



Simgenet SMG104 IP/MPLS Router Datasheet

In-house developed SMGOS software, advanced routing and MPLS capabilities, PTP support, and a modular hardware architecture

SMG104 is a high-performance, modular **IP/MPLS router** platform designed for critical infrastructures and service provider networks, running Simgenet's in-house developed IP/MPLS routing software (SMGOS).

SMGOS - In-House Developed IP/MPLS Routing Software

Running on the SMG104, **SMGOS** is an IP/MPLS routing operating system developed entirely in-house by Simgenet.

- No dependency on third-party routing software
- Provides full control, customizability, and long-term sustainability
- An architecture optimized for critical infrastructure and service provider networks

SMGOS CLI Design Approach

While preserving a Cisco IOS-like syntax and operating logic, SMGOS is designed to reduce operational complexity—especially for advanced configurations such as traffic engineering and MPLS-TE. Instead of multiple contexts and complex, cross-referenced configurations, the required settings can be defined clearly, directly, and understandably through a single CLI line. This simplified approach reduces configuration errors, eases field operations, and enables fast and secure commissioning by eliminating additional training requirements.

Routing, MPLS, and Service Protocol Support

Core Routing Capabilities

- Static Routing
- Default Routing
- Policy-Based Routing (PBR)
- Route redistribution between routing protocols

IGP Protocols

- RIP v2
- OSPFv2
- OSPFv3
- IS-IS (Level-1 / Level-2)
- IS-IS Wide Metrics

BGP Capabilities (Advanced)

- iBGP / eBGP
- BGP Multipath
- ECMP
- BGP Communities and Extended Communities
- Local Preference, MED, and AS-Path manipulation
- Prefix-list, route-map, and community-based routing policies
- Graceful Restart
- Graceful Shutdown
- Session Recovery
- Route Aggregation / Summarization
- BGP Add-Path
- BGP Flowspec

MPLS and Advanced MPLS Capabilities

- IP MPLS
- MPLS LDP
- MPLS L2VPN
- MPLS L2VPN VPWS (Virtual Private Wire Service)
- MPLS L2VPN VPLS (Virtual Private LAN Service)
- MPLS L3VPN
- VRF-based MPLS services
- Segment Routing (SR-MPLS)
- Segment Routing TI-LFA (Topology Independent Loop-Free Alternate)
- OSPFv2 Segment Routing Extensions
- IS-IS Segment Routing Extensions
- MPLS label operations (push / pop / swap)
- MPLS PHP (Penultimate Hop Popping)
- MPLS TTL propagation control



- MPLS OAM (Y.1731 Performance Monitoring, CFM)

MPLS Traffic Engineering

- MPLS Traffic Engineering (MPLS-TE)
- RSVP-TE
- Constraint-based path selection
- Explicit and dynamic LSP definition
- MPLS FRR (Fast Reroute) — Facility Backup, One-to-One Backup

Fast Convergence and Load Sharing

- **Fast Convergence:** Millisecond-level rerouting upon link or neighbor failures
- **ECMP (Equal-Cost Multi-Path):** Traffic distribution across multiple equal-cost paths
- **BFD (Bidirectional Forwarding Detection):** Very fast detection of link and path status
- **Advanced timer settings:** Hello / dead / keepalive / holdtime tuning

IP Address Management and Services

- DHCP Server
- DHCP Relay
- VRF-aware services
- IPv4 / IPv6 Dual-Stack Routing
- ARP / IPv6 Neighbor Discovery
- Source NAT (SNAT)
- Destination NAT (DNAT)
- Port Address Translation (PAT)
- VRF-aware NAT support

Time Synchronization - PTP and NTP

SMG104 provides **IEEE 1588-2008 PTP v2** support for critical infrastructures that require time awareness and event correlation.

PTP Support Scope

- IEEE 1588-2008 (PTP v2)
- Network transport: UDP/IPv4 and Layer 2
- Delay mechanism: End-to-End (E2E)
- PTP role: Timing Consumer (Follower / Slave)

PTP Operating Behavior

- Synchronization acquisition using **hardware timestamping** on the first node directly connected to an upstream Grandmaster Clock source
- Maintaining synchronization using **software timestamping** on downstream nodes in daisy-chained multi-router deployments
- Targets **time awareness, SOE, and system correlation** for power, SCADA, and edge networks
- SMG104 is not positioned as a hardware re-clocking (Hard Boundary Clock) platform for telecom-core or 5G fronthaul/core deployments.

Additionally:

- NTP / SNTP support

Network Management, Monitoring, and Security

- Centralized network monitoring and management with SNMP support
- Performance, status, and alarm monitoring
- Syslog support
- Centralized authentication and authorization with RADIUS (AAA) integration
- ACL (Access Control Lists) — IPv4 / IPv6 extended access lists
- QoS / DiffServ — DSCP marking, traffic policing, traffic shaping, priority queuing
- LLDP (Link Layer Discovery Protocol)
- LACP / Link Aggregation (IEEE 802.3ad)

Overlay and Virtualized Network Support

- VXLAN support
- Compatibility with overlay network architectures and virtualized infrastructures

Modular Ethernet Line Card Architecture

Thanks to its modular Ethernet line card design, SMG104 can be configured for application-specific needs:

- 1G / 10G / 40G / 100G Ethernet modules
- SFP / SFP+ / QSFP+ / QSFP28 interface options
- Different port and speed combinations on the same platform



Example supported Ethernet modules:

- SMG3500PF-4SFP-M
- SMG7100PF-4SFP+-M
- SMG8100PF-2QSFP28-M

Hardware Platform

- Platform / Chipset: Intel® C236
- CPU: Intel® Xeon® E3-1200 v5 series
- Memory: 4 × DDR4 DIMM, DDR4-2133 MHz, up to 64 GB total
- Expansion: 4 × PCIe Gen3 x8

Backplane (Theoretical, PCIe-based)

- Theoretical per-slot capacity (FD): ≈ 126 Gbps
- Total theoretical backplane capacity (FD): ≈ 504 Gbps
- Note: Theoretical values are not performance commitments; actual performance depends on packet size and service load.

Power

- 1 × 220 VAC **server-grade power supply (industrial type)**, 250 W

Mechanical and Environmental Conditions

Parameter	Value
Operating temperature	-20°C ~ +60°C
Storage temperature	-20 °C ~ +75 °C
Relative humidity	10% ~ 95% (non-condensing)
EMC Emission	EN 55032:2015+A11:2020 (Class A)
EMC Immunity	EN 55035:2017+A11:2020
ESD (IEC 61000-4-2)	Level 3
Radiated RF (IEC 61000-4-3)	Level 3
EFT/Burst (IEC 61000-4-4)	Level 3
Surge (IEC 61000-4-5)	Level 3
Conducted RF (IEC 61000-4-6)	Level 3
Magnetic Field (IEC 61000-4-8)	Level 3
Voltage Dips (IEC 61000-4-11)	Level 3
Harmonics	EN IEC 61000-3-2:2019+A1:2021
Flicker	EN 61000-3-3:2013+A2:2021
LVD	EN 62368-1:2020+A11:2020
RoHS	EN IEC 63000:2018
EU Directives	2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU+2015/863/EU (RoHS)

Built-in SIP Server (VoIP)

With its built-in Asterisk-based SIP Server running on the SMGOS operating system, SIP lines from the ISP are terminated directly on the router, eliminating the need for additional termination hardware. Calls can be forwarded to the customer’s existing PBX system via the router, or the router can operate as an independent IP PBX at locations without a dedicated PBX. This provides a more practical and seamless deployment.

- **Unlimited SIP Extensions:** Define as many internal lines as needed
- **ISP SIP Trunk Integration:** Directly integrates with SIP numbers from the service provider
- **Basic PBX Functions:** Internal calling, call forwarding, dial plan support
- **ISP SIP Termination:** SIP lines terminate directly on the router, no additional hardware required
- **PBX Integration:** Forward calls to existing customer PBX systems via the router
- **Standalone PBX Mode:** Basic IP PBX function at locations without a dedicated PBX
- **Management:** Configuration via CLI (Web interface under development)

Use Cases



- Edge and aggregation layers in telecom and service provider networks
 - ISP and Metro Ethernet backbones
 - Power transmission and substation facilities
 - SCADA and industrial automation networks
 - Railway communications infrastructures (IP/MPLS transport infrastructure for GSM-R / FRMCS / ETCS-based systems)
 - Public sector and critical infrastructure communication systems
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Brief Summary

SMG104 is a professional IP/MPLS Router platform developed for critical infrastructures and service provider networks, featuring an in-house developed SMGOS software foundation, field-tested and validated advanced routing and MPLS capabilities, MPLS-TE and RSVP-TE support, PTP-based time awareness, and a modular Ethernet line card architecture.

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