# ZYXEL

IES4105 Series

2U 5-slot Temperature-Hardened MSAN

Copper-pair line cards for various "Last Mile" constructions

Equipped with copper-pair (ADSL2+, VDSL2, VoIP and Fast Ethernet) subscriber line cards, the Zyxel IES4105 Series 2U 5-slot Temperature-Hardened MSAN allows operators to easily construct the last mile of broadband networks based on the available transmission media to deliver services to the subscribers.

DSL
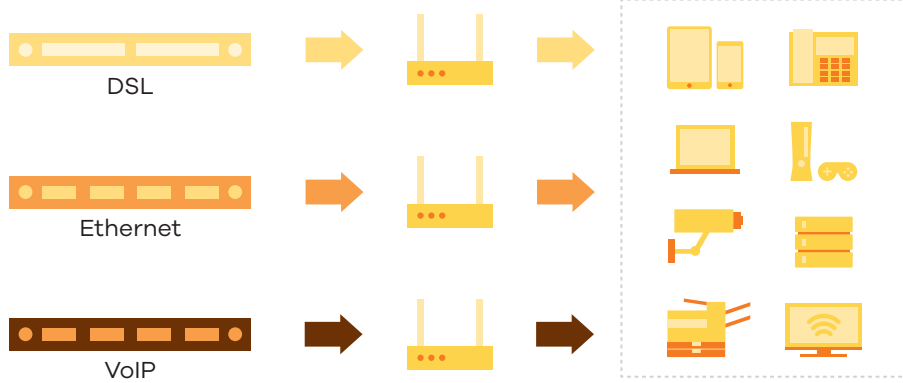
Ethernet

VoIP

Up to 256 VoIP ports or 128 xDSL ports in compact 2U size

Multi-service interfaces including ADSL2, VDSL2, Fast Ethernet and VoIP

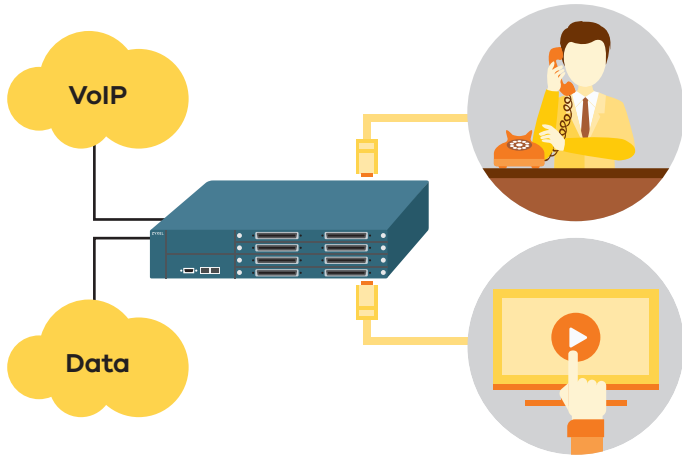Comprehensive QoS to enhance Triple-Play experience for users

Flexible ACL, VLAN-aware DHCP and Anti-IP/MAC address spoofing to prevent malicious attacks

Field-proven IGMP snooping and proxy for IPTV deployments

Datasheet IES4105 Series

SIP and H.248 for smooth Voice-over-IP migration

The Zyxel IES4105 Series has SIP- or H.248-enabled Voice-over-IP line cards, with which analog voice signals coming from subscriber lines can be digitalized and transmitted to the SIP or H.248 voice core. The capability enables operators to turn traditional voice exchange into VoIP core without any impact on the subscriber side. It also makes migration to the entire VoIP infrastructure controllable.

Various power modules to facilitate field installations

The Zyxel IES4105 Series is a temperature-hardened remote system with a modular power supply compatible with either AC or DC sources. The operator staff can easily power the mini MSAN and put it to service according to the status of power facility at the installation site. Its compact 2U design fits standard racks in remote sites and provides deployment flexibility for service providers to adapt to the existing network infrastructures.
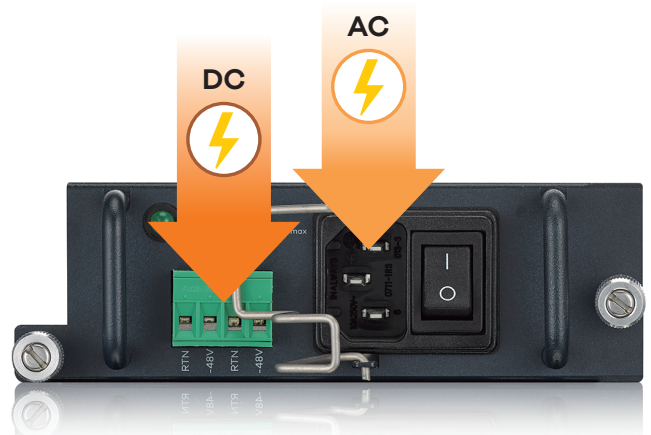
Comprehensive, future-proof advanced features

The Zyxel IES4105 Series inherits Zyxel's field-proven Quality of Service (QoS) and security features to provide IPTV, VoIP and high-speed Internet services through a user-friendly configuration interface. The IES4105 Series supports IGMP snooping to prevent unnecessary forwarding of multicast traffics to all subscribers, and thus optimizes bandwidth utilization for multicast applications such as broadcast video. It also supports the multicast VLAN feature that distributes the source to all the VLANs requesting the video stream. With a built-in splitter over POTS, the IES4105 Series allows the operators to provide triple-play services over the same copper wire.

Integrated ANSI/ETSI (600 ohm/900 ohm) POTS splitters

The ADSL and VDSL line card of the Zyxel IES4105 Series are both integrated with splitters supporting both 600 ohm and 900 ohm. It not only saves space for remote sites or sidewalk cabinets, but also simplifies deployments of broadband services where the voice service provided by the Telco is available. Service Providers can take advantages of the IES4105 Series to offer VoIP services along with broadband through the infrastructure to certain confined areas or buildings complexes.
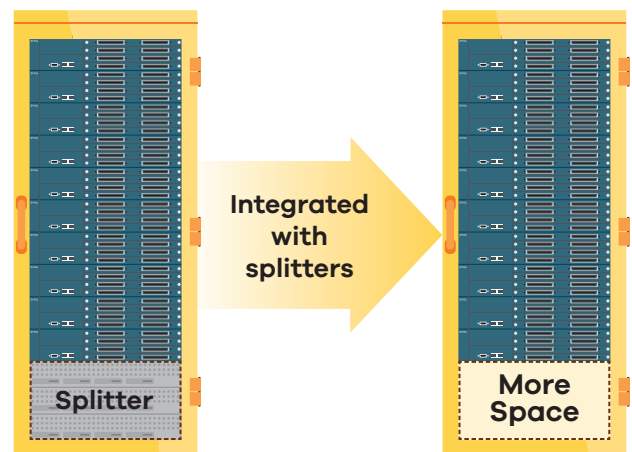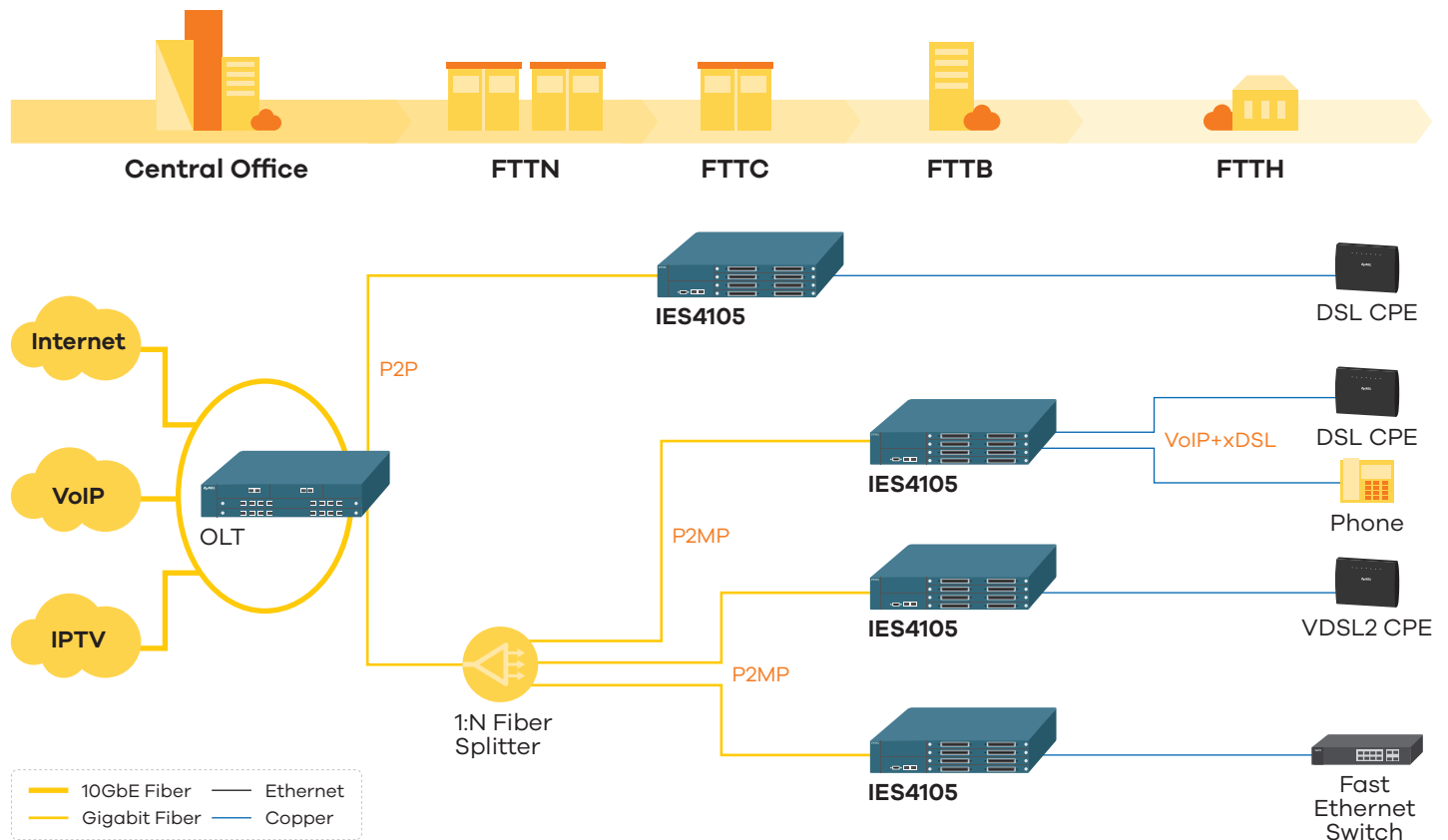
Hot-swappable modulation mechanism for easy maintenance

The compact chassis of Zyxel IES4105 Series has been designed to fit standard racks. It comes with 32-port ADSL2, 24-port VDSL2, 64-port VoIP, 32-port Fast Ethernet line cards and GbE uplink management cards. All line cards are swappable as such replacements can be easily performed without powering down, and therefore the services are not interrupted.

Application Diagram

Central Office **FTTN** **FTTC** **FTTB** **FTTH**

Internet

VoIP

IPTV

OLT

P2P

P2MP

P2MP

1:N Fiber Splitter

IES4105

IES4105

IES4105

IES4105

DSL CPE

VoIP+xDSL

DSL CPE

Phone

VDSL2 CPE

Fast Ethernet Switch

— 10GbE Fiber —— Ethernet
— Gigabit Fiber —— Copper

System Architecture

Chassis

IES4105M

Management Switch Card

MSC1002GA

ADSL Line Card

ALC1132A-51

VDSL Line Card

VLC1124A-51

VoIP Line Card

VOP1164A-61

Fast Ethernet Line Card

ELC1132A-45

Specifications

System Specifications

DSL Compliant

- ADSL:
  - Support dual stack (IPv4 and IPv6)
  - Auto or fixed operation as either one of the following: ADSL2, ADSL2+, G.dmt, T1.413, G.lite
  - OAM loopback: both CO to CPE and CPE to CO
  - Frequency allocation band plan 998 and 997
  - 8 PVC per port
  - G.992.1, G.992.3, G.992.5
  - 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 mode by TR-202
  - Power management L0 and L2 mode. Parameters support: L0Time, L2Time, L2ATPR, L2ATPRT in G.992.3 and G.992.5
  - Seamless Rate Adaptation (SRA: Fix rate, Startup, Runtime) on-line configuration in G.992.3 and G.992.5
  - Reach extension ADSL (Annex L, RE-ADSL2)
  - Loop Diagnostic Mode (LDM, DELT)
  - Single End Loop Test (SELT)
  - Double upstream (Annex M)
- VDSL2:
  - Support Annex Y in G.993.2
  - G.993.5, G.998.4, G.993.2, G.994.1, G.997.1
  - Support profile 8a, 8b, 8c, 8d, 12a, 12b, 17a and ADSL/ADSL2/ADSL2+ fall back
  - Support VDSL bonding

VoIP

- ITU-T H.248 v2 or RFC3261 SIP v2
- Codec: G.711 (μ-law and A-law), G.726, G.729a/b, G.723.1
- RTP (RFC1889)
- RTCP (RFC1890)
- 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
- Metallic Loop Testing for subscriber lines (MLT)
- Configurable jitter buffer
- Certified POTS phone with individual country code signaling
- Certified Fax machine with T.30, T.38
- Certified analog dial-up modem
- Certified pay phone with battery (polarity) reversal, 12 KHz or 16 KHz charging signal
- Certified POS terminal
- Dial tone, second dial tone, ringing tone (ringback tone), busy tone, off-hook, warning tone
- Supplementary services
- 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
- Warning tone
- Calling Line Identification Presentation (CLIP)
- Calling Line Identification Restriction (CLIR)
- Abbreviated dialing (speed dial)
- Hotline (H.248)
- Local dial (SIP only)

IPTV

- 512 IGMP groups
- IGMP v3 any source multicast
- IGMP group fast leave
- IGMP message count control
- MLD v2 any source multicast
- IP multicast forwarding
- Multicast VLAN (4 VLANs)
- IGMP multicast channel limiting by count/bandwidth usage
- Multicast membership reports
- IGMP privilege profile
- Broadcast/Multicast/Destination lookup fail storm control and configurable the limit number

Security

- DHCP spoofing with static IP filtering
- Anti-MAC spoofing & ARP inspection (both can be enabled at the same time)
- Upstream ACL mechanism: up to L4 packet classification based on IP source/destination address, protocol ID, UDP/TCP source/destination port number and action definition
- Static MAC address filtering by source/destination
- ARP/DHCP broadcast filtering
- NetBios filtering
- IGMP/BPDU filtering
- L2 frame filtering, such as based on source MAC address, port etc.
- PPPoE filtering
- Layer 3 filtering based on IP header: source addresses, destination addresses, protocol ID, UDP/TCP port number
- L2 frame filtering based on OUI
- IPv6 packet classification
- L2 filtering based on Ether type, source/destination MAC address
- Static MAC address forwarding/port lock
- Anti MAC/IP address spoofing (DHCP snooping)
- Limitation of number of dynamic learned MAC address on per subscriber port
- Ethernet MAC filtering
- Secure FTP

VLAN

- VLAN transparent (802.1D; except for VLAN stacking TLS mode in a port/PVC)
- IEEE 802.1Q VLAN tagging
- VLAN trunk
- VLAN translation (8 rules per port/PVC)
- VLAN aggregation (4 rules per port/PVC)
- IEEE 802.1ad VLAN stacking (Outer TPID configurable, selective QinQ; VLAN stacking TLS mode cannot coexist with VLAN transparent in a port/PVC)
- Limited MAC per DSL port
- At least 1024 VLAN ID
- Able to accept untagged frame from CPE
- IEEE 802.1p priority que; at least 8 per uplink
- Protocol-based VLAN
- Port isolation
- Broadcast storm control

Performance

- Eight queues with packet priority scheduling (SPQ, WRR)
- Support 1024 IGMP multicast groups
- The maximum channel zapping processing time is 250 ms
- DSCP to 802.1p mapping

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)

Traffic Management

- IEEE 802.3ad (link aggregation; LACP, GE uplink only)
- IEEE 802.1d (Spanning tree)
- IEEE 802.1w (Rapid spanning tree protocol)
- PPPoE
- PPPoEIA
- DHCP (Snooping, relay & option 82)
- LAN to LAN (Transprent LAN service; TLS)
- IEEE 802.1p priority que:
  - Configurable based Strict Priority Queuing (SPQ) or Weighted Round Robin (WRR)
  - DSCP code to 802.1p priority mapping
- PVC default priority
- OAM F5 loopback
- Performance counters
- Performance statistics (15m)
- DHCPv6 L2 relay agent
- Support dual stack (IPv4 and IPv6)
- MTU size up to 1600
- Rate limiting
- Upstream broadcast storm control

Network Management

- DDMI readout for each uplink port (SFP dependent)
- FTP for firmware upgrade, via MSC or via console
- Dual image for smooth FW upgrade
- Text-base configuration through console port and telnet (CLI)
- Daylight saving
- Configurable TPID
- Private MIB
- RFC1213 MIB II Management Information Base for Network Management of TCP/IPbased internets
- RFC5650 VDSL2 line MIB

Hardware Specifications

IES4105M

- Four slots for hot-swappable line cards
- One slot for management & uplink card
- One slot for AC, DC or dual power module
- One slot for hot-swappable FAN module
- 2G backplane switching capacity per line card slot
- 2U in height
- Rack-mountable for 19-inch rack
- Front access (all interface, including all line cards, power and FAN modules)
- REN: 15
- Grounding terminal

Management Switch Card—MSC1002GA

- Two Gigabit combo ports
- DDM readout
- 2G switching capacity to each line card slot

ADSL Line Card—ALC1132A-51

- Thirty-two ADSL+POTS subscriber ports via one champ-64 connector
- Thirty-two POTS splitter input ports via one champ-64 connector
- Annex A
- Built-in POTS splitter that supports both 600 and 900 ohm
- Hot-swappable

VDSL Line Card—VLC1124A-51

- G.993.2, G.994.1, G.997.1
- Twenty-four VDSL+POTS subscriber ports via one champ-64 connector
- Twenty-four POTS splitter input ports via one champ-64 connector
- Annex A
- Built-in POTS splitter that supports both 600 and 900 ohm
- Hot-swappable

VoIP Line Card—VOP1164A-61

- Sixty-four voice subscriber ports via two champ-64 connectors
- Hot-swappable
- Loop current:
  - 25 mA MAX
  - ≥20 mA at 800 ohm loop resistance

Fast Ethernet Line Card—ELC1132A-45

- Thirty-two subscriber ports via two champ-64 connectors
- Hot-swappable

Power Consumption

- IES4105M+MSC1002GA+ IES4105M-ACA: 37.18W
- ALC1132A-51: 33W
- VLC1124A-51: 27.83W
- VOP1164A-61: 104.58W
- ELC1132A-45: 11.11W

Physical Specifications

IES4105M

- Item dimensions (WxDxH): 441.2 x 262 x 88.8 mm (17.37" x 10.31" x 3.5")
- Item weight: 3.2 kg (7.05 lb.)

Management Switch Card—MSC1002GA

- Item dimensions (WxDxH): 130 x 239.8 x 42 mm (5.11" x 9.44" x 1.65")
- Item weight: 0.54 kg (1.19 lb.)

ADSL Line Card—ALC1132A-51

- Item dimensions (WxDxH): 280 x 236.6 x 20.5 mm (11.02" x 9.31" x 0.8")
- Item weight: 0.7 kg (1.54 lb.)

VDSL Line Card—VLC1124A-51

- Item dimensions (WxDxH): 280 x 236.6 x 20.5 mm (11.02" x 9.31" x 0.8")
- Item weight: 0.7 kg (1.54 lb.)

VoIP Line Card—VOP1164A-61

- Item dimensions (WxDxH): 280 x 236.6 x 20.5 mm (11.02" x 9.31" x 0.8")
- Item weight: 0.97 kg (2.14 lb.)

Fast Ethernet Line Card—ELC1132A-45

- Item dimensions (WxDxH): 280 x 236.6 x 20.5 mm (11.02" x 9.31" x 0.8")
- Item weight: 0.49 kg (1.08 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)

Certification

- Safety:
  - EN60950-1
  - CSA60950-1
  - UL60950-1
  - IEC60950-1
- EMC:
  - EN55032 class A
  - EN55022 class A
  - EN55024 class A
  - ETSI 300 386 class A
  - FCC part 15 class A

* AC power module:
  -40°C to 65°C (-40°F to 149°F)
  DC power module:
  -40°C to 65°C (-40°F to 149°F)
  AC/DC dual power module:
  -40°C to 55°C (-40°F to 131°F)

12/17