– **Reliable and high performance solution**
– **Wide support for MPLS switching mechanisms**
– **Redundant hot-swappable modules**

ME5000M routers are multifunctional devices with high port density, designed for use in telecommunication operators' networks as routers of IP/MPLS network core level: aggregation, edge, transport. The device can be used to build high-performance switching and routing nodes with a high level of reliability due to the use of redundancy functions, automatic switching and automatic restoration of network connectivity. The device can be used in the networks of large telecommunication operators.

ME5000M is a part of ME series routers with a unified software and management interfaces. ME5000M supports a wide range of switching, routing and backup mechanisms: MPLS Layer3 VPN, VPLS in Kompella and Martini modes, VPWS with pseudowire backup capabilities, Multicast routing with PIM-SM/PIM-SSM/MSDP/Anycast PIM/NG-MVPN protocols with mLDP signaling. The device supports various schemes of traffic prioritization processing and QoS provisioning. This set of functions allows to use devices as network edge routers for termination of client services.

ME5000M modular architecture provides flexible scaling and the ability of hardware configuration for various requirements both in terms of bandwidth and types of network interfaces. The router modules are installed into standard 19" eurorack 15U. The chassis has 2 slots for fabric and management cards (FMC) and 12 slots for line cards (LC).

Fault tolerance of the device is ensured by redundant power supply (the chassis has two DC-48V power inputs and a distributed power supply scheme) and the use of replaceable fan modules. All replaceable modules, including management and switching boards, line cards, and fan modules, can be replaced while the unit is running.

Technical features

Name	Description	Performance	Power consumption
Routing and management modules			
FMC32	Routing and management module. RAM – up to 64 GB Interfaces: 1GbE RJ-45 management port 1GbE SFP management port RS-232 (RJ-45) console port USB 2 × USB 3.0 port	3.06 Tbps	Up to 190 W
Line cards			
LC20XGE	10GE interface module. Interfaces: 20 × 10GBASE-R (SFP+)/1000BASE-X (SFP)[1]	200 Gbps 720 Mpps	Up to 250 W
LC8XLGE	40GE/100GE interface module. Interfaces: 4 × 40GBASE-R4 (QSFP+) + 4 × 100GBASE-R4 (QSFP28)/40GBASE-R4 (QSFP+)	560 Gbps 720 Mpps	Up to 250 W
Other modules			
ME5000-mFC2	Fan module	—	Up to 400 W

[1]Support for auto-negotiation only on interfaces 1–4.

Technical features (continued)

Performance	
Switching performance of the control and switching module	3.06 Tbps
Maximum switching fabric performance	Up to 6.1 Tbps with two FMC32 modules
Maximum bandwidth per slot	Up to 255 Gbps with one FMC32 module Up to 510 Gbps with two FMC32 modules Line cards provide data processing at wire speed with 256-byte or more packet
Line interface module performance	Data processing at wirespeed for packet sizes of 256 bytes or more
Queues	96K per line card
FIB	Up to 3.9M IPv4 routes or 2.7M IPv6 routes (FIB capacity depends on the prefix length) The resource is shared with ARP tables and IPv6 ND cache
MAC address table	Up to 750 000 per line card for LC20XGE, LC8XLGE The resource is shared with MPLS switching tables and elements of single-hop BFD sessions
RIB capacity	Up to 72M IPv4 routes Up to 32M IPv6 routes Defined by free RAM capacity
L3 subinterfaces	Up to 96K per device Up to 8K per line card
MPLS VPN connections (L2/L3 service tunnels)	Up to 16K per device
MPLS LSPs (transport tunnels)	Up to 16K per line card
ARP table	Up to 57K per line card
VRFs (MPLS L3VPN)	Up to 1000 (or up to 128 while running instances of BGP processes in each of the VRFs)
Form factor	
Chassis	Up to 2 management and switching modules Up to 12 line interface modules
Module orientation	Vertical
Redundancy	Routing and management module redundancy Two power inputs, distributed power supply scheme for modules with “1+1” redundancy Fan module redundancy

Features and capabilities[1]

Interfaces functions

– Link aggregation groups: LAG and LACP
– Tunnel interfaces with IP-GRE and IP-IP support
– IP unnumbered interfaces, Proxy ARP functionality
– Layer 3 interfaces (Bridge-domain Virtual Interfaces, BVI)
– Equal load balancing in group
– Multi-chassis LAG
– Support for BFDoverLAG, fault detection of a single connection (RFC 7130)
– SPAN, RSPAN traffic mirroring, including ACL-based mirroring
– Support for SyncE
– Support for QSFP-breakout with 4×10G and 4×25G partitioning
– Support for combining 4×10G interfaces into one 40G interface

L2 protocols and functions

– Providing Ethernet switching through bridge domains and cross-connects
– IEEE bridging (IEEE 802.1d)
– VLAN (IEEE 802.1q)
– Q-in-Q (IEEE 802.1ad) with push/pop/swap/replace tag operation capability
– Spanning Tree protocols (STP, RSTP, MSTP)
– DHCP Snooping for bridge domains
– LLDP protocol
– EVPN/MPLS
– EVPN/VPWS
– EVPN/VXLAN
– Ethernet ACL

L3 protocols and functions

– IPv4, IPv6 Static Unicast Routing
– IS-IS protocol
– IS-IS multi-instance
– IS-IS multi-topology
– OSPFv2, OSPFv3 protocols
– OSPFv2, OSPFv3 multi-instance
– OSPF multi-area adjacency (RFC 5185)
– Border Gateway Protocol (BGP)
– BGP FlowSpec for IPv4/IPv6 unicast (control-plane and data-plane) and for VPNv4/VPNv6 (control-plane only)
– BGP Route Reflector, BDP Additional Path
– BGP table policy, BGP AIGP
– Route filtering (routemap, prefix-list)
– Policy-based routing (PBR)
– BFD protocol for routing protocolsand static routes
– FastReroute/Loop Free Alternate for OSPF/IS-IS
– VRRP (version 3), DHCP relay agent, DHCPv4/DHCPv6 server
– IPv4 ACL (access control lists) for transit traffic
– IPv6 ACL (access control lists) for transit traffic
– ECMP load balancing
– VRF
– Inter-VRF routing with route filtering capability
– RIPv2 and RIPng protocols

Multicast management

– PIM-SM, PIM-SSM, Anycast RP
– IGMP v2/v3, IGMP Snooping, SSM mapping
– MSDP
– MulticastVPN over mLDP
– MulticastVPN over RSVP-TE P2MP LSP
– VRF-lite technology, including for all protocols (PIM/IGMP/MSDP)
– BGP IPv4 multicast for PIM RPF

MPLS functions

– Label Distribution Protocol (LDP)
– LDP FRR
– mLDP
– LDP authentication (Md5)
– RSVP-TE: automatic tunnel construction with specified bandwidth requirement, semi-automatic tunnel construction with indication of intermediate nodes
– RSVP-TE authentication
– RSVP-TE FRR (detour, facility)
– RSVP-TE end-to-end protection
– RSVP-TE autobandwidth
– BGP IPv4 multicast for PIM RPF
– Multiprotocol extensions for BGP-4
– BGP labeled unicast, BGP 6PE
– MPLS pseudowire with PW backup
– MPLS FAT PW (flow-aware transport)
– MPLS L2VPN
  – VPWS
  – VPLS LDP signalling («Martini»)
  – VPLS BGP autodiscovery/signalling («Kompella»)
  – VPLS BGP autodiscovery + LDP signalling
  – L2VPN Inter-AS option B, option C
– MPLS L3VPN
  – L3VPN for AFI/SAFI vpnv4 unicast and vpnv6 unicast
  – BGP 6VPE
  – L3VPN Inter-AS option A, option B, option C
  – Assigning labels in label-per-vrf mode
– LSP ping and LSP traceroute
– LDPoRSVP
– Carrier Supporting Carrier (CsC)

QoS

– Ingress policing, egress policing/shaping
– Strict priority (SP) and Deficit weighted round-robin (DWRR) queue scheduling algorithms
– Up to 8 queues per logical interface, one SP queue
– QoS queue counters
– Configurable Hierarchical QoS (HQoS)
– Queue and burst size configuration
– Traffic classification based on the 802.1p, MPLS TC, IP DSCP fields with the ability to remark the corresponding fields
– QoS labeling and processing based on access control lists (ACLs), ACL policing
– Storm Control

[1]For firmware version 3.12.0.

Features and capabilities (continued)[1]

Управление и мониторинг

– Command Line Interface (CLI), SSH, Telnet for remote control
– SNMPv1/v2c/v3 for device status monitoring
– NETCONF protocol
– Static data export (Netflow v9, v5, IPFIX)[1]
– Configuration backup and restore (local, FTP, SFTP, TFTP)
– RADIUS, TACACS+ authentication and authorization, TACACS+ accounting
– Remote firmware change
– System parameters and resources monitoring
– Syslog
– Clock Synchronization, NTP, SNTP protocols
– Control-plane filtering
– Traffic rate limiting on CPU
– ELTEX IP SLA
– Support for script execution when events occur on the device (EEM, embedded event manager)

Функции обеспечения надежности

– Management module redundancy feature; module fault detection time is 300 ms max
– Synchronization of FIB/ARP tables between management modules
– Graceful Restart for routing protocols
– Non-stop forwarding
– In-service Software Upgrade
– Storage of two firmware versions on the internal drive
– Ability to restore the previous firmware version during update

Physical parameters

Physical specifications and ambiemt parameters	
Case ventilation	Front-to-back air flow Two hot-swappable redundant fan modules
Power supply sources	Two DC feeders 36–72 V Distributed redundant power supply system
Maximum power consumption	4200 W
Operating temperature range	From 0 to +45 °C
Storage temperature	From -40 to +70 °C
Weight	Chassis assembly without LC/FMC – 46.7 kg FMC32 – 3.42 kg LC20XGE – 3.7 kg LC8XLGE – 3.9 kg ME5000-mFC2 – 6.28 kg ME5000-FP – 0.76 kg
Dimensions (W × H × D)	Chassis – 487 × 661 × 495 mm FMC32 – 30 × 358,5 × 397 mm LC20XGE – 30 × 358 × 397 mm LC8XLGE – 30 × 358 × 397 mm ME5000-mFC2 – 436 × 43 × 446 mm ME5000-FP – 30 × 341.5 × 397 mm

[1]For firmware version 3.12.0.
[2]A hardware module for collecting statistics on line cards with Netflow/IPFIX enabled is required.

Ordering information

Name	Description
Chassis	
ME5000M chassis	ME5000M universal edge router chassis. Bandwidth up to 6 Tbps (up to 510 Gbps per slot)
Routing and management modules	
FMC32	FMC32 routing and management module. 64 GB of CPU RAM
Line cards	
LC20XGE	LC20XGE line card. Interfaces: 20 × 10GBASE-R (SFP+)/1000BASE-X (SFP)
LC20XGE-STAT	LC20XGE line card with statistics collection module installed. Interfaces: 20 × 10GBASE-R (SFP+)/1000BASE-X (SFP)
LC8XLGE	LC8XLGE line card. Interfaces: 4 × 40GBASE-R4 (QSFP+) + 4 × 100GBASE-R4 (QSFP28)/ 40GBASE-R4 (QSFP+)
LC8XLGE-STAT	LC8XLGE line card with statistics collection module installed. Interfaces: 4 × 40GBASE-R4 (QSFP+) + 4 × 100GBASE-R4 (QSFP28)/40GBASE-R4 (QSFP+)
Other modules	
ME5000-mFC2	Fan module ME5000-mFC2. Installation of two modules in the chassis is mandatory
ME5000-FP	Slot plug for installation in unused chassis slots. Installation of the plugs is mandatory for proper operation of the chassis ventilation system

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About Eltex

Eltex Enterprise is a leading Russian developer and manufacturer of communication equipment with 30 years of history. Complete solutions and their seamless integrability into the Customer's infrastructure are the priority growth areas of the company.