



Key Features

- Unique 24 dual-personality Gigabit ports (XGS-4728F only)
- L3 advanced routing protocols, OSPF and RIP
- Policy-based QoS optimizes multi-service quality
- Multicast DVMRP & IGMP support
- Multilayer-aware (L2/L3/L4) ACL for security protection and traffic optimization
- Port security and enhanced 802.1x port authentication
- High redundancy and resilience architecture with RSTP, VRRP and port trunking
- ZyXEL iStacking™ technology (up to 24 switches)
- SNMP and RMON support
- Optional backup power support

Carrier Switches

Metro Switch 4000 Series

The ZyXEL Metro Switch 4000 Series is an intelligent Layer-3 Gigabit Ethernet switch specially designed for service providers to deliver profitable Ethernet services. With high-performance switching functionalities suitable for triple-play services such as Internet data exchange, Web surfing, IPTV and VoIP telephony, the Metro Switch 4000 Series enables service providers to deploy integrated and value-added IP services.

The Metro Switch 4000 Series consists of two models: XGS-4728F and GS-4012F. The XGS-4728F provides extreme flexibility of deployment; with 24 GbE dual-personality ports, service providers can easily deploy either copper or fiber interfaces on the 24 GbE ports. Thanks to the two built-in 10G stacking ports and one 10G extend slot, the XGS-4728F fulfills the high-speed uplink and network expansion requirements at the same time. The GS-4012F is a low port density solution for service providers; with 8 open SFP slots and 4 GbE dual-personality ports, the GS-4012F can easily fit into any fiber-intensive deployment scenarios.

Key Benefits

Construction of large networking environments

The Metro 4000 is designed for the market of large Internet service providers and Telcos. With carrier-class 16K MAC Entries/8K Routing Path, the Metro Switch 4000 Series can be easily deployed in a huge metropolitan network to fulfill future expansion of subscriber numbers.

Unique 24 GbE copper and fiber connectivity in 1U-height design (XGS-4728F only)

The leading architecture employed by XGS-4728F delivers 24 1000Base-T copper interfaces along with standard RJ-45 connectors and 24 SFP slots in a 19-inch 1U enclosure. This unique benefit gives network designers the highest flexibility and cost advantage in terms of equipment investment, network administration and system maintenance.

True wire-speed L3 switching for high-performance networks

The Metro Switch 4000 Series delivers wire-speed full-dynamic IP routing features, such as OSPF and RIP, using a hardware-based IP routing engine and sophisticated multilayer operating software. In addition to dynamic IP multicast, the Metro 4000 Series supports Distance Vector Multicast Routing Protocol (DVMRP) and Internet Group Management Protocol (IGMP) to perfectly handle a variety of datagrams, making the ZyXEL Metro 4000 Series an ideal solution for today's multi-service network environments.

High-level security for critical applications

The Metro Switch 4000 Series works with the intelligent 3-tier security mechanism that offers complete data protection on the data and management plane via a wide range of security features to protect subscribers' data and administrative traffic to deter unauthorized users.

The 802.1x authentication and Port security features provide the ability to deny unauthorized users from accessing the network, while Limited MAC Number by Port limits the total number of devices connected to a switch port, and thus significantly reduces the risk of unknown access from massively deployed wireless networks or hubs.

Cooperating with RADIUS, 802.1x is useful in preventing unauthorized access with username and password (or other credentials) and it acts as powerful access control for convergent networks with mixed wired and wireless access. The multilayer (L2/L3/L4) ACLs suite of Metro Switch 4000 Series has sophisticated rule-based control mechanisms that can be easily deployed based on realistic network environments via a Web GUI or command line interface to prevent illegitimate access. The rules can be defined to deny packets according to source and destination MAC addresses, IP addresses or TCP/UDP ports.

Advanced QoS for significant service

The ZyXEL Metro Switch 4000 Series offers wire-speed flow control that can classify, policy, and prioritize incoming packets according to the predefined QoS policies to meet service provider requirements. In terms of classification, Differentiated Services Code Point field (DSCP) and the 802.1p class of service (CoS) fields are identified to assess the priority of incoming packets.

Classification and reclassification can be based on criteria as specific as rule-based on IP, MAC addresses, VLAN ID and TCP/UDP port number. For bandwidth management, the ZyXEL Metro Switch 4000 Series provides 8 priority queues per port for different types of traffics, allowing service providers to set rule-based rate limiting that takes full advantage of limited network resources and guarantees the best performance.

Resilient and redundant design

A round-the-clock network capable of quick recovery is vital for service providers to establish robust services. The ZyXEL Metro Switch 4000 Series provides comprehensive features to ensure the network is fully operational. The IEEE 802.3ad Link Aggregation feature reduces network downtime by providing redundant paths and bandwidth aggregation to critical connections, while IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) allow immediate recovery from failed links by sending packets via the backup path. Furthermore, since the Metro Switch 4000 Series supports backup power system, power can be delivered to the switch in case of unexpected power outages.

Supporting DDMI (Digital Diagnostics Monitoring Interface) SFP enhances management capability (XGS-4728F only)

The enhanced digital interface enables a real time link to be established between the switch and the SFP transceiver. This enables the switch to access operating parameters within the fibre link. This includes digital features such as soft control and monitoring of SFP I/O signals. In addition the DDMI functionality enables the capability to implement digital alarms and warnings.

The digital diagnostic monitoring interface enables users to have the capability of performing component monitoring, fault isolation and failure prediction tasks on their transceiver-based links. This feature ensures that the business can be proactive in preventative maintenance of the network and ensure business continuity.

DDMI Monitors:

- Temperature
- Supply voltage
- Transmitted bias current
- Transmitted power
- Received power

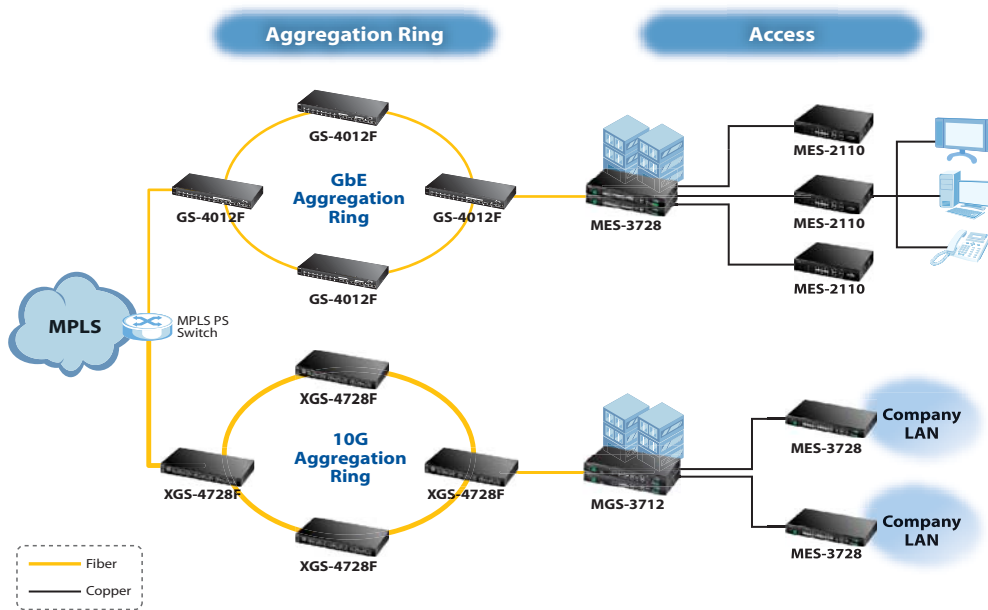
All features listed above include alarm and warning thresholds.

Key Applications

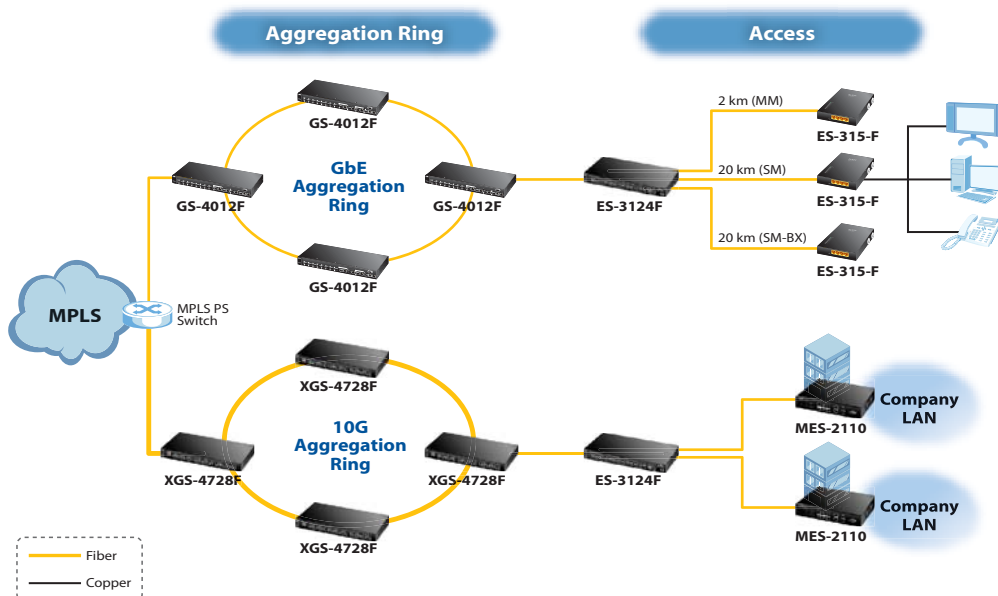
Service providers network

Competitive and customer bandwidth demands compel the business to deliver secure, reliable connections. In order to satisfy home and commercial subscribers with Triple-Play services incorporating voice, video and data delivery, ZyXEL Metro Switch solutions help business to offer reliable, secure feature rich solutions which deliver the required applications critical to retain and attract customers.

Last mile copper



Last mile fiber



Specifications

Feature/Model	XGS-4728F	GS-4012F
Product Picture		
Port Density		
GbE Open SFP Slot	-	8
Dual Personality GbE Ports	24	4
10G Extend Slot	1	-
12G Stacking Port	2	-
Performance		
Switching Capacity, Gbps	144	24
Switching Forwarding Rate, Mpps	100	17.8
Packet Buffer, Bytes	2M	2M
MAC Address	16K	16K
IP Address Table	8K	8K
Routing Entries	8K	8K
Routing Domains	64	64
Power Requirement		
Power Supply	AC Power: 100 - 240 V AC, 50/60 Hz DC Power: -36 to -72 V DC	AC Power: 100 - 240 V AC, 50/60 Hz DC Power: -48 to -60 V DC
Environmental Specification		
Operating Temperature	0°C to 45°C	0°C to 45°C
Storage Temperature	-10°C to 70°C	-10°C to 70°C
Operating Humidity	10% to 90%, (non-condensing)	10% ~ 90%, (non-condensing)
Physical Feature		
Dimensions, (W) x (D) x (H) mm	438 x 310 x 44.5	438 x 225 x 44.5
Weight, kg	4.9	3.1

Features

Standard Compliance

- IEEE 802.3 10Base-T Ethernet
- IEEE 802.3u 100Base-Tx Ethernet
- IEEE 802.ab 1000Base-T Ethernet
- IEEE 802.3x flow control
- IEEE 802.1D spanning tree protocol
- IEEE 802.1w rapid spanning tree protocol
- IEEE 802.1s multiple spanning tree protocol
- IEEE 802.1p class of service, priority protocols
- IEEE 802.1Q VLAN tagging
- IEEE 802.1x port authentication
- IEEE 802.3ad LACP aggregation

Traffic Management and QoS

- IEEE 802.1ad QinQ
- Bandwidth control/rate limiting: rule-based/port-based bandwidth control, 64 kbps granularity ingress/egress
- Dual-Rate-Three-Color marking
- CIR/PIR for bandwidth control
- Port-based egress traffic shaping
- Broadcast storm control
- IEEE 802.1p with 8 hardware priority queues per port for different traffic types
- WFQ (Weighted Fair Queue)/WRR (Weighted Round Robin)/SPQ scheduling algorithm (WFQ, except GS-4012F)
- DSCP/DSCP to 802.1p priority mapping
- IGMP/IGMP snooping v1 v2 v3 with fast leave (very suitable for TV channel switching)
- MVR (Multicast VLAN Registration)
- Congestion control on all ports
- Smart isolation (XGS-4728F only)

IP Routing and Service Features

- 64 IP routing domains
- 8K IP address table
- Wire-speed IP forwarding
- RIP v1, v2
- 12K routing entries
- IGMP v1, v2, v3
- DHCP server/relay DHCP relay per VLAN, DHCP relay option 82, DHCP client

Link Aggregation

- IEEE 802.3ad LACP link aggregation
- Static manually port trunking
- Up to 6 aggregation groups, 8 ports/per group randomly selected

Resilient Network

- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- MRSTP—Multiple RSTP
- IEEE 802.1s multiple spanning tree provides link availability in multiple VLAN environments by allowing multiple spanning tree
- BPS (Backup Power System) power supply redundancy
- VRRP (Virtual Router Redundancy Protocol)

User Security and Authentication

- IEEE 802.1Q tag-based and port-based VLAN
- Support GVRP; automatic VLAN member registration
- 1K static VLANs, up to 4K dynamic VLAN
- Full range 4K PVID support
- Port-based VLAN & IP subnet VLAN & VLAN isolation
- IP classification VLAN
- Intrusion lock
- MAC freeze
- MAC filtering per port secures access to each port
- Limited MAC number per port
- IP source guard (static IP/MAC binding, DHCP snooping, ARP inspection)
- Loop guard prevents a switch from being affected by another switch which is already in a looping status
- IP filtering
- TCP/UDP socket filtering
- BPDU transparency
- 802.1x port-based authentication
- Port security, port isolation, port mirroring, intrusion lock
- Clone feature copies port settings from one port to other port(s) in one step

Network Administration Security

- User name/password required for Web/Telnet/local console administrators
- Two-level security by specific SNMP read/write community
- Multiple login session
- Multiple access permission management
- SSH v1/v2
- SSL/TLS
- RADIUS MAC login
- RADIUS accounting
- TACACS+ authentication, accounting
- NTP, daylight saving

Network Management

- ZyXEL iStacking™, up to 24 switches managed by single IP address
- Intuitive Web-based management with all features configurable
- Telnet CLI (Cisco like)
- SNMP v1, v2c, v3
- SNMP trap group
- Out-of-Band management: RS-232c Local console & RJ-45 console
- DHCP relay, DHCP relay per VLAN, DHCP relay option 82, DHCP client
- 802.3ah Ethernet OAM (Operations, Administration and Management)
- IP management: static IP or DHCP server/relay
- RMON four RMON groups 1, 2, 3, 9 (history, statistics, alarms, and events)
- Port mirroring: source/destination/both port mirroring
- 802.1ag CFM (XGS-4728F only)

Intelligent ACL (L2/L3/L4 Access List Control)

- Based on MAC address
- Based on VLAN
- Based on IP address
- Based on protocol type
- Based on TCP/UDP type
- Based on DSCP

MIB Information



- RFC1213 MIB II
- RFC1493 Bridge MIB
- RFC1643 Ethernet MIB
- RFC1757 RMON group 1, 2, 3, 9
- RFC2011 IP MIB
- RFC2012 TCP MIB
- RFC2013 UDP MIB
- RFC2674 VLAN MIB
- RFC2925 PING-MIB and TRACEROUTE-MIB
- ZyXEL Private MIB

Certification


- UL 60950-1
- CSA 60950-1
- EN 60950-1
- IEC 60950-1
- EU RoHS Compliant

Accessories

10-Gigabit Module (Optional)

Model	Features
EM-412 	<ul style="list-style-type: none"> • 2-slot CX4 10 GbE module • Extended 10 GbE CX4 module for short distance deployment
EM-422 	<ul style="list-style-type: none"> • 2-slot XFP 10 GbE module • Extended 10 GbE XFP module for long distance deployment

Backup Power System (Optional)

Model	Features
BPS-120 	<ul style="list-style-type: none"> • Up to 6 switches can be connected to one BPS-120 • Provides power to one switch without traffic or user interruption or switch rebooting in the event of a switch internal power supply failure • Temperature, power and fan speed monitoring

SFP Transceivers (Optional)

Speed	Model	Type	Description
10 Gigabit	FTLX8511D3 (XFP-SR)	LC connector	Multimode, up to 300 m reach
	FTLX1611M3 (XFP-ER)	LC connector	Singlemode, up to 40 km reach
	FTLX1412D3BCL (XFP-LR)	LC connector	Singlemode, up to 10 km reach
Gigabit	SFP-1000T	RJ-45 connector	Up to 100 m using standard Ethernet cable
	SFP-SX-D	LC connector	SFP SX 550 m commercial type transceiver, DDMI version
	SFP-LX-10-D	LC connector	SFP LX 10 km commercial type transceiver, DDMI version
	SFP-BX1310-10-D	LC connector	Bidirectional singlemode, up to 10 km reach, DDMI version*
	SFP-BX1490-10-D	LC connector	Bidirectional singlemode, up to 10 km reach, DDMI version*
	SFP-LHX1310-40-D	LC connector	SFP LHX 1310 wavelength 40 km commercial type transceiver, DDMI version
	SFP-ZX-80-D	LC connector	SFP ZX 80 km commercial type transceiver, DDMI version

*: Bi-directional SFP must be used in pairs (Example: 1 x SFP-BX1310-10-D and 1 x SFP-BX1490-10-D connected together is a solution)