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 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
- VRF-lite enables sharing of networking infrastructure and provides L3 traffic isolation across tenants

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 1.0/1.3* enabled with ability to inter-operate with industry standard OpenFlow controllers

* Full 1.3 compliance available in early Q1CY15.
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, PSU to I/O Panel Airflow
Z9000, 32 x 40GBe QSFP+, 1 x DC PSU, 4 x Fans, 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

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, 100–150mm Reach on OMS/O4M
Transceiver, QSFP+, 40GBe, 56GBase-SR4, 1km, 1.25km, 10km, 100km

Software
Cable, 40GbE MTP Fiber over OM3, 1m, 3m, 5m, 7m, 10m, 25m
Cable, 40GbE QSFP+ to 4xSFP+, Direct Attach Breakout Cable,
Cable, 40GbE QSFP+, Active Fiber Optic, 10m, 50m
Transceiver, 40GbE PSM4 (2km reach), 1m, 5m, 15m
Transceiver, QSFP+, LRA, 10m reach

Cables
Cable, 40GbE QSFP+, Active Fiber Optic, 10m, 50m
Cable, 40GbE QSFP+, Direct Attach Cable, 0.5m, 3m, 5m, 7m
Cable, 40GbE MTP to 4xLC Optical Breakout Cable, 3m, 5m, 7m, 10m, 25m, 300m, 750m, 1000m
Cable Management Kit, Z9000 to MTP (LCU 1RU 48-port LC)

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 RJ45 console/management port with RS232 signaling
1 RJ45 10/100/1000 Base-T management port
1 x USB 2.0 type B console port
1 x USB 2.0 type B storage port
Size: 2.43 x 17.32 x 24" (61.7 x 44 x 61 cm)

Packet buffer memory: 54MB
L2 VLANs: 4096
Queues per port: 8 COS queues
Forwarding capacity: 1.9 Bpps
Switch fabric capacity: 2.56 Tbps (full-duplex)
IPv6 routes: 8K (shared cam space with IPv4)
IPv4 routes: 16K

Performance
MAC addresses: 128K
IPv4 routes: 16K
IPv6 routes: 8K shared cam space with IPv4
Switch fabric capacity: 2.56 Tbps (full-duplex)
Forwarding capacity: 1.9 Bpps
Packet buffer memory: 54MB

IEEE compliance
802.1AB LLDP
802.1aq Connectivity Fault Management
802.1B Bridging, STP
802.1D Spanning Tree
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP
802.1s MSTP
802.1w RSTP
802.1x Network Access Control
802.3abi Gigabit Ethernet (1000BASE-T)
802.3ac Link Aggregation with LACP
802.3ae 10 Gigabit Ethernet (10GBASE-X)
802.3af 40 Gigabit Ethernet (40GBASE-SR, 40GBASE-CR4)
on Optical Ports
802.3u Fast Ethernet (10BASE-T) on Management Ports
802.3x Flow Control

RFC and I-D Compliance

General Internet protocols
768 UDP
793 TCP

General IPv4 protocols
791 IPv4
792 ICMP
1027 Proxy ARP
1315 DNS (client)
1342 Ethernet
1390 Transmission
1395 TP+K
1519 CIDR
1542 BOOTP (relay)
1812 Requirements for IPv4 Routers
2243 IPv4 Stateless Address Autoconfiguration
2404 The Use of HMAC-SHA-1-96 within ESP and AH
3619 Radius and IPv6
3619 Radius support for EAP
3658 802.1X with RADIUS
3786 AES Cipher Algorithm in the SNMP User-Based Security Model
3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
4250, 4251, 4252, 4253, 4254, 4255 IPv6v2
4301 Security Architecture for IPv6
4303 ESP Protocol
4807 IPv6 Security Policy Dictionary

RIP
1058 RIPv2
1262 OSPF (v2/v3)
1378 BGP
8755 Communities
2545 BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
2439 Route Flap Damping
2767 Route Reflector
2842 Capabilities
2858 Multiprotocol Extensions
2918 Route Reflection
3065 Confederations
3463 Extended Communities
4083 4-byte ASNs
4593 4-byte ASNs, 4-byte ASNs, 4-byte ASNs, 4-byte ASNs
4850 4-byte ASNs, 4-byte ASNs, 4-byte ASNs, 4-byte ASNs

IPv6
1120 IGPv6
2236 IGPv6
3376 IGPv6
5838 MD5
5912 Sha-256
2832 Authentication/Confidentiality for OSPFv3
3401 Security Protocol for IPv6
5340 OSPF for IPv6

Security
2453 RIPv2
4552 Authentication/Confidentiality for OSPFv3
4301 Security Protocol for IPv6
4303 ESP Protocol
4807 IPv6 Security Policy Dictionary

Multicast
112 IGPv6
2236 IGPv6
3376 IGPv6

Data center bridging
802.1Qbb Priority-Based Flow Control
802.1Qbb Enhanced Transmission Selection (ETS)
802.1Qbb Frame Extension (iSCSI, FCoE)

Network management
1155 SNMPv1
1157 SNMPv1
1212 Concise MIB Definitions
1213 MIB II Definitions

Network management
128 FINE-PROTOCOL-STAT-MIB
2388 MIB for IPv6
2596 Assured Forwarding Header
2863 Assured Forwarding Headers
3410 SNMPv3
3411 SNMPv3 Management Framework
3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
3413 SNMP Applications
3414 User-based Security Model (USM) for SNMPv3
3415 VACM for SNMP
3416 SNMPv2
3417 Transport mappings for SNMP
3418 SNMPv2
3419 SNMPv3
3420 SNMPv3
3421 SNMPv3
3422 SNMPv3

Regulatory compliance

Safety
UL/CSA 60950-1, Second Edition
EN 60950-1, Second Edition
IEC 60950-1, Second Edition

Emissions
Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
Canada: ICES-003, Issue-4, Class A
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 S series components are EU RoHS compliant.

Certifications
Available with US Trade Agreements Act (TAA) compliant 8UG6 Host and Router Certified on Dell Networking OS 9.5 and greater
IPv6 Ready for both Host and Router
UCR DoA APL (core and distribution ALSAN switch)