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); and hardware support for TRILL and DCB.

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 enable build out of massively scalable, high performance data center networks with 10/40 GbE ToR, 10/40 GbE End of Row and 40 GbE 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. Resiliency in a distributed core model is much improved compared to centralized core architectures as 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 would be required in a centralized design.

Key applications

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

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
- Data Center Bridging (DCB) hardware 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
- Low power consumption

> 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

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
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	LLDP
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 for management port)
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-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
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
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.

Learn more at Dell.com/Networking