– **Bandwidth up to 2.15 Tbps**
– **Non-blocking architecture**
– **L3 switch**
– **Stacking up to 8 devices**
– **48 ports of 10G + ports of 40G/100G**
– **MAC table capacity up to 294K**
– **Hot-swappable redundant power supplies**
– **Hot-swappable fans**
– **Front-to-Back cooling**
– **CE conformity**

MES7048 switches are high performance devices with 10GBASE-R, 40GBASE-SR4/LR4, and 100GBASE-SR4/LR4 interfaces that can be used as aggregation or transport switches in carrier networks and as Top-of-Rack or End-of-Row switches for data centers.

The device's ports support operation at rates of 1 Gbps (SFP), 10 Gbps (SFP+) and 100 Gbps (QSFP28), that provides usage flexibility and ability of gradual transition to higher data rates.

The non-blocking architecture guarantees lossless packet forwarding at wire speed with minimum and predictable delays for all types of traffic. The front-to-back cooling provides effective cooldown in modern data centers.

The redundant and hot-swappable fans and AC/DC power supplies along with advanced hardware monitoring functions provide high reliability and uninterrupted services.

Technical features

Interfaces	
10GBASE-R (SFP+)/1000BASE-X (SFP)	48
40GBASE-SR4/LR4 (QSFP+)/ 100GBASE-SR4/LR4 (QSFP28)	6
10/100/1000BASE-T (OOB)	1
USB 2.0	1
Console port RS-232 (RJ-45)	1
Performance	
Bandwidth	2.15 Tbps
Throughput for 64 bytes[1]	1449 MPPS
Buffer memory	16 MB
RAM (DDR3)	4 GB
ROM (SATA SSD)	8 GB
MAC table	294912
ARP table	6144
VLAN table	4094
L2 Multicast groups	2048
802.1ad rules (QinQ)	4090

[1]The value is given for one-way transmission

Technical features (continuation)

Performance	
ACL rules	12276 ingress, 1023 egress
IPv4 routes[1]	16381
IPv6 routes[1]	8192
VRRP routers	128
ECMP-groups	512
L3 interfaces	256
Link Aggregation Groups (LAG)	64, 32 ports per LAG
Loopback interfaces	64
Quality of Service (QoS)	7 egress queues per port
Jumbo frames size	9394 bytes
Stacking	up to 8 devices

Features and capabilities

Interface features
– Head-of-line blocking (HOL) protection
– Back Pressure
– Auto MDI/MDIX
– Jumbo Frames
– Flow Control (IEEE 802.3x)
– Protected ports
– Link Aggregation Groups (LAG)
– LACP
– Different LAG balancing algorithms

MAC table features
– MAC Multicast Support
– Static MAC filtering
– Port/VLAN MAC locking

VLAN features
– IEEE 802.1Q
– GVRP
– MAC/IP-based VLAN
– Different VLAN port operating modes
– Voice VLAN
– Independent VLAN learning
– Private VLAN
– Layer 2 Protocol Tunneling

L2 Multicast features
– IGMP Snooping v1,2,3
– Port/host-based IGMP Snooping Fast Leave
– MLD Snooping v1,2
– MGMD Snooping SSM
– IGMP and MLD Snooping Querier
– MVR
– GMRP

L3 functions
– Static routing
– Inter VLAN routing
– Dynamic routing protocols RIP, OSPFv2, OSPFv3, BGP
– Address Resolution Protocol (ARP)
– Proxy ARP
– VRF
– Policy-Based Routing
– BFD
– VRRP
– ECMP Load Balancing
– UDP Relay/IP Helper
– ICMP Throttling
– Loopback interfaces
– IPv6 Host
– IPv6 DHCP Client (Stateful/Stateless)
– DHCPv6 Server
– IPv4 and IPv6 Dual Stack
– ICMPv6 Throttling

Ring topology security functions
– STP (Spanning Tree Protocol, IEEE 802.1d)
– RSTP (Rapid Spanning Tree Protocol, IEEE 802.1w)
– MSTP (Multiple Spanning Tree Protocol, IEEE802.1s)
– PVSTP+ (Per VLAN Spanning Tree Protocol Plus)
– RPVSTP+ (Rapid Per VLAN Spanning Tree Protocol Plus)
– Spanning Tree Fast Link option
– STP Root Guard
– STP Loop Guard
– BPDU Filtering
– STP BPDU Guard
– Loopback Detection (LBD)

[1] IPv4/IPv6 routes share hardware resources

Features and capabilities (continuation)

Security functions
– DHCP snooping (IPv4 and IPv6)
– IP source guard (IPv4 and IPv6)
– Dynamic ARP Inspection
– IPv6 RA Guard (Stateless)
– MAC-based authentication, Port Security, Static MAC entries
– Port-based authentication IEEE 802.1x
– Guest VLAN IEEE 802.1x
– DoS attack prevention
– Traffic segmentation
– Protection against non-authorized DHCP servers
– DHCP clients filtering
– BPDU attack prevention
– NetBIOS/NetBEUI filtering

Access Control Lists (ACL)
– L2-L3-L4 ACL
– Time-Based ACL
– IPv6 ACL
– ACL based on:
  – Source/destination MAC/IP/IPv6 address
  – Physical port number
  – IEEE 802.1p
  – VLAN ID
  – EtherType
  – TOS/DSCP/Preference
  – Protocol type
  – TCP/UDP source/destination port
– ACL actions:
  – Egress queueing
  – Flow-based redirecting and mirroring
  – ACL-based fixed rate limiting
  – Generation of trap log entries containing rule hit count

Quality of service (QoS)
– QoS statistics
– Shaping, policing
– IEEE 802.1p Class of Service (CoS)
– Interface trust mode: IEEE 802.1p, IP DSCP
– IEEE 802.1p and IP DSCP-based traffic classification and mapping
– Storm control for various types of traffic (broadcast, multicast, unknown unicast)
– Interface bandwidth management
– Bandwidth management per queue
– Strict priority and weighted (WRR/WFQ) scheduling algorithms
– Tail Drop/Weighted Random Early Detection (WRED) queue depth management
– Class-based CoS/DHCP mark assignment
– Automatic VoIP Class of Service (CoS) settings

Management functions
– Configuration file download and upload via TFTP/SCP/FTP/SFTP and USB
– Firmware file download and upload via TFTP/SCP/FTP/SFTP and USB
– SNMP v1, v2, and v3
– Command Line Interface (CLI)
– SSH server
– Web interface
– NETCONF
– Syslog
– SNTP (Simple Network Time Protocol)
– Traceroute/Ping
– Authentication, Authorization and Accounting (AAA)
– Local authentication
– Command authorization
– RADIUS, TACACS+
– Management interface blocking
– SSL
– Macrocommands
– CLI command logging
– System log
– DHCP auto-provisioning
– Debugging commands
– CPU traffic limiting mechanism
– Command completion
– Context-sensitive help
– Password encryption
– Management access control lists

Monitoring functions
– Interface statistics
– Port mirroring (SPAN)
– Remote port mirroring (RSPAN)
– Remote monitoring (RMON/SMON)
– sFlow
– Task- and traffic type-based CPU utilization monitoring
– RAM utilization monitoring
– Temperature monitoring
– LLDP (802.1ab) + LLDP MED
– Virtual Cable Testing (VCT)
– Optical transceiver diagnostics

METRO
– Ethernet OAM
– IEEE 802.1ag Connectivity Fault Management (CFM)
– Unidirectional Link Detection (UDLD)
– Layer-2 Protocol Tunneling (L2PT)
– IEEE 802.1ad Double VLAN tagging (in compliance with TR-101)

Data Center Bridging (DCB)
– Quantized Congestion Notification (QCN)
– Enhanced Transmission Selection (ETS)
– Priority-Based Flow Control (PFC)
– Data Center Bridging Exchange Protocol (DCBX) – MLAG (Virtual Port Channel)
– FIP Snooping
– Cut-through switching

Stacking
– Redundant Management Unit support
– Single IP address management
– Automatic election of management control unit
– Automatic software and configuration update throughout stack
– Hot-swap of stack units
– Offline configuration of stack units
– Stacking (up to 8 switches in a stack)

Features and capabilities (continuation)

MIB/IETF

– IEEE 802.3 10BASE-T
– IEEE 802.3u 100BASE-T
– IEEE 802.3ab 1000BASE-T
– IEEE 802.3ac VLAN tagging
– IEEE 802.3ad Link aggregation
– IEEE 802.3ae 10GbE
– IEEE 802.3 Forward Error Correction (FEC) CL91
– IEEE 802.1ak Multiple Registration Protocol (MRP)
– IEEE 802.1as Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks
– IEEE 802.1s Multiple Spanning Tree compatibility
– IEEE 802.1w Rapid Spanning Tree compatibility
– IEEE 802.1D Spanning Tree Compatibility
– IEEE 802.1Q Virtual LANs with Port-based VLANs
– IEEE 802.1ad Double VLAN tagging (TR-101)
– IEEE 802.1ag Connectivity Fault Management (CFM)
– IEEE 802.3ah Operations, Administration and Maintenance (OAM)
– IEEE 802.1Qat Multiple Stream Reservation Protocol (MSRP)
– IEEE 802.1Qav Forwarding and Queuing Enhancements for Time-Sensitive Streams
– IEEE 801.1Qbb Priority-based Flow Control
– IEEE 802.1Qau Virtual bridged local area networks amendment 13: congestion notification (Draft 2.4)
– IEEE 802.1Qaz Enhanced transmission election for bandwidth sharing between traffic classes (Draft 2.4)
– IEEE 802.1v Protocol-based VLANs
– IEEE 802.1p Ethernet priority with user provisioning and mapping
– IEEE 802.1X Port-based authentication and supplicant support
– IEEE 802.3x Flow control
– IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
– ANSI/TIA-1057 LLDP-Media Endpoint Discovery (MED)
– RFC 768 UDP
– RFC 783 TFTP
– RFC 791 IP
– RFC 792 ICMP
– RFC 793 TCP
– RFC 826 Ethernet ARP
– RFC 894 Transmissions of IP datagrams over Ethernet networks
– RFC 896 Congestion control in IP/TCP networks
– RFC 951 BootP
– RFC 1034 Domain names – concepts and facilities
– RFC 1035 Domain names – implementation and specification
– RFC 1321 Message digest algorithm
– RFC 1534 Interoperation between BootP and DHCP
– RFC 2021 Remote Network Monitoring Management Information base v2
– RFC 2030 Simple Network Time Protocol (SNTP) v4 for IPv4, IPv6, and OSI
– RFC 2131 DHCP Client/Server
– RFC 2132 DHCP options and BootP vendor extension
– RFC 2347 TFTP option extension
– RFC 2348 TFTP block size option
– RFC 2865 RADIUS client
– RFC 2866 RADIUS accounting
– RFC 2868 RADIUS attributes for tunnel protocol support
– RFC 2869 RADIUS Extensions
– RFC 3162 RADIUS and IPv6
– RFC 3164 The BSD syslog protocol
– RFC 3580 IEEE 802.1X RADIUS usage guidelines
– RFC 4541 IGMP Snooping and MLD Snooping
– RFC 5171 Unidirectional Link Detection (UDLD) Protocol
– RFC 5176 Dynamic Authorization Server
– RFC 5424 The Syslog Protocol
– RFC 1027 Using ARP to implement transparent subnet gateways (Proxy ARP)
– RFC 1256 ICMP router discovery messages
– RFC 1757, 2819 RMON MIB
– RFC 1765 OSPF database overflow
– RFC 1812 Requirements for IP version 4 routers
– RFC 1997 BGP Communities Attribute
– RFC 2082 RIP-2 MD5 authentication
– RFC 2131 DHCP relay
– RFC 2328 OSPFv2
– RFC 2370 OSPF Opaque LSA Option
– RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
– RFC 2453 RIP v2
– RFC 2545 BGP-4 Multiprotocol Extensions for IPv6 Inter- Domain Routing
– RFC 2918 Route refresh capability for BGP-4
– RFC 3021 Using 31-Bit Prefixes on IPv4 Point-to-Point Links
– RFC 3046 DHCP/BootP relay
– RFC 3101 The OSPF “not so stubby area” (NSSA) option
– RFC 3137 OSPF stub router advertisement
– RFC 3623 Graceful OSPF restart
– RFC 3704 Unicast Reverse Path Forwarding (uRPF)
– RFC 3768 Virtual Router Redundancy Protocol (VRRP) version 2
– RFC 5187 OSPFv3 Graceful Restart
– RFC 5340 OSPF for IPv6
– RFC 5549 Advertising IPv4 Network Layer Reachability Information with an IPv6 Next Hop
– RFC 5798 Virtual Router Redundancy Protocol (VRRP) version 3
– RFC 5880 Bidirectional Forwarding Detection
– RFC 5881 BFD for IPv4 and IPv6 (Single Hop)
– RFC 6860 Hiding Transit-Only Networks in OSPF
– RFC 1981 Path MTU for IPv6
– RFC 2460 IPv6 Protocol Specification
– RFC 2464 IPv6 over Ethernet
– RFC 2711 IPv6 Router Alert
– RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
– RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
– RFC 3484 Default Address Selection for IPv6
– RFC 3493 Basic Socket Interface for IPv6
– RFC 3513 Addressing Architecture for IPv6
– RFC 3542 Advanced Sockets API for IPv6
– RFC 3587 IPv6 Global Unicast Address Format
– RFC 3633 IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6
– RFC 3736 Stateless DHCPv6
– RFC 4213 Basic Transition Mechanisms for IPv6
– RFC 4291 Addressing Architecture for IPv6
– RFC 4443 ICMPv6
– RFC 4861 Neighbor Discovery
– RFC 4862 Stateless Autoconfiguration
– RFC 6164 Using 127-bit IPv6 Prefixes on Inter-router Links
– RFC 6583 Operational Neighbor Discovery Problems
– RFC 854 Telnet

Features and capabilities (continuation)

– RFC 855 Telnet Option Specifications
– RFC 1155 SMI v1
– RFC 1157 SNMP
– RFC 1212 Concise MIB definitions
– RFC 1867 HTML/2.0 forms with file upload extensions
– RFC 1901 Community-based SNMP v2
– RFC 1908 Coexistence between SNMP v1 and SNMP v2
– RFC 2068 HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03
– RFC 2271 SNMP Framework MIB
– RFC 2295 Transparent Content Negotiation
– RFC 2296 Remote Variant Selection; RSVA/1.0 State Management "Cookies"– draft-ietf-http-state-mgmt-05
– RFC 2576 Coexistence between SNMP v1, v2, and v3
– RFC 2578 SMI v2
– RFC 2579 Textual Conventions for SMI v2
– RFC 2580 Conformance statements for SMI v2
– RFC 2616 HTTP/1.1
– RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework
– RFC 3411 An Architecture for Describing SNMP Management Frameworks
– RFC 3412 Message Processing and Dispatching for SNMP
– RFC 3413 SNMP v3 Applications
– RFC 3414 User-Based Security Model for SNMP v3
– RFC 3415 View-Based Access Control Model for SNMP
– RFC 3416 Version 2 of the Protocol Operations for SNMP
– RFC 3417 Transport Mappings for SNMP
– RFC 3418 Management Information Base for SNMP
– RFC 6020 A Data Modeling Language for NETCONF
– RFC 6022 YANG Module for NETCONF Monitoring
– RFC 6242 Using the NETCONF Protocol over Secure Shell (SSH)
– RFC 6415 Web Host Metadata
– RFC 6536 NETCONF Access Control Model
– RFC 7223 YANG Data Model for Interface Management
– RFC 7277 YANG Data Model for IP Management
– RFC 7317 YANG Data Model for System Management
– RFC 2246: The TLS Protocol, version 1.0
– RFC 2818: HTTP over TLS
– RFC 3268: AES Cipher Suites for Transport Layer Security SSH 1.5 and 2.0
– RFC 4251: SSH Protocol Architecture
– RFC 4252: SSH Authentication Protocol
– RFC 4253: SSH Transport Layer Protocol
– RFC 4254: SSH Connection Protocol
– RFC 4716: SECSH Public Key File Format
– RFC 4419: Diffie-Hellman Group Exchange For The SSH Transport Layer Protocol
– RFC 1858 Security Considerations for IP Fragment Filtering
– RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 headers
– RFC 2475 An architecture for differentiated services
– RFC 2597 Assured forwarding Per Hop Behavior (PHB) group
– RFC 2697 Single-Rate Policing
– RFC 3246 An expedited forwarding PHB
– RFC 3260 New terminology and clarifications for DiffServ
– RFC 1997 BGP Communities Attribute
– RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
– RFC 2545 BGP-4 multiprotocol extensions for IPv6 inter-domain routing
– RFC 2918 Route Refresh Capability for BGP-4
– RFC 4271 A Border Gateway Protocol 4 (BGP-4)
– RFC 4360 BGP Extended Communities Attribute
– RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
– RFC 4486 Subcodes for BGP Cease Notification Message
– RFC 4724 Graceful Restart
– RFC 4760 Multiprotocol Extensions for BGP-4
– RFC 5492 Capabilities Advertisement with BGP-4
– RFC 6793 BGP Support for Four-Octet Autonomous System (AS) Number Space
– RFC 7047 Open vSwitch Database Management Protocol
– ANSI/INCITS Fibre Channel backbone-5 (FC-BB-5) Rev 2.0.0 - FIP Snooping bridge

Physical parameters

Physical specifications and environmental parameters	
Maximum power consumption	180 W
Power supply	176–264 V AC, 50 Hz 36–72 V DC Power supply options: • 1 AC/DC power supply • 2 hot-swappable AC/DC power supplies
Input current	1.1–0.8 A
Operating temperature	from 0 to +45 °C
Storage temperature	from -40 to +70 °C
Operating humidity	no more than 80 %
Cooling	Front-to-Back, 4 fans
Implementation	19", 1U
Dimensions (W × H × D)	440 × 44 × 447 mm
Weight	6.35 kg

Ordering information

Name	Description
MES7048	MES7048 Ethernet-switch, 1 port of 10/100/1000BASE-T (OOB), 48 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), 6 ports of 40GBASE-SR4/LR4 (QSFP+)/100GBASE-SR4/LR4 (QSFP28), 1 USB port, L3
Related products	
PM350-220/12	Power module PM350-220/12, 176–264 V AC, 350 W
PM350-48/12	Power module PM350-48/12, 36–72 V DC, 350 W
Related software	
ECCM-MES7048	ECCM-MES7048 option of ELTEX ECCM management system to control and monitor ELTEX network elements: 1 network element MES7048

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