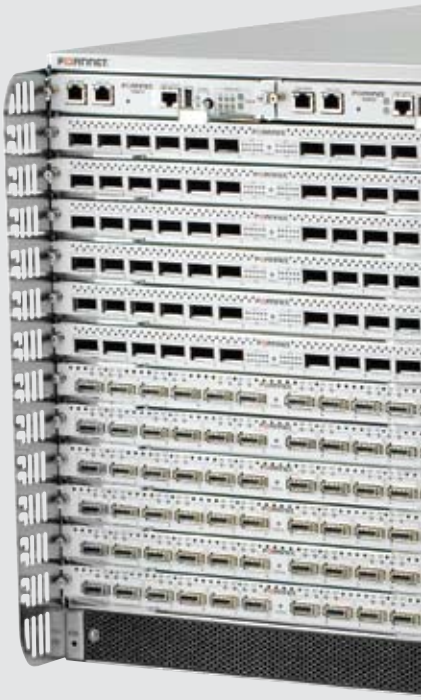
DATASHEET

# FortiSwitch™-1000

## 10-Gigabit Ethernet Fabric Platform

FortiSwitch 10-Gigabit Ethernet (10 GbE) fabric switching platforms deliver outstanding price, performance, scalability, and simplified management using familiar, standards-compliant Ethernet. The platforms' architecture is purpose-built for high performance computing and data center environments. They provide high density, non-blocking 10 GbE ports at one-third the rack space and one-fifth the power requirements of traditional fabric switching solutions.

The FortiSwitch-1000 is a 10 GbE fabric switching platform that meets the growing needs of high performance computing and data center environments. With FortiSwitch-1000 hardware at the core, network operators can build wire speed, resilient, scalable, ultra-low latency 10 GbE fabrics with the simplicity and robustness of standard Ethernet. Fortinet's vScale™ multi-path traffic switching and dynamic congestion avoidance features route data flows to the lowest latency path—avoiding congestion while maintaining full Ethernet compliance. The fully redundant and modular 10RU FortiSwitch-1000 chassis houses configurable line cards, supporting up to 144 10 GbE ports.

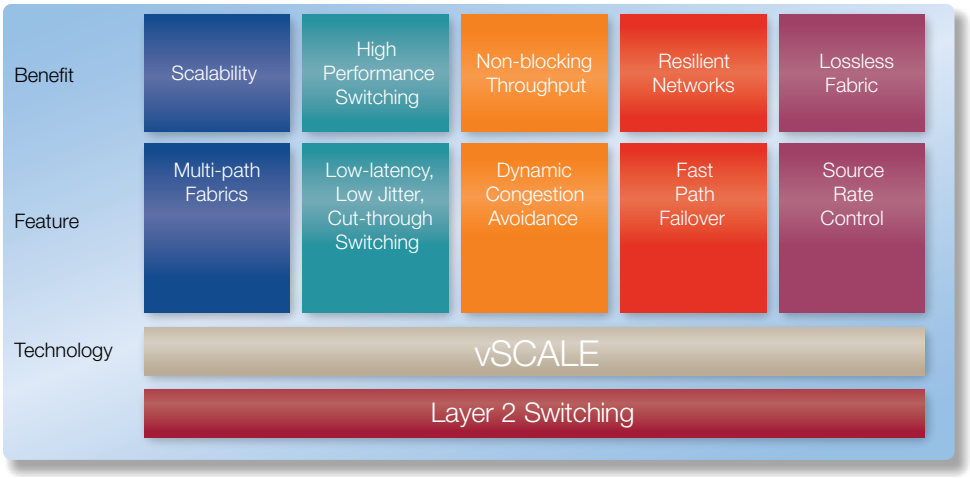


| Features | Benefits |
|---|---|
| **Multi-Path, Multi-Chassis Layer 2 10 GbE Fabric** | Increased flexibility and scalability when deployed in a two-tiered Clos architecture that can significantly scale the number of 10 GbE devices supported in a single Ethernet fabric |
| **Non-Blocking Performance** | Ultra-low latency and lossless 10 GbE fabric delivers peak performance, regardless of the application |
| **Dynamic Congestion Avoidance** | Traffic moving across the fabric will be routed around any bottlenecks in real time for the lowest possible latency (avg 6.4 µs port-to-port in a Clos architecture) |
| **High Density Interfaces** | Up to 144 ports per FortiSwitch-1000 Chassis, for up to 576 ports in a standard seven-foot rack |
| **Low-Power Design** | Lowered energy requirements with an average power consumption of less than 25 watts per port |

## Invest-As-You-Grow

Legacy switches require large upfront capital investments or expensive upgrades requiring data center budgets to grow ahead of the businesses they support. Fortinet's multi-path, multi-chassis 10 GbE fabric departs from this legacy model by enabling its customers to grow their data center network cores in small steps of 12 wire speed 10 GbE ports at a time—an invest-as-you-grow model. Fortinet's customers can start with small server and storage clusters and, in small steps, grow their networks at pace with their businesses to interconnect thousands of external 10 GbE devices. Each small step expands a data center network core or fabric that delivers wire speed 10 GbE with ultra-low latency and no congestion.

### vSCALE Packet Processing Technology




Fortinet's vSCALE technology utilizes existing standards in innovative ways to deliver high throughput, resilient, and scalable Ethernet fabrics for the data center.

### The FortiSwitch-1000 Platform

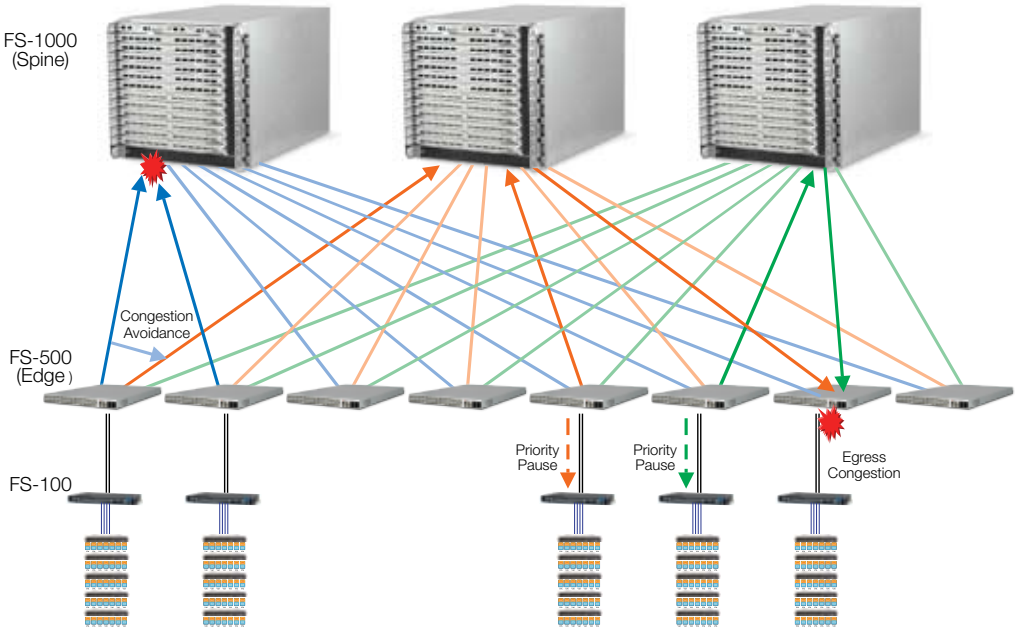
- Modular 10RU Ethernet fabric switching platform
- Up to 144 10 GbE copper and fiber interfaces
- Redundant, hot-swappable system management cards, power supplies, and fan assemblies.

### The FortiSwitch-500 Platform

- Fixed 1RU Ethernet fabric switching platform
- 24 10 GbE copper and fiber interfaces
- Redundant fans, power supplies, and management connections.

Fortinet's ultra-low latency, multi-path dynamic congestion avoidance feature dynamically avoids congestion in real time. Using standards-based technology, it overcomes the limits of "no loops" Ethernet protocols to support large non-blocking wire speed 10 GbE fabrics. Latency through the Fortinet's Ethernet fabric is as low as 1.6 µs with a single chassis and as low as 6.4 µs across a multi-path, multi-chassis fabric. Fully IEEE Ethernet standards compliant, the FortiSwitch platforms interoperate with the industry's leading 10 GbE network adapters, storage systems, switches, and routers.

## Optimized for Scalable Performance




### 10 GbE Fabric Capabilities

- Multiple paths (up to 12 per switch) from fabric ingress to egress
- Prevents loops and minimizes latency, jitter, and packet loss
- Industry-standard Ethernet everywhere
- Full non-blocking bandwidth from fabric ingress to egress
- Large Layer 2 network; (does not require Layer 3)

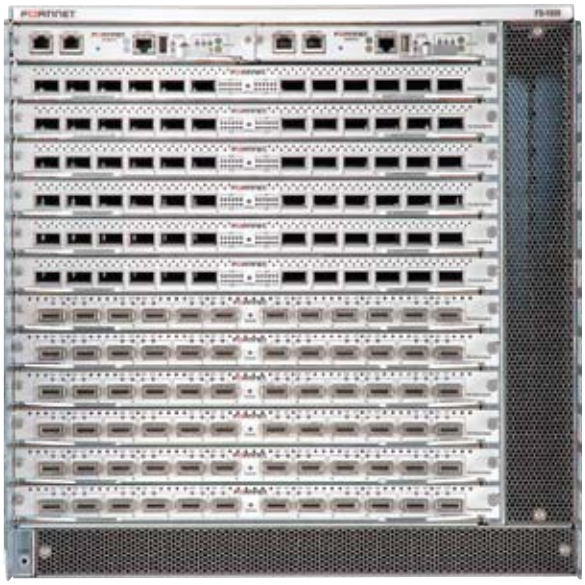
## Multi-Path, Multi-Chassis Ethernet Fabrics

Fortinet's patented vScale technology overcomes the scalability limitations of traditional Ethernet, allowing network designers to build full multi-path (up to 12) fabric networks of 10 GbE ports.

All paths carry traffic for full non-blocking wire speed bandwidth across the network. vScale technology automatically re-routes traffic to an alternate path in less than 500 nanoseconds, avoiding congestion and application time out, ensuring ultra low-latency and low jitter.

## Dynamic Congestion Avoidance

Fortinet's innovative vScale packet processing technology reroutes traffic around any bottlenecks in the fabric in real-time. The vScale Dynamic Congestion Avoidance feature continuously monitors congestion edge-to-edge across a large 10 GbE fabric and steers traffic onto the lowest latency paths in real-time without dropping or re-ordering packets. vScale's latency-based algorithms balance traffic across the fabric, ensuring the highest levels of performance and efficiencies.



FS-1000 (Front View)

FS-1000 (Rear View)

| | FortiSwitch-1000 |
|---|---|
| **Performance Specifications** | |
| Throughput (Max) | 2.9 Tbps |
| Latency (Port-to-Port) | 1.6 µs |
| MAC Address Storage | 16,000 |
| VLANs Supported | 4,000 |
| Link Aggregation Group Size | 6 |
| Total Link Aggregation Groups | 72 |
| Total Active Flows Managed | 144,000 |
| **Hardware Specifications** | |
| 10 GbE Ports (Max) | 144 |
| Out-of-Band Management Ports | 2 |
| Console Ports | 2 |
| 10 GbE Interface Type | Powered CX4<br>XFP |
| 1 + 1 Power Redundancy | Yes |
| Field-Serviceable Power Supply | Yes |
| Line Cards (Max) | 12 |
| Fabric Cards (Max) | 6 |
| Management Cards (Max) | 2 |
| Fan Units (Max) | 2 |
| Power Supplies (Max) | 6 |
| Airflow | Front-to-Back |
| Supported Optical Modules | 10GBase-SR<br>10GBase-LR |
| Power Consumption | All CX4 - 2550 W<br>All XFP - 3600 W |
| **Dimensions** | |
| Height | 10RU Chassis<br>17.5 in (44.45 cm) |
| Width | 17.25 in (43.82 cm) |
| Length | 28 in (71.12 cm) |
| Weight | 180 lbs (82 kg) |

All performance values are "up to" and vary depending on system configuration

# Other Specifications

**IEEE Compliance**
802.3ae 10 Gigabit Ethernet
802.3ak 10 Gigabit Ethernet – CX4
802.1p Prioritization
802.1q VLAN Tags, GVRP
802.1s Multiple Spanning Tree
802.1w Rapid Spanning Tree
802.3ad Link Aggregation
802.1D Bridging, GARP, GMRP
802.3x Flow Control
802.1ac VLAN Frame Extensions

**RFC Security Compliance**
2865 RADIUS Authentication
3128 Protection Against a Variant of the Tiny Fragment Attack
3580 IEEE 802.1x RADIUS Usage
ETF-draft SSH v2

**Performance and Availability**
Line rate performance for up to 10 Kbytes jumbo frames
End-to-end path failure detection and automatic path re-route
in less than 500 nanoseconds

**Application Flow Visibility using FlowTrak**
Per-flow performance statistics and roll-up reporting for latency and bandwidth
Hot spot detection and reporting
Fabric performance baseline capture and event management
Performance quality measurement configuration
Performance delivery reporting and event generation

**Quality of Service and Multi-path, Multi-chassis Features**
Automated fabric topology discovery and multi-path provisioning
Automated congestion detection and load-balancing
Application flow load balancing
Guaranteed in-order delivery of load balanced traffic
Automatic path re-route on link congestion or link failure

**Management and SNMP**
CLI with support for scripting command completion and context sensitive help
768 UDP 783 TFTP 791 IP 792 ICMP 826 ARP 951 BootP 1157 SNMP v1 1212 Concise MIB Definition 1213 SNMP v2 (MIB-II) 1493 Bridge MIB
1643 Ethernet-like MIB 1901 Community-based SNMPv2
1905 Protocol Operations for SNMPv2
1906 Transport Mappings for SNMPv2
1907 Management Information Base for SNMPv2
1908 Coexistence between SNMPv1 and SNMPv2
2131 DHCP Server
2233 The Interfaces Group MIB using SMI v2
2570 SNMP v3 2665 Ethernet-like Interfaces

**Environmental**
Operating temperature: 0°C to 40°C (32°F to 104°F)
Operating relative humidity: 5% to 90% at 40°C (104°F), non-condensing
Operating altitude: 3,000 m (10,000 ft)
Storage temperature: -25°C to 70°C (-13°F to 158°F)
Storage humidity: 95% non-condensing
Storage altitude: 4,500 m (15,000 ft)

**Safety**
UL 60950-1
CSA C22.2 No. 60950-1
EN 60950-1
IEC 60950-1

**Laser Safety**
21CFR (FDA/CDRH)
EN68025-1

**EMC**
FCC Part 15 / ICES-003 (Class A) ETSI EN 300-386 EN 55022 (Class A) VCCI (Class A)
EN 55024 (Immunity)
EN 61000-4-2 Electrostatic Discharge (ESD) Immunity
EN 61000-4-3 Radiated RF Immunity
EN 61000-4-4 Electrical Fast Transients (EFT) Immunity
EN 61000-4-5 Electrical Surge Immunity
EN 61000-4-6 Conducted RF Immunity
EN 61000-4-8 Magnetic Field Immunity
EN 61000-4-11 Power Voltage Dips Immunity

FORTINET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