802.3ah OAM
- Support XML-based North Bound Interface (with ZyXEL NetAtlas EMS)
- In-band and out-of-band IP interface for management (Telnet, SSH, SFTP)
- SNMP management (with ZyXEL NetAtlas EMS)
- SNMPv1, v2c, v3 agent and traps
- Standard MIBs:
 - RFC1213 MIB II
 - DSL line MIB (RFC2662) and extension line MIB (RFC3440)
 - SHDSL line MIB (RFC3276)
 - VDSL line MIB (RFC3728)
 - VDSL2 line MIB (RFC5650)
 - Bridge MIB and extension MIB
 - RMON MIB (RFC1757)
- Vendor specific MIBs:
 - Chassis management MIB (fan speed, voltage and temperature)
- Static route for MGMT IP

Hardware Specifications

IES-5112M

- 12-slot rack mountable enclosure, 19" or 23" chassis
- Maximum 10 slots for line cards (slot 1 - 5 and 8 - 12)
- 2 slots for management and switch cards (slot 6 and 7)
- 2 DC power input module and filter
- One FAN and dust filter module
- One alarm module

IES-5106M

- 6-slot rack mountable enclosure, 19" or 23" chassis
- Maximum 5 slots for line cards (slot 1 - 5)
- 1 slots for management and switch cards (slot 6)
- 2 DC power input module and filter
- One FAN and dust filter module
- One alarm module

Management Switch Cards—

MSC1224GB/MSC1024GB

- Failover-enabled network termination card
- Embedded 48G, non-blocking full duplex switching fabric
- MSC1224GB supports two 10G (SFP+) and four 1G uplink/subtending interfaces:
 - 2 optical fiber port (SFP+ modules)
 - 4 1000 Mbps interface modules (combo design, SFP and copper)
- MSC1024GB supports four 1G Ethernet uplink/subtending interfaces:
 - 4 1000 Mbps interface modules (combo design, SFP and copper)
- One mini-RJ11 console port
- One 10/100M out-of-band Mgmt interface
- 16K MAC addresses
- 1024 L2 multicast groups (1K scalability)
- 4K VLANs
- DSL line card battery saving mode
- IPv6 capable

Management Switch Signaling Card—

MSC1024GC

- VoIP media IP aggregation
- Failover-enabled network termination card
- Embedded 48G, non-blocking full duplex switching fabric
- Four 1G Ethernet uplink/subtending interfaces:
 - 4 1000 Mbps interface modules (combo design, SFP and copper)
- One mini-RJ11 console port
- One 10/100M out-of-band Mgmt interface
- 16 Gigabit Ethernet (SerDes) backplane interface

- 16K MAC addresses
- 1024 L2 multicast groups (1K scalability)
- 4K VLANs
- IPv6 capable

E1 IMA Card—IMA1408G-81

- Hot swappable 8-port E1 IMA card
- G.703, G.704
- Full-duplex bandwidth up to 16M
- One mini-RJ11 console port

Gigabit Ethernet Line Card—GLC1320G-55

- Hot swappable 20-port active Gigabit Ethernet line card
- 20 open slots for Gigabit or Fast Ethernet SFP (1000/100BASE-FX/BX/LX/EX)
- 4 open slots for Gigabit Ethernet C-SFP
- One mini-RJ11 console

VDSL Line Card—VLC1424G-56

- Hot swappable 24-port VDSL2 line card
- 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
- VDSL2 profiles 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a
- Frequency allocation band plan 998 and 997
- PTM bonding
- Customer PSD, RFI notch, single latency in PTM mode and INP
- Trellis coding
- IEEE 802.1ag Connectivity Fault Management (CFM)
- IPv6 capable

VDSL Line Cards—

VLC1348G-51/VLC1348G-53

- Hot swappable 48-port VDSL2 line card over POTS or over ISDN
- 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
- VDSL2 profiles 8a, 8b, 8c, 8d, 12a, 12b and 17a
- Frequency allocation band plan 998 and 997
- PTM bonding
- UPBO and DPBO, Reed Solomon and trellis coding
- IEEE 802.1ag Connectivity Fault Management (CFM)
- ADSL fallback with ADSL/ADSL2/ADSL2+ CPE in Annex A, J, M, L modes
- U0 band, customer PSD, RFI notch, single latency in PTM mode and INP, sub carrier mask in fallback mode and TPS-TC under fallback operation

ADSL Line Card—ALC1372G-51

- Hot swappable 72-port ADSL2/ADSL2+ Annex A line card
- Maximum transmission rate up to 24 Mbps/1 Mbps for ADSL2+
- One mini-RJ11 console port
- Spectral mask in G.992.3, G.992.5 and G.997.1
- Embedded Operations Channel (EOC) and overhead channel access in G.992.1, G.992.3 and G.997.1
- Latency path function in G.992.3 and G.992.5
- Annex L and Annex M in G.992.3 and G.992.5
- Loop diagnostic in G.992.3 and G.992.5
- Power management in G.992.3 and G.992.5
- Seamless Rate Adaptation (SRA) on-line configuration in G.992.3 and G.992.5
- ADSL2+ 2-port bonding in G.998.1
- IPv6 capable

ADSL Combo Line Card—ALC1348G-51C

- Hot swappable 48-port ADSL2+/VoIP Combo Card with built-in ETSI/ANSI POT Splitter
- 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)
- 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: 40 W
- IPv6 capable

SHDSL Line Card—SLC1348G-22

- Hot swappable 48-port SHDSL line card
- ETSI TS 101 524 V 1.2.1, G.991.2, G.991.2.bis and G.994.1
- G.998.1 ATM-based multi-pair bonding up to 8 ports
- Support 2/4 ports EFM bonding
- Symmetric transmission rate of 5.69 Mbps/port
- One mini-RJ11 console port
- EFM mode compliant to IEEE 802.3, G.998.2
- PPP over Ethernet (RFC2516)
- OAMPDU loopback control
- VLAN base QOS (802.1P/Q)
- Support 2-wire/4-wire/6-wire and 8-wire mode SHDSL CPE auto detect in either ATM mode and EFM mode

VoIP Line Card—VOP1372G-61

- Hot swappable 72-port VoIP line card
- Metallic Loop Testing for subscriber lines (MLT) and GR-909 loop diagnostic
- Ringer Max output power: 24 Watt
- IPv6 capable

Physical Specifications

IES-5112M

- Item dimensions (WxDxH):
440 x 250 x 363 mm (17.32" x 9.84" x 14.29")
- Item weight: 13.34 kg (29.48 lb.)
- Packing dimensions (W x D x H):
547 x 358 x 530 mm (21.53" x 14.09" x 20.86")
- Packing weight: 16 kg (35.36 lb.)

IES-5106M

- Item dimensions (WxDxH):
440 x 250 x 215 mm (17.32" x 9.84" x 8.46")
- Item weight: 10.2 kg (22.54 lb.)
- Packing dimensions (WxDxH):
542 x 360 x 383 mm (21.33" x 14.17" x 15.07")
- Packing weight: 12 kg (26.52 lb.)

Management Switch Card—MSC1224GB

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 0.9 kg (1.99 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 1.76 kg (3.89 lb.)

Management Switch Card—MSC1024GB

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 0.87 kg (1.92 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 1.7 kg (3.76 lb.)

Management Switch Signaling Card—

MSC1024GC

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1.1 kg (2.46 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 100 mm (18.18" x 13.46" x 3.94")
- Packing weight: 1.97 kg (4.34 lb.)

E1 IMA Card—IMA1408G-81

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 0.8 kg (1.77 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 1.8 kg (3.96 lb.)

Gigabit Ethernet Line Card—GLC1320G-55

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 0.5 kg (1.1 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.48 kg (5.48 lb.)

VDSL Line Card—VLC1424G-56

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1 kg (2.2 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.54 kg (5.61 lb.)

VDSL Line Cards—

VLC1348G-51/VLC1348G-53

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1.3 kg (2.87 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.62 kg (5.79 lb.)

ADSL Line Card—ALC1372G-51

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1.1 kg (2.43 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.2 kg (4.86 lb.)

ADSL Combo Line Card—ALC1348G-51C

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1.5 kg (3.51 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 100 mm (18.18" x 13.46" x 3.94")
- Packing weight: 2.4 kg (5.37 lb.)

SHDSL Line Card—SLC1348G-22

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 0.5 kg (1.1 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.1 kg (4.64 lb.)

VoIP Line Card—VOP1372G-61

- Item dimensions (WxDxH):
390.6 x 240 x 13.8 mm (15.39" x 9.45" x 0.55")
- Item weight: 1.4 kg (3.09 lb.)
- Packing dimensions (WxDxH):
462 x 342 x 123 mm (18.18" x 13.46" x 4.84")
- Packing weight: 2.2 kg (4.86 lb.)

Environmental Specifications

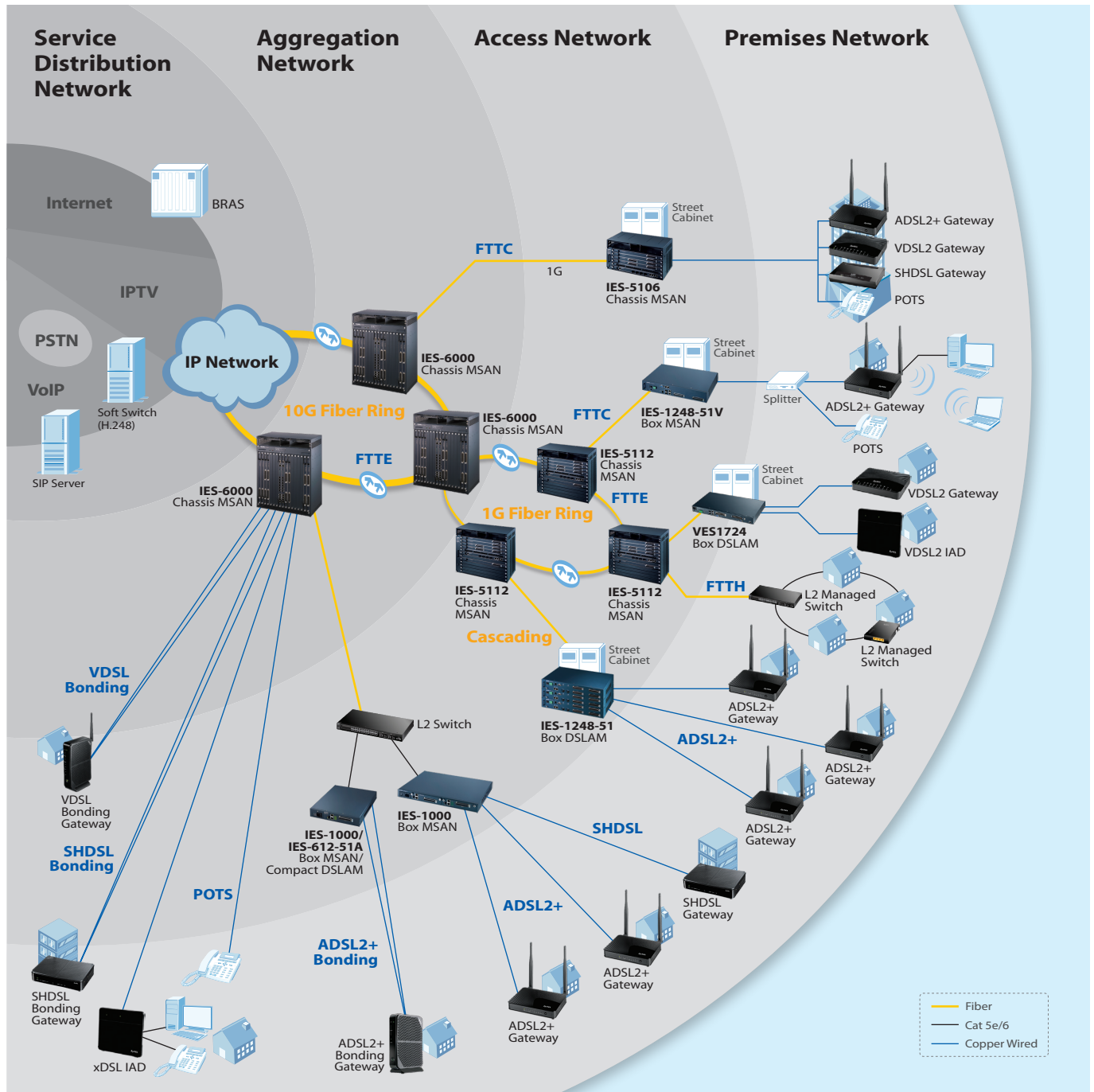
- Operating environment:
 - Temperature: -40°C to 65°C (-40°F to 149°F)
 - Humidity: 10 to 95% (Non-condensing)
- Storage environment:
 - Temperature: -40°C to 70°C (-40°F to 158°F)
 - Humidity: 10 to 95% (Non-condensing)
- Power supply: -48 V DC
- Full load power consumption:
 - IES-5112M: 40 W
 - IES-5106M: 16 W
 - MSC1224GB: 45 W
 - MSC1024GB: 45 W
 - MSC1024GC: 36 W
 - IMA1408G-81: 32 W
 - GLC1320G-55: 40 W
 - VLC1424G-56: 66 W
 - VLC1348G-51/VLC1348G-53: 93 W
 - ALC1372G-51: 85 W
 - ALC1348G-51C: 166 W
 - SLC1348G-22: 45 W
 - VOP1372G-61: 144 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 Class A

Key Applications

Network Topology for MSAN/DSLAM Products



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



Copyright © 2015 ZyXEL Communications Corp. All rights reserved. ZyXEL, ZyXEL logo are registered trademarks of ZyXEL Communications Corp. All other brands, product names, or trademarks mentioned are the property of their respective owners. All specifications are subject to change without notice.

5-000-01615001

12/15