

# FortiSwitch™ -500

## 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-500 is a 10 GbE fabric switching platform that meets the growing needs of high performance computing and data center environments. With FortiSwitch-1000 and FortiSwitch-500 hardware at the core and edge, respectively, 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 fixed-port 1RU FortiSwitch-500 platform includes 24 10 GbE ports, redundant fans, power supplies, and management connections.

Features	Benefits
<b>Multi-Path, Multi-Chassis Layer 2 10 GbE Fabric</b>	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
<b>Non-Blocking Performance</b>	Ultra-low latency and lossless 10 GbE fabric delivers peak performance, regardless of the application
<b>Dynamic Congestion Avoidance</b>	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)
<b>High Density Interfaces</b>	24 10 GbE ports per 1RU FortiSwitch-500 platform
<b>Low-Power Design</b>	Lowered energy requirements with an average power consumption of less than 25 watts per port



FortiSwitch-500 (CX4)



FortiSwitch-500 (SFP+)

## 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.

### The FortiSwitch-1000 Platform

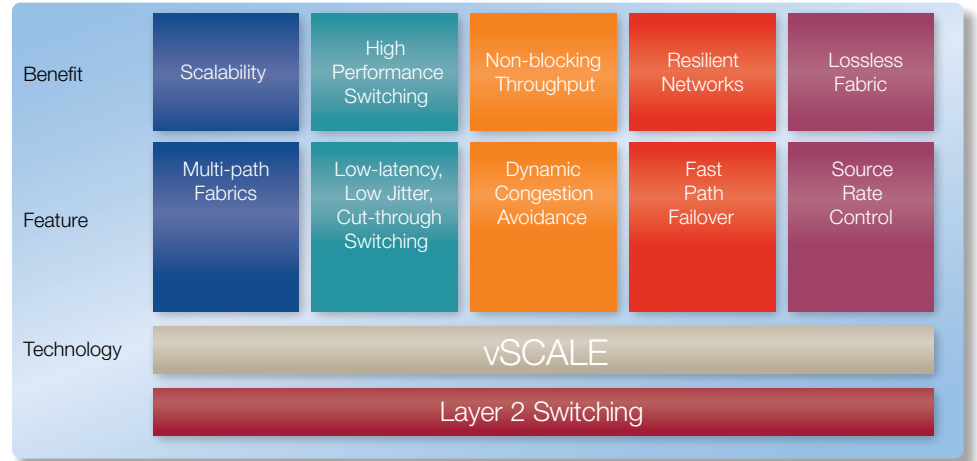
- Modular 10RU Ethernet fabric switching platform
- Up to 144 10 GbE interfaces
- Redundant, hot-swappable system management cards, power supplies, and fan assemblies.

### The FortiSwitch-500 Platform

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

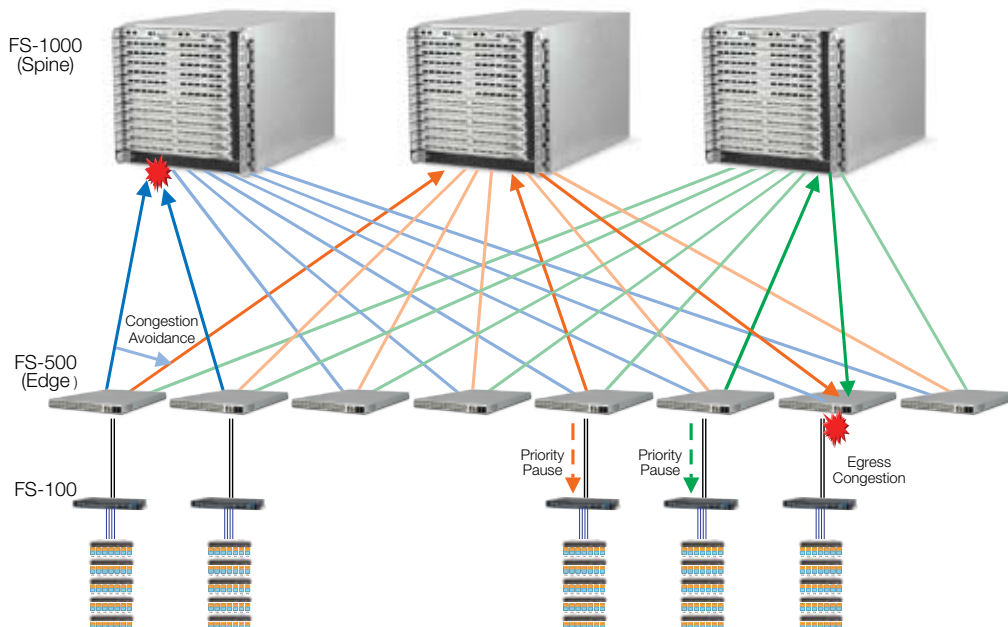
Fortinet's ultra-low latency, multi-path dynamic congestion avoidance feature dynamically avoids congestion in real time. Using standards-based technology, it overcomes the limits of "no loops" Ethernet protocols to support large non-blocking wire speed 10 GbE fabrics. Latency through the Fortinet's Ethernet fabric is as low as 1.6  $\mu$ s (FS-1000 platform) with a single chassis and as low as 6.4  $\mu$ s 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.

## 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.

## 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 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 routes 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-500 (SFP+)



FS-500 (CX4)

### FortiSwitch-500

#### Performance Specifications

Throughput (Max)	480 Gbps
Latency (Port-to-Port)	2.4 µs
MAC Address Storage	32,000
VLANs Supported	4,000
Link Aggregation Group Size	8
Total Link Aggregation Groups	12
Total Active Flows Managed	24,000

#### Hardware Specifications

10 GbE Ports	24
Out-of-Band Management Ports	2
Console Ports	1
10 GbE Interface Type	Powered CX4 SFP+
1 + 1 Power Redundancy	Yes
Field-Serviceable Fan Unit	Yes
Field-Serviceable Power Supplies	No
Fan Units	1
Power Supplies	2
Airflow	Front-to-Back Back-to-Front
Supported Optical Modules	10GBase-SR Lite 10GBase-SR 10GBase-LR
Power Consumption	All CX4 - 300 W All SFP+ - 400 W

#### Dimensions

Height	1RU Appliance 1.75 in (4.45 cm)
Width	17.25 in (43.82 cm)
Length	25 in (63.57 cm)
Weight	30 lbs (13.61 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 Kb 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



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