ZyXEL

Key Features

- 16K MAC address table
- Policy-based QoS optimizes multi-service quality
- IGMP snooping v1, v2, v3, MVR
- Multilayer-aware (L2/L3/L4) ACL for security protection
- High redundancy and resilient architecture with RSTP, port trunking
- "Front access" design; external alarm input/output block (MGS-3712, MGS-3712F, MES-3728 only)
- Temperature harden & protection against humidity and dust (MGS-3712, MGS-3712F, MES-3728 only)
- Removable fan modular (MGS-3712, MGS-3712F, MES-3728 only)
- Intelligent fan control for power saving (MGS-3712, MGS-3712F, MES-3728 only)
- AC/DC dual power input flexible for service provider

Carrier Switches
Metro Switch 3000 Series

The ZyXEL Metro Switch 3000 Series consists of four switches: the MGS-3712/MGS-3712F, MES-3728, and ES-3124F.

The Metro Switch 3000 Series is specially designed for service providers to deliver profitable Ethernet services. With the high-performance hardware platform, service providers can easily extend network topologies while enabling robust security, QoS and management functions to help customers fulfilling differentiated needs for Metro Ethernet services.

Key Benefits

Meeting industry standards

The Metro Ethernet Forum (MEF) is a global industry alliance comprised of more than 145 active members representing Carrier Ethernet industry groups. The forum develops technical specifications and implementation agreements to promote interoperability and deployment of Carrier Ethernet services worldwide. The Metro Switch 3000 Series is aligned with carrier-class standards for Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL) and Ethernet LAN (E-LAN) of Metro Ethernet Forum (MEF), and the Series has been certified as MEF-9 and MEF-14 compliant.

Advanced QoS for significant services

Consistent service quality and reliable connecting ability in a converged network is the key for service providers to win customers and build loyalty; therefore the ability to control traffic flow and set traffic policy becomes more critical than ever. The Metro Switch 3000 Series offers wire-speed flow control that classifies and prioritizes the incoming packets according to the predefine QoS policies that meet requirements of service providers.

In terms of classification, the Differentiated Services Code Point (DSCP) field and the 802.1p class of service (CoS) field are identified to assess the priority of incoming packets. Classification and reclassification can be based on criteria as specific as rules based on IP, MAC addresses, VLAN ID or TCP/UDP port number. For bandwidth management, the Metro Switch 3000 Series provides 8 priority queues per port for different types of traffics, allowing service providers to set rule-based rate limitations that take full advantage of constrained network resources and guarantee the best performance.

Enhanced security for protection among customers

Avoiding subscribers affecting each other on a shared network or shared device is a major concern for service providers. The Metro Switch 3000 Series offers a complete set of security features to protect user data while administrating the traffics. The intrusion lock function detects the "plugged" and "unplugged" status change of Ethernet cables, and the switch would deactivate a specific port automatically if needed, and the 802.1x authentication can secure the network from unauthorized users. Port security provides the ability to deny unauthorized users from accessing the network.

Moreover, the 802.1x feature cooperating with RADIUS is useful to prevent unauthorized access based on username and password (or other credentials) and acts as powerful access control for converged networks with mixed wired and wireless access.

The Metro Switch 3000 Series provides a multilayer (L2/L3/L4) ACL suite of sophisticated policy-based control mechanisms that enables service providers to deploy easily based on actual network environment needs via a Web GUI or command line interface to prevent abnormal or illegal access. The policies can be defined to deny packets based on source and destination MAC addresses, IP addresses or TCP/UDP ports.

Resilient and redundant design

A quick recovery and round-the-clock network is vital for service providers to establish a robust network. The Metro Switch 3000 Series provides comprehensive features to make sure network is well operated. 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 connections by sending packets via the backup link. Furthermore, since the Metro Switch 3000 Series supports backup power system, the power is supplied to the switch in case of an unexpected outage.

Intelligent fan control algorithm for power saving

Fans play an important role in energy consumption since it's the key to heat dissipation. The Metro Switch 3000 features auto temperature detection and appropriate fan speeds with the Intelligent Fan Control algorithm based on complex mathematics and physics formulas. When the ambient temperature is low, the switch would decrease fan speed to prevent unnecessary power waste from excessive cooling.

Removable fan modules (MGS-3712, MGS-3712F, MES-3728 only)

Removable fan modules provide flexibility and high availability, and they solve the noise problem when the modules are approaching the end of their life cycle. When necessary, customers can replace the fans with new ones by their own to save cost.

Optimized design for Metropolitan Area Network, MAN (MGS-3712, MGS-3712F, MES-3728 only)

The Metro Switch 3000 Series offers high operating temperature tolerance, flexible AC/DC dual-input power source as well as protection against humidity and dust for service providers to extend their networks. The Metro Switch 3000 Series adopts the "front access" design for technicians to easily wire and maintain outdoor cabinets. The external alarm input/output block connects mechanical cabinet parts to the management network and offers better protection to the equipment.

Carrier switches supports DDMI (Digital Diagnostics Monitoring Interface) SFP (MGS-3712, MGS-3712F, MES-3728 only)

The enhanced digital interface allows real-time access to device operating parameters, and includes optional digital features such as soft control and monitoring of SFP I/O signals. In addition, it fully incorporates the functionality needed 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 applications.

DDMI Monitors:

• Temperature

• Supply voltage

• Transmitted bias current

• Transmitted power

• Received power

All features listed above include alarm and warning thresholds.

![ZyXEL]

Metro Switch 3000 Series

The Metro Switch 3000 Series comes with aggregation and access switches.

Aggregation Switches

MGS-3712

- 8 1000Base-T ports
- 4 GbE dual-personalities
- Switching capacity: 24 Gbps
- Forwarding rate: 17.8 Mpps
- Front access design & flexible AC/DC dual-input power
- External alarm input/output block (4 inputs, 1 output)
- Temperature harden
- Protection against humidity and dust
- IEEE 802.1ag CFM
- MEF9 and MEF14 certified for EPL, EVPL and ELAN
- Removable fan modular

MGS-3712F

- 8 GbE open SFP slots
- 4 GbE dual-personalities
- Switching capacity: 24 Gbps
- Forwarding rate: 17.8 Mpps
- Front access design & flexible AC/DC dual-input power
- External alarm input/output block (4 inputs, 1 output)
- Temperature harden
- Protection against humidity and dust
- IEEE 802.1ag CFM
- MEF9 and MEF14 certified for EPL, EVPL and ELAN
- Removable fan modular

Access Switches

MES-3728

- 24 10/100Base-TX ports
- 2 GbE open SFP slots
- 2 GbE dual-personalities
- Switching capacity: 12.8 Gbps
- Forwarding rate: 9.6 Mpps
- Front access design & flexible AC/DC dual-input power
- Optimized design for cabinet
- MEF9 and MEF14 certified for EPL, EVPL and ELAN
- Removable fan modular

ES-3124F

- 24 FE open SFP slots
- 2 GbE open SFP slots
- 2 GbE dual-personalities
- Switching capacity: 12.8 Gbps
- Forwarding rate: 9.6 Mpps
- Easy ETTx deployments
- Robust high-availability system design
- Secured service-level IP TV and VoIP operations
- Strengthened service management and control
- MEF9 and MEF14 certified

Specifications

Feature/Model	Aggregation Switches		Access Switches	
	MGS-3712	**MGS-3712F**	**MES-3728**	**ES-3124F**
Port Density				
10/100Base-TX, Fixed	-	-	24	-
10/100/1000Based-T, Fixed	8	-	-	-
Dual Personality Ports (Fixed RJ-45 1000Base-T or SFP Open Slots)	4	4	2	2
Open SFP Slot (GbE)	-	8	2	2
Open SFP Slot (FE)	-	-	-	24
Performance				
Switch Fabric Speed, Gbps	24	24	12.8	12.8
Forwarding Rate	17.8	17.8	9.6	9.6
Packet Buffer, Bytes	1M	1M	1M	32M (External)
MAC Address Table	16k	16k	16k	16k
Power Requirement—Input Power				
AC, DC Dual Power Supply	Yes	Yes	Yes	-
AC Power	100 - 240 V AC, 50/60 Hz	100 - 240 V AC, 50/60 Hz	100 - 240 V AC, 50/60 Hz	100 - 240 V AC, 50/60 Hz
DC Power	-48 to -60 V DC	-48 to -60 V DC	-48 to -60 V DC	-48 to -60 V DC
Environmental Specification				
Operating Temperature	0°C to 65°C	0°C to 65°C	0°C to 65°C	0°C to 45°C
Storage Temperature	-25°C to 70°C	-25°C to 70°C	-25°C to 70°C	-25°C to 70°C
Operating Humidity	-10% to 99% (non-condensing)	-10% to 99% (non-condensing)	-10% to 99% (non-condensing)	-10% to 90% (non-condensing)
Physical Feature				
Dimensions, (W) x (D) x (H) mm	438 x 225 x 44.5	438 x 225 x 44.5	438 x 225 x 44.5	438 x 270 x 44.5
Weight, Fully Loaded, kg	3.4	3.4	3.4	4.2
Mean Time Between Failure (MTBF), hours	320,302	220,339	307,007	216,298

Features

Standard Compliance of Metro Switch 3000 Series
- IEEE 802.3 10Base-T Ethernet
- IEEE 802.3u 100Base-Tx Ethernet
- IEEE 802.ab 1000Base-T Ethernet
- IEEE 802.3z 1000Base-X
- 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
- IEEE 802.1ad VLAN stacking

Traffic Management and QoS
- Broadcast storm control
- IEEE 802.1p with 8 hardware priority queues per port for different types of traffic
- IEEE 802.1ad QinQ
- IEEE 802.1Q tag-based and port-based VLAN
- Selective QinQ (MGS-3712, MGS-3712F only)
- WFQ (Weighted Fair Queuing)/WRR/SPQ scheduling algorithm
- Port based rate limiting (ES-3124F only)
- Policy based rate limiting
- Policy based bandwidth control
- Port based traffic shaping
- Rule-based traffic mirroring
- IGMP snooping (v1, v2, v3)
- IGMP filtering
- Jumbo frame support (9K Bytes) for high performance data backup or recovery services
- Support GVRP, automatic VLAN member registration
- Supports Dual-Rate-Three-Color marking
- MVR (Multicast VLAN Registration)
- BPDU Transparency

Link Aggregation
- IEEE 802.3ad LACP link aggregation compliant
- Support static manually port trunking
- Up to 6 aggregation groups, 8 ports/per group randomly selected
- VLAN trunking

Redundancy for Fault Backup
- BPS (Backup Power System) support, one power connector with ZyXEL BPS-120
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) provides rapid convergence of spanning tree independent of spanning-tree timer
- IEEE 802.1s multiple spanning tree provides link availability in multiple VLAN environments by allowing multiple spanning trees
- MRSTP—Multiple RSTP

User Security and Authentication
- IEEE 802.1x authentication
- IP source guard (static IP/MAC binding, DHCP snooping, ARP inspection)
- IP subnet VLAN & VLAN isolation
- Limiting MAC number per port
- Loop guard prevents a switch from being affected by another switch which is already in a looping status
- MAC filtering per port secures access to each port
- MAC freeze
- Port security, port isolation, port mirroring, intrusion lock
- RADIUS MAC authentication
- Static MAC forwarding per port: only specified MAC addresses can access the network (port security)
- Wire speed filtering per MAC/IP/TCP/UDP
- Wire speed mirroring per MAC/IP/TCP/UDP
- Wire speed rate limiting per MAC/IP/TCP/UDP

Network Administration Security
- SSH v1/v2
- SSL
- RADIUS accounting
- TACACS+ authentication, accounting
- NTP, daylight saving

Network Management
- Supports ZyXEL iStacking™, up to 24 switches can be managed by one IP address
- Intuitive Web-based management with all features configurable
- Text-based configuration profile for massive deployment
- Telnet CLI (Cisco like)
- SNMP v1, v2c, v3
- SNMP trap group

- RMON four RMON groups 1, 2, 3, 9 (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis
- Out-of-Band management: RS-232c local console & RJ-45 console
- Fireware upgrade, configuration backup/restore via ftp
- Alarm led indicator for early warning of hardware troubles
- Send system trap to trap server
- DHCP relay, DHCP relay per VLAN, DHCP relay option 82, DHCP client
- Port mirroring: supports source/destination/both port mirroring
- IEEE 802.3ah Ethernet OAM (Operations, Administration and Management)
- IEEE 802.1ag CFM (MGS-3712, MGS-3712F, MES-3728 only)

Intelligent ACL (L2/L3/L4 Access List Control)
- Based on port
- Based on MAC + VLAN ID
- Based on IP address (source/destination)
- Based on protocol type
- Based on TCP/UDP port number

MIB Information of Metro Switch 3000 Series
- 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

Safety Agency Certification
- UL 60950-1
- CSA 60950-1
- EN 60950-1
- IEC 60950-1
- EU RoHS compliant

Accessories

Backup Power System (Optional)

Model	Features
BPS-120	• 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
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
Fast Ethernet	SFP-100FX-2	LC connector	Singlemode, up to 2 km reach
	SFP-100TX	RJ-45 connector	Up to 100 m reach using standard Ethernet cable
	SFP-100LX-20	LC connector	Singlemode, up to 20 km reach
	SFP-100BX1310-20-D	LC connector	Bidirectional singlemode, up to 20 km reach, DDMI version
	SFP-100BX1550-20-D	LC connector	Bidirectional singlemode, up to 20 km reach, DDMI version

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