



Force10

Dell Force10 Z9000

Data Center Core Switch

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 Dell Force10 Operating System (FTOS).

Highly available, high performance distributed core

The Dell Force10 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. The Z9000 switch 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. The Z9000 switch can be positioned as a Core switch or End-of-Row switch within a data center. The Z9000 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 be built out to create scalable, high performance 10/40GbE data center networks. A distributed control plane in a CLOS based leaf-spine architecture can be leveraged to build highly scalable data center switching fabric. The resiliency in a distributed core model is much improved compared to 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 rebook would be required in a centralized design.

Key applications

- Containerized Data Centers
- Provider Hosted Data Centers
- Cloud Computing Cores
- High performance Computing Cores
- Enterprise DC Core aggregating 10/40GbE

Key features

- 2RU high-density 10/40 GbE Aggregation/Core Switch with 32 x 40 GbE ports expandable to 128 x 10GbE ports using QSFP+ to SFP+ breakout cables
- 2.5 Tbps (full-duplex) non-blocking, 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
- Modular Force10 Operating System (FTOS) software delivers inherent stability as well as advanced monitoring and serviceability functions
- 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
- Low power consumption
- VLT (Virtual Link Trunking) and Enhanced VLT for layer 2 multipathing

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

Specifications: Z9000 Data Center Core Switch

Dell SKU description

Product

Z9000, 32 x 40GbE QSFP+, 1 x AC PSU, 4 x Fans, IO panel to PSU Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x AC PSU, 4 x Fans, PSU to IO panel Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x DC PSU, 4 x Fans, IO panel to PSU Airflow
 Z9000, 32 x 40GbE QSFP+, 1 x DC PSU, 4 x Fans, PSU to IO panel Airflow

Redundant Power Supply

Z9000, AC Power Supply, IO panel to PSU Airflow
 Z9000, AC Power Supply, PSU to IO panel Airflow
 Z9000, DC Power Supply, IO panel to PSU Airflow
 Z9000, DC Power Supply, PSU to IO panel Airflow

Optics

Transceiver, QSFP+, 40GbE, SR Optics, 850nm Wavelength, 100-150m Reach on OM3/OM4

Cables

Cable, 40GbE QSFP+, Active Fiber Optic, 10m
 Cable, 40GbE QSFP+, Active Fiber Optic, 50m
 Cable, 40GbE QSFP+, Direct Attach Cable, 1m
 Cable, 40GbE QSFP+, Direct Attach Cable, 5m
 Cable, 40GbE MTP to 4xLC 5M Optical Breakout Cable (optics not included)
 Cable, 40GbE QSFP+ to 4xSFP+ 5M Direct Attach Breakout Cable
 Cable Management Kit, Z9000 MTP to LC (1RU 48 port LC)

Software

Software, FTOS - Force10 Operating System 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 h x 17.32 w x 24" d (8.8 h x 44 w x 61 cm d)
 Weight: 39 lbs (1 power supply, 4 fan trays)
 Power supply: 100-240 VAC 50/60 Hz, -40 to -60 VDC
 Max. thermal output: 2692 BTU/h
 Max. current draw per system:
 8 A at 100/120 VAC, 4 A at 200/240 VAC
 16.5 A at -48VDC
 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
 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: 2.56 Tbps (full-duplex)
 Forwarding capacity: 1.9 Bpps
 Queues per port: 8 COS queues
 L2 VLANs: 4096
 Line-rate Layer 2 switching
 Line-rate Layer 3 routing
 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 LLDAP
 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 mgmt 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
 1542 BOOTP (relay)
 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

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

Network Management

1155 SMIv1
 1156 Internet MIB
 1157 SNMPv1

General IPv6 Protocols

2460 IPv6 1858 IP Fragment Filtering
 2461 Neighbor Discovery 2675 Jumbograms
 (partial) 3587 Global Unicast Address Format
 2462 Stateless Address 4291 Addressing
 Autoconfiguration (partial)
 2463 ICMPv6

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
 ANS/ITIA-1057 LLDAP-MED MIB
 draft-ietf-idr-bgp4-mib-06 BGP MIBv1
 IEEE 802.1AB LLDAP MIB
 IEEE 802.1AB LLDAP DOT1 MIB
 IEEE 802.1AB LLDAP 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.

© 2012 Dell, Inc. All rights reserved. Force10 Networks, Force10, C-Series, E-Series, Traverse, and TraverseEdge are registered trademarks and, FTOS, JumpStart, Open Automation, Open Cloud Networking, S-Series, ScriptStore, SmartScripts, SwitchLink, HyperLink and Z-Series are trademarks of Dell, Inc. All other company names are trademarks of their respective holders. Information in this document is subject to change without notice. Dell Inc. assumes no responsibility for any errors that may appear in this document.

Learn more at Dell.com/Networking

SS783_Dell_Force10_Z9000_090911_072512

