Z-SERIES

Z9000 • Plug-n-Play Core for Next Generation Data Center

High-density 32-port 40 GbE Core Router/Switch in 2RU form factor

Line rate, non-blocking, low-latency and lower power switch enabling a greener, faster data center

Feature rich FTOS operating system

TRILL, EVB and DCB ready

Highly Available, High performance Distributed Core

Z9000 is a compact next generation switch/router product designed to meet the requirements for high density 10/40 GbE aggregation in a Data Center core network. Z9000 product is designed to address data center 10/40 GbE aggregation requirements through Centralized Core or Distributed Core architectures for High Performance Enterprise Data Centers, High Performance Computing Cores, Cloud Computing Cores, Provider Hosted Data Centers and Enterprise LAN Cores. Z9000 product can be positioned as a Core switch or End of Row switch within a Data Center. The product can support 32 ports of 40 GbE QSFP or 128 ports of 10 GbE SFP+ realized through breakout cables. Z9000 supports a full suite of Ethernet switching and Routing protocols in the hardened FTOS operating system to enable layer 2 or layer 3 network architectures.

A distributed core design with Z9000 switches can enable build out of massively scalable, high performance data center networks with 10/40 GbE ToR, 10/40 GbE End of Row and 40 G Core network connections. A distributed control plane in a CLOS based leaf-spine architecture can be leveraged to build highly scalable data center switching fabric. Distribution of traffic between the leaf and spine trunks can be achieved through ECMP at layer 3 or layer 2 (OSPF or BGP can be used as the layer 3 control plane protocol and TRILL in future for layer 2 deployments). Resiliency in a distributed core model is much improved compared to centralized core architectures as the failure of a single node within the CLOS network cannot bring down the entire switching fabric. A single switching element can be restarted or replaced in the event of a failure versus an entire chassis reboot would be required in a centralized design.

Application

- Containerized Data Centers, Provider Hosted Data Centers, Cloud Computing Cores and High performance Computing Cores

Key Features

- 2-RU high-density 10/40 GbE Aggregation/Core Switch with 32 x 40 GbE ports expandable to 128 10 GbE ports using QSFP+ breakout cables
- 2.5 Tbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance under full load
- Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 for unicast and multicast applications
- CLOS based architecture enables you to build a line-rate, non-blocking core for 2000 10 GbE servers
- Combined with S4810 in the access layer with 3:1 oversubscription, a distributed core can provide connectivity to 6000 10 GbE servers
- Control Plane Policing (CoPP) for policing control plane traffic providing protection to CPU from DOS attacks
- Open Automation Framework adds VM-awareness as well as automated configuration and provisioning capabilities to simplify the management of virtual network environments
- Modular Force10 Operating System (FTOS) software delivers inherent stability as well as advanced monitoring and serviceability functions
- VirtualView real-time network and application traffic monitoring for virtualized data centers
- Data Center Bridging (DCB) support* enables a lossless Ethernet fabric for iSCSI storage and NFS traffic
- 128 link aggregation groups with up to 8 members per group, using advanced hashing with random seed values
- Supports jumbo frames for high-end server connectivity
- Reversible front-to-back or back-to-front airflow
- Total aggregated packet buffer memory of 54MB
- Redundant, hot-swappable power supplies and fans
- Hardware support for TRILL, EVB, DCB* (Roadmap)
- Low power consumption

FORCE10

Specifications: Z9000 Data Center Core Network Switch

Ordering Information

Order Number	Description
Z9000-AC	Z9000 base unit* with 4 fans** and 1 AC power supply (non-redundant power)
Z9000-DC	Z9000 base unit* with 4 fans** and 1 DC power supply (non-redundant power)
Z9000-FAN	Z9000 fan**
Z9000-PWR-AC	Z9000 AC Power Supply**
Z9000-PWR-DC	Z9000 DC Power Supply**
Z9000-01-SW-L3	Z9000 FTOS - Force10 Operating System Software Layer3
GP-QSFP-40GE-1SR	40 GbE QSFP+ short reach optics
GP-QSFP-40GE-1LR	40 GbE QSFP+ long reach optics
CBL-QSFP-40GE-10M	40 GbE QSFP+ active fiber cable (10m)
CBL-QSFP-40GE-50M	40 GbE QSFP+ active fiber cable (50m)
CBL-QSFP-40GE-PASS-1M	40 GbE QSFP+ passive cable (1m)
CBL-QSFP-40GE-PASS-5M	40 GbE QSFP+ passive cable (5m)
GP-10GSFP-1S	Qualified 10G SFP+ optics module - SR
CBL-QSFP-4x10GSFP-5M	40 GbE MTP (QSFP+) to 4xLC (SFP+) optical cable (5m) (optics not included)
CBL-QSFP-4x10GSFP-PASS-5M	40 GbE MTP (QSFP+) to 4xLC (SFP+) passive breakout cable (5m)

* Z9000 base unit provides 32 x 40 GbE ports, optics MUST be ordered separately.

** Airflow from I/O panel (front) to Power Supply panel (back).

Physical

32 line-rate 40 Gigabit Ethernet QSFP+ ports
1 RJ45 console/management port with RS232 signaling
1 RJ45 10/100/1000 Base-T management port
1 x USB 2.0 type A storage port
1 x USB 2.0 type B console port
Size: 2 RU, 3.48 h x 17.32 w x 24" d (8.8 h x 44 w x 61 cm d)
Power supply: 100–240 VAC 50/60 Hz, -40 to -70 VDC
Max. thermal output: 2654 BTU/h
Max. current draw per system:
8 A at 100/120 VAC, 4 A at 200/240 VAC
Max. power consumption: 789 W

Max. operating specifications:
Operating temperature: 0°C to 40°C
Operating humidity: 10 to 85% (RH), non-condensing
Max. non-operating specifications:
Storage temperature: –40° to 158°F (–40° to 70°C)
Storage humidity: 5 to 95% (RH), non-condensing

Redundancy

Hot swappable redundant power
Hot swappable redundant fans

Performance

MAC addresses: 128K
IPv4 routes: 16K
Switch fabric capacity: 2.56 Tbps (full-duplex)
Queues per port: 10 COS queues
VLANs: 4096
Line-rate Layer 2 switching
Line-rate Layer 3 routing: IPv4 and IPv6
ACLs: 8K ingress, 4k egress
LAGs: 128 with up to 8 members per LAG.
LAG load balancing: based on Layer 2, IPv4 or IPv6 headers
Packet buffer memory: 54MB

IEEE Compliance

802.1AB LLDP
802.1ag Connectivity fault Management
802.1D Bridging, STP
802.1p L2 Prioritization
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP
802.1s MSTP
802.1w RSTP
802.1X Network Access Control
802.3ab Gigabit Ethernet (1000BASE-T)
802.3ac Frame Extensions for VLAN Tagging
802.3ad Link Aggregation with LACP
802.3ae 10 Gigabit Ethernet (10GBASE-X)
802.3ba 40 Gigabit Ethernet (40GBase-SR4, 40GBase-CR4, 40GBase-LR4) on optical ports
802.3u Fast Ethernet (100BASE-TX) on mgmt ports
802.3x Flow Control
802.3z Gigabit Ethernet (1000BASE-X)
ANSI/TIA-1057 LLDP-MED
Force10 PVST+
MTU 12,000 bytes

RFC and I-D Compliance

General Internet Protocols

768 UDP
793 TCP
854 Telnet
959 FTP

General IPv4 Protocols

791 IPv4
792 ICMP
826 ARP
1027 Proxy ARP
1035 DNS (client)
1042 Ethernet Transmission
1191 Path MTU Discovery
1305 NTPv3
1519 CIDR
1542 BOOTP (relay)

General IPv6 Protocols

1981 Path MTU Discovery (partial)
2460 IPv6
2461 Neighbor Discovery (partial)
2462 Stateless Address Autoconfiguration (partial)

RIP

1058 RIPv1
2453 RIPv2

OSPF

2154 MD5
1587 NSSA
2328 OSPFv2
2370 Opaque LSA

BGP

1997 Communities
2385 MD5
2439 Route Flap Damping
2796 Route Reflection
2842 Capabilities
2858 Multiprotocol Extensions
2918 Route Refresh
3065 Confederations
4360 Extended Communities
4893 4-byte ASN
5396 4-byte ASN representations
draft-ietf-idr-bgp4-20 BGPv4
draft-ietf-idr-restart-06 Graceful Restart
draft-michaelson-4byte-as-representation-05
4-byte ASN Representation (partial)
draft-ietf-idr-add-paths-04.txt ADD PATH

Multicast

1112 IGMPv1
2236 IGMPv2
3376 IGMPv3
draft-ietf-pim-sm-v2-new-05 PIM-SM

Network Management

1155 SMIv1
1156 Internet MIB
1157 SNMPv1
1212 Concise MIB Definitions
1215 SNMP Traps
1493 Bridges MIB
1850 OSPFv2 MIB
1901 Community-based SNMPv2
2011 IP MIB
2012 TCP MIB
2013 UDP MIB
2024 DLSw MIB
2096 IP Forwarding Table MIB
2570 SNMPv3
2571 Management Frameworks
2572 Message Processing and Dispatching
2574 SNMPv3 USM
2575 SNMPv3 VACM
2576 Coexistence Between SNMPv1/v2/v3
2578 SMIv2
2579 Textual Conventions for SMIv2
2580 Conformance Statements for SMIv2
2618 RADIUS Authentication MIB
2665 Ethernet-like Interfaces MIB
2674 Extended Bridge MIB
2787 VRRP MIB
2819 RMON MIB (groups 1, 2, 3, 9)
2863 Interfaces MIB
2865 RADIUS
3273 RMON High Capacity MIB
3416 SNMPv2
3418 SNMP MIB
3434 RMON High Capacity Alarm MIB
3580 802.1X with RADIUS
5060 PIM MIB
ANSI/TIA-1057 LLDP-MED MIB
draft-grant-tacacs-02 TACACS+
draft-ietf-idr-bgp4-mib-06 BGP MIBv1
IEEE 802.1AB LLDP MIB
IEEE 802.1AB LLDP DOT1 MIB
IEEE 802.1AB LLDP DOT3 MIB
ruzin-mstp-mib-02 MSTP MIB (traps)
sFlow.org sFlowv5
sFlow.org sFlowv5 MIB (version 1.3)
FORCE10-BGP4-V2-MIB Force10 BGP MIB
(draft-ietf-idr-bgp4-mibv2-05)
FORCE10-IF-EXTENSION-MIB
FORCE10-LINKAGG-MIB
FORCE10-COPY-CONFIG-MIB
FORCE10-MON-MIB
FORCE10-PRODUCTS-MIB
FORCE10-SS-CHASSIS-MIB
FORCE10-SMI
FORCE10-SYSTEM-COMPONENT-MIB
FORCE10-TC-MIB
FORCE10-TRAP-ALARM-MIB
FORCE10-FORWARDINGPLANE-STATS-MIB

Regulatory Compliance

Safety

UL/CSA 60950-1, Second Edition
EN 60950-1, Second Edition
IEC 60950-1, Second Edition Including all National Deviations and Group Differences
EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide
EN 60825-2 Safety of Laser Products Part 2: Safety of Optical Fibre Communication Systems
FDA Regulation 21 CFR 1040.10 and 1040.11

Emissions

Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
Canada: ICES-003, Issue-4, Class A
Europe: EN 55022: 2006+A1:2007 (CISPR 22: 2006), Class A
Japan: VCCI V3/2009 Class A
USA: FCC CFR 47 Part 15, Subpart B:2009, Class A

Immunity

EN 300 386 V1.4.1:2008 EMC for Network Equipment
EN 55024: 1998 + A1: 2001 + A2: 2003
EN 61000-3-2: Harmonic Current Emissions
EN 61000-3-3: Voltage Fluctuations and Flicker
EN 61000-4-2: ESD
EN 61000-4-3: Radiated Immunity
EN 61000-4-4: EFT
EN 61000-4-5: Surge
EN 61000-4-6: Low Frequency Conducted Immunity

RoHS

All Z-Series components are EU RoHS compliant.

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