



Dell Networking Z9000

Data center core fabric switch

High-density 32-port 40GbE core router/switch in 2RU form factor; line rate, non-blocking, low-latency and lower power, enabling a greener, faster data center; feature-rich Dell Networking OS.

Highly-available, high-performance Active Fabric spine

The Dell Networking Z9000 is a high-performance, efficient switch-router product designed to meet the requirements for high density 10/40GbE aggregation in a data center core network. The Z9000 switch is designed to address the East/West traffic patterns of modern data centers, providing higher performance and bandwidth across the data center for server to server communications. The Z9000 fabric switch can support 32 ports of 40GbE QSFP+ or 128 ports of 10GbE SFP+ realized through breakout cables. Supporting a full suite of Ethernet switching and routing protocols in the hardened Dell Networking OS, the Z9000 fabric switch can enable an Active Fabric™ via Layer 2 or Layer 3 protocols.

An Active Fabric design with Z9000 switches can be built out to create scalable, high-performance 10/40GbE data center networks. The resiliency of an Active Fabric is superior to legacy, centralized core architectures, since the failure of a single node within a 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 required in a centralized design.

The Z9000 is supported with Active Fabric Manager (AFM), which helps automate design and deployment of multi-tier fabrics. AFM helps customers manage multiple fabrics from a single console, enabling a unified view of the entire fabric, when combined with Dell OMNM and other management solutions. With AFM, over 25 templates can be customized for specific workload and deployment scenarios, easily delivering active-active L2 or L3 designs for 1/10/40G with Z9000 to rack (with top-of-rack switches including Dell S4810/S4820T, S6000) and blade infrastructures (including Dell MXL).

Key applications

- Containerized data centers and prover-hosted data centers
- Enterprise DC core aggregating 10/40GbE, cloud computing, high-performance cores
- High-performance SDN/OpenFlow 1.0 enabled with ability to inter-operate with industry standard OpenFlow controllers

Key features

- 2RU high-density 10/40GbE fabric/core switch with 32 x 40GbE ports expandable to 128 x 10GbE ports using QSFP+ to SFP+ breakout cables
- 2.5Tbps (full-duplex) non-blocking, fabric delivers line-rate performance under full load
- Virtual link trunking (VLT) and enhanced VLT for layer 2 multipathing
- Modular Dell Networking OS software delivers inherent stability as well as advanced monitoring and serviceability functions
- Supported with Active Fabric design and Active Fabric Manager to reduce design, configuration and management for active/active deployments
- Total aggregated packet buffer memory of 54MB for line-rate processing
- 128 link aggregation groups with up to eight members per group, using advanced hashing with random seed values
- Reversible front-to-back or back-to-front airflow
- Supports jumbo frames for high-end server connectivity
- Redundant, hot-swappable power supplies and fans
- Low power consumption
- Supports OpenFlow 1.0 in hybrid mode
- Supports new QSFP+ PSM4, SR and ESR transceiver/cables

High-performance,
efficient fabric switch
for modern data center
traffic.

Specifications: Z9000 data center core switch

Dell SKU description

Product

Z9000, 32 x 40GbE QSFP+, 1 x AC PSU, 4 x Fans, I/O Panel to PSU Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x AC PSU, 4 x Fans, PSU to I/O Panel Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x DC PSU, 4 x Fans, I/O Panel to PSU Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x DC PSU, 4 x Fans, PSU to I/O Panel Airflow

Redundant power supply

Z9000, AC Power Supply, I/O Panel to PSU Airflow
 Z9000, AC Power Supply, PSU to I/O Panel Airflow
 Z9000, DC Power Supply, I/O Panel to PSU Airflow
 Z9000, DC Power Supply, PSU to I/O Panel Airflow

Optics

Transceiver, QSFP+, 40GbE, SR Optics, 850nm Wavelength, 100-150m Reach on OM3/OM4
 Transceiver, QSFP+, 40GbE, ESR Optics
 Transceiver, QSFP+, 40GbE PSM4 (2km reach), 1m, 5m, 15m
 Transceiver, QSFP+, 40GbE, LR4, 10Krm reach

Cables

Cable, 40GbE QSFP+, Active Fiber Optic, 10m, 50m
 Cable, 40GbE QSFP+, Direct Attach Cable, 0.5m, 1m, 3m, 5m, 7m
 Cable, 40GbE MTP to 4xLC Optical Breakout Cable, 1m, 3m, 5m, 7m (optics not included)
 Cable, 40GbE QSFP+ to 4xSFP+, Direct Attach Breakout Cable, 0.5m, 1m, 3m, 5m, 7m
 Cable, 40GbE MTP Fiber over OM3, 1m, 3m, 5m, 7m, 10m, 25m, 50m, (75m and 100m in 2014)
 Cable Management Kit, Z9000 MTP to LC (1RU 48-port LC)

Software

Dell Networking OS Software, Layer3

Note: In-field change of airflow direction not supported.

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 x 17.32 x 24" (8.8 x 44 x 61 cm) (H x W x D)
 Weight: 39 lbs (1 power supply, 4 fan trays)
 Power supply: 100-240V AC 50/60 Hz, -40 to -60V DC
 Max. thermal output: 2692 BTU/h
 Max. current draw per system:
 8A at 100/120V AC, 4A at 200/240V AC
 16.5A at -48V DC
 Max. power consumption: 789W
 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°F to 158°F (-40°C to 70°C)
 Storage humidity: 5 to 95% (RH), non-condensing
 Reliability: MTBF 135,744 hours

Redundancy

Hot swappable redundant power
 Hot swappable redundant fans

Performance

MAC addresses: 128K
 IPv4 routes: 16K
 IPv6 routes: 8K (shared cam space with IPv4)
 Switch fabric capacity: 2.56Tbps (full-duplex)
 Forwarding capacity: 198pps
 Queues per port: 8 COS queues
 L2 VLANs: 4096
 ACLs: 8K ingress, 4k egress
 LAGs: 128 with up to 8 members per LAG
 LAG load balancing: Based on Layer 2, IPv4 headers
 Packet buffer memory: 54MB

IEEE compliance

802.1AB LLDp
 802.1D Bridging, STP
 802.1p L2 Prioritization
 802.1Q VLAN Tagging, Double VLAN Tagging, GVRP
 802.1s MSTP
 802.3ad Link Aggregation with LACP
 802.3ae 10 Gigabit Ethernet (10GBase-X)
 802.3ba 40 Gigabit Ethernet (40GBase-SR4, 40GBase-LR4) on optical ports
 802.3u Fast Ethernet (100BASE-TX) on manament ports

802.3x Flow Control
 Force10 PVST+
 MTU 12,000 bytes

RFC and I-D Compliance

General Internet protocols

768 UDP
 793 TCP
 854 Telnet
 959 FTP
 1321 MD5
 1350 TFTP
 2474 Differentiated Services
 3164 Syslog

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
 1812 Routers
 1858 IP Fragment Filtering
 2131 DHCP (relay)
 2338 VRRP
 3021 31-bit Prefixes
 3046 DHCP Option 82
 3069 Private VLAN
 3128 Tiny Fragment Attack Protection

RIP

1058 RIPv1
 2453 RIPv2

OSPF

2154 MD5	1587 NSSA
2328 OSPFv2	2370 Opaque LSA
2740 OSPFv3	4552 OSPFv3 IPsec authentication

BGP

1997 Communities
 2385 MD5
 2439 Route Flap Damping
 2796 Route Reflection
 2842 Capabilities
 2918 Route Refresh
 3065 Confederations
 4360 Extended Communities
 4893 4-byte ASN
 5396 4-byte ASN Representations
 4271 BGPv4
 2545 BGP.4 Multiprotocol Extensions for IPv6 Inter-Domain Routing

Draft Graceful Restart
 Draft BGP Add Path

Multicast

1112 IGMPv1	2236 IGMPv2
3376 IGMPv3	3569 SSM for IPv4
4541 IGMP Snooping	4601 PIM-SM

SDN/Openflow

Openflow standard 1.0 with extensions

Network management

1155 SMIv1
 1156 Internet MIB
 1157 SNMPv1

General IPv6 protocols

2460 IPv6	1858 IP Fragment Filtering
2461 Neighbor Discovery (partial)	2675 Jumbograms
2462 Stateless Address Autoconfiguration (partial)	3587 Global Unicast Address Format Addressing
2463 ICMPv6	4291 IPv6 Path MTU Discovery
4861 IPv6 Host for Management Port	1981

IS-IS

RFC 1195 Routing IPv4 with IS-IS
 RFC 5308 Routing IPv6 with IS-IS
 2461 Neighbor Discovery

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	
2096 IP Forwarding Table MIB	
2570 SNMPv3	
2571 Management Frameworks	
2572 Message Processing and Dispatching	
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	
5060 PIM MIB	
ANSI/TIA-1057	LLDP-MED MIB
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-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: 2008, Class A
 Canada: ICES-003:2004, Class A
 Europe: EN 55022: 2006+A1:2007 (CISPR 22: 2008), Class A
 Japan: VCCI V-3/2010.04 Class A
 USA: FCC CFR 47 Part 15, Subpart B:2011, 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.

Certifications

TAA (Trade Agreement Act) compliant models also available

