DELL EMC NETWORKING POWERSWITCH Z9332F-ON SERIES SWITCH

High-performance, high-density open networking 400GbE multi rate aggregation switch

The Z9332F-ON 100/400GbE fixed switch comprises Dell EMC's latest disaggregated hardware and software data center networking solutions, providing state-of-the-art, high-density 100/400 GbE ports and a broad range of functionality to meet the growing demands of today's data center environment. These innovative, next-generation open networking high-density aggregation switches offer optimum flexibility and cost-effectiveness for the web 2.0, enterprise, mid-market and cloud service provider with demanding compute and storage traffic environments.

The compact PowerSwitch Z9332F-ON provides industry-leading density of either 32 ports of 400GbE in QSFP56-DD form factor or 128 ports of 100 or up to 144 ports of 10/25/50 (via breakout), in a 1RU design.

Using industry-leading hardware and a choice of Dell EMC's OS10 or select 3rd party network operating systems and tools, the Z9332F-ON switch incorporates multiple architectural features that optimize data center network flexibility, efficiency and availability, including IO panel to PSU airflow or PSU to IO panel airflow* for hot/ cold aisle environments, redundant, hot-swappable power supplies and fans and delivers non-blocking performance for workloads sensitive to packet loss. The compact Z9332F-ON model provides multi-rate speed, enabling denser footprints and simplifying migration to 400Gbps.

Priority-based flow control (PFC), data center bridge exchange (DCBX) and enhanced transmission selection (ETS) make the Z9332F-ON ideally suited for DCB environments.

Dell EMC PowerSwitch Z9332F-ON switches support the open source Open Network Install Environment (ONIE) for zero touch installation of Dell EMC's OS10 networking operating system, as well as of alternative network operating systems.

Key applications

- Organizations looking to enter the software-defined data center era with a choice of networking technologies designed to maximize flexibility
- High-density multi-rate 100/400GbE ToR server aggregation in high-performance data center environments at the desired fabric speed
- Small-scale Fabric implementation via the Z9332F-ON switch in leaf and spine along with S-Series 10/25/40/50/100GbE ToR switches enabling cost-effective aggregation of 100/400 uplinks
- High-density 10/25/40/50/100GbE ToR server access in high-performance data center environments

- Multi-functional 10/25/40/50/100/400GbE switching in High Performance Computing Clusters or other business-sensitive deployments requiring the highest bandwidth.
- iSCSI and FCOE deployment, including DCB converged lossless transactions

Key features

- 1RU high-density 100/400GbE aggregation switch with up to 32 ports of 400GbE (QSFP56-DD) or up to 128 ports of 100GbE or up to 144 ports of 10/25/50GbE (using breakout cable)
- Multi-rate 400GbE ports support 10/25/40/50/100GbE. 40GbE ports support 10/40GbE
- Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features, including OSPF and BGP routing support
- 25.6Tbps non-blocking (full duplex), switching fabric delivers line-rate performance under full load on Z9332F-ON
- L2 multipath support via Virtual Link Trunking (VLT) and Routed VLT support
- Support for OS10 Enterprise Edition
- Converged network support for DCB, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV support
- Z9332F-ON supports Routable RoCE to enable convergence of compute and storage on Active Fabric
- IO panel to PSU airflow or PSU to IO panel airflow* Redundant, hot-swappable power supplies and fans
- Supports the open source Open Network Install Environment (ONIE) for zero touch installation of alternate network operating systems
- Accelerated mounting kits reducing time and resources for switch rack installation
- Power-efficient operation up to 45ºC helping reduce cooling costs in temperature-constrained deployments

Key features with Dell EMC Networking OS10

- Consistent DevOps framework across compute, storage and networking elements
- Standard networking features, interfaces and scripting functions for legacy network operations integration
- Standards-based switching hardware abstraction via Switch Abstraction Interface (SAI)
- Pervasive, unrestricted developer environment via Control Plane Services (CPS)
- OS10 Enterprise Edition software enables Dell EMC layer 2 and 3 switching and routing protocols with integrated IP services, quality of service, manageability and automation features

- Leverage common open source tools and best practices (data models, commit rollbacks*)
- Increase VM Mobility region by stretching L2 VLAN within or across two DCs with unique VLT capabilities
- Scalable L2 and L3 Ethernet Switching with QoS, ACL and a full complement of standards based IPv4 and IPv6 features including OSPF, BGP and PBR
- Enhanced mirroring capabilities including local mirroring, Remote Port Mirroring (RPM), and Encapsulated Remote Port Mirroring (ERPM).
- Converged network support for Data Center Bridging, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV

* Roadmap

Product	Description
Z9332F-ON	Z9332F, 32x 400GbE QSFP56-DD, 2x AC PSU, Fan module, I/O Panel to PSU Airflow, OS10 Enterprise Edition Z9332F, 32x 400GbE QSFP56-DD, 2x AC PSU, Fan module, I/O Panel to PSU Airflow, NO-OS Z9332F, 32x 400GbE QSFP56-DD, 2x AC PSU, Fan module, I/O Panel to PSU Airflow, OS10 Enterprise Edition. TAA Certified
Redundant power supplies	AC Power Supply, IO Panel to PSU Airflow AC Power Supply, PSU to IO Panel Airflow DC Power Supply, IO Panel to PSU Airflow** DC Power Supply, PSU to IO Panel Airflow**
Fans	Fan module, IO Panel to PSU Airflow Fan module, PSU to IO Panel Airflow
Optics	Transceiver, 400GbE, SR8 QSFP56-DD*, ** Transceiver, 400GbE, SR4.2 QSFP56-DD*, ** Transceiver, 400GbE, DR4 QSFP56-DD*, ** Transceiver, 400GbE, FR4 QSFP56-DD*, ** Transceiver, 400GbE, LR4 QSFP56-DD*, ** Transceiver, 400GbE, ZR1 QSFP56-DD*, ** Transceiver, 100GbE, FR1 QSFP28** Transceiver, 100GbE, SR4 QSFP28 Transceiver, 100GbE, eSR4 QSFP28 Transceiver, 100GbE, SWDM4 QSFP28 (Duplex) Transceiver, 100GbE, BiDi QSFP28 (Duplex) Transceiver, 100GbE, BiDi-ON QSFP28 (Duplex)** Transceiver, 100GbE, PSM4 (500m) QSFP28 Transceiver, 100GbE, CWDM4 (2Km) QSFP28 Transceiver, 100GbE, LR4 QSFP28 Transceiver, 100GbE, ER4 Lite (30Km) QSFP28 Transceiver, 100GbE, DWDM2 (80Km) QSFP28 Transceiver, 40GbE, SR4 optic QSFP+ Transceiver, 40GbE, eSR4 optic QSFP+ Transceiver, 40GbE, BIDI optic QSFP+ (Duplex) Transceiver, 40GbE, SM4 optic QSFP+ (Duplex) Transceiver, 40GbE, LM4 optic QSFP+ (Duplex) Transceiver, 40GbE, PSM4 10Km, QSFP+ Transceiver, 40GbE, LR4 optic QSFP+ Transceiver, 40GbE, ER4 optics QSFP+
Cables	400GbE, QSFP56-DD to QSFP56-DD, active optical** 400GbE, QSFP56-DD to QSFP56-DD, passive DAC 400GbE, QSFP56-DD to QSFP56-DD, active DAC** 400GbE, 400GbE, 4x100GbE, QSFP56-DD to 4xQSFP28, active optical** 400GbE, 400GbE, 4x100GbE, QSFP56-DD to 4xQFSP28, passive DAC** 400GbE, 400GbE, 4x100GbE, QSFP56-DD to 4xQSFP28, active DAC** 100GbE, 4x25GbE, QSFP28 to 4xSFP28, passive DAC 100GbE, QSFP28 to QSFP28, active optical 100GbE, QSFP28 to QSFP28, passive DAC 100GbE, 2x50GbE, 2xQSFP to 2xQSFP28, passive DAC, breakout 40GbE, QSFP+ to QSFP+, active optical 40GbE, QSFP+ to QSFP+, passive DAC 40GbE, MTP to 4xLC optical breakout 40GbE, 4x10GbE, QSFP+ to 4xSFP+, passive DAC
Cable management	Cable Breakout solution for MTP12 to 4xLC and MTP24 to 2xMTP12 or 4xLC available. See separate Structured Cabling offering.

* Note that units configured in the PSU to IO airflow direction are subject to tighter restrictions for power consumptions on cables and optics used for 400GbE ports
** Available post launch

Physical
1 RJ45 console/management port with RS232 signaling
1 10/100/1000bT Ethernet for management
1 USB 2.0 type A storage port
32x400GbE QSFP56-DD ports + 2xSFP+ 10GbE

Chassis
Size: 1 RU, 1.73"h x 17.3"w x 25.8"d (4.38h x 43.8w x 6.56d)
Weight: 22 lbs (9.98 kg)

Environmental
Power supply: 200-240 VAC 50/60 Hz
Max Power consumption: 1500 Watts
Typ. Power consumption: 900 Watts
Max Operating specifications:
  AC Max. Operating specifications:
  Operating temperature: 32° to 113°F (0° to 45°C)
  Operating humidity: 10 to 90% (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
Fresh air Compliant to 45°C

Redundancy
Hot swappable redundant power (2 per switch)
Hot swappable redundant fans (7 per switch)

Performance
Switch fabric capacity: 25.6Tbps (full duplex)
Forwarding capacity: up to 5.1Tpps
Latency: sub 700ns
Packet buffer memory: 64MB
CPU memory: 32GB
MAC addresses: 8K
ARP table: 16K standalone, 8K shared
IPv4 routes: up to 400K (ALPM)
IPv6 routes: 300K
Multicast hosts: 1K
Link aggregation: 16 links per group, 128 groups
Multicast IPv6 Routes : 4K
MSTP: 64 instances
LAG load balancing: Based on layer 2, IPv4 or IPv6 headers

IEEE compliance
802.1AB	LLDP
TIA-1057	LLDP-MED
802.3ad	Link Aggregation
802.1D	Bridging, STP
802.1p	L2 Prioritization
802.1Q	VLAN Tagging
802.1Qbb	PFC
802.1Qaz	ETS
802.1X	Network Access Control
802.3ac	Frame Extensions for VLAN Tagging
802.3x	Flow Control

Layer2 Protocols
802.1D	Compatible
802.1p	L2 Prioritization
802.1Q	VLAN Tagging
802.1s	MSTP
802.1w	tRSTP
802.1t	RPVST+

VLT (Virtual Link Trunking)
VRRP Active/Active
RSTP & RPVST+
Port Mirroring on VLT ports
DCB, iSCSI, FSB on VLT
RPM/ERPM over VLT
VLT Minloss upgrade

RFC Compliance
768	UDP
793	TCP
854	Telnet
959	FTP
1321	MD5
1350	TFTP
2474	Differentiated Services
2698	Two Rate Three Color Marker
3164	Syslog
4254	SSHv2

General IPv4 Protocols
791	IPv4
792	ICMP
826	ARP
1027	Proxy ARP
1035	DNS (client)
1042	Ethernet Transmission
1191	Path MTU Discovery
1305	NTPv4
1519	CIDR
1812	Routers, Static Routes
1858	IP Fragment Filtering
2131	DHCPv4 (server and relay)
5798	VRRPv3
3021	31-bit Prefixes
1812	Requirements for IPv4 Routers
1918	Address Allocation for Private Internets
2474	Diffserv Field in IPv4 and Ipv6 Headers
2597	Assured Forwarding PHB Group
3195	Reliable Delivery for Syslog
3246	Expedited Forwarding PHB Group

VRF (BGPv4/v6)

General IPv6 Protocols
1981	Path MTU for IPv6
2372	IPv6 Addressing
2460	IPv6 Protocol Specification
2461	Neighbor Discovery
2462	Stateless Address AutoConfig
2711	IPv6 Router alert
2463	ICMPv6
2464	Ethernet Transmission
2675	IPv6 Jumbograms
3484	Default Address Selection
3493	Basic Socket Interface
4291	Addressing Architecture
3542	Advanced Sockets API
3587	Global Unicast Address Format
4291	IPv6 Addressing
2464	Transmission of IPv6 Packets over Ethernet Networks
2711	IPv6 Router Alert Option
4007	IPv6 Scoped Address Architecture
4213	Transition Mechanisms for IPv6 Hosts and Routers
3633	DHCPv6 Relay

OSPF
1745	OSPF/BGP interaction
1765	OSPF Database overflow
2154	OSPF with DigitalSignatures
2328	OSPFv2
5340	OSPF for IPv6 (OSPFv3)
2370	Opaque LSA
3101	OSPF NSSA
4552	OSPFv3 Authentication

Multicast
2236	IGMPv2 Snooping
3810	MLDv2 Snooping

Security
2865	RADIUS
3162	Radius and IPv6
3579	Radius support for EAP
3580	802.1X with RADIUS
3826	AES Cipher in SNMP
1492	TACACS (Authentication, Accounting)

Control Plane, VTY & SNMP ACLs
IP Access Control Lists

BGP
1997	Communities
2385	MD5
2439	Route Flap Damping
2796	Route Reflection
2918	Route Refresh
3065	Confederations
4271	BGP-4
2545	BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
2858	Multiprotocol Extensions
4360	Extended Communities
4893	4-byte ASN
5396	4-byte ASN Representation
5492	Capabilities Advertisement

draft-ietf-idr-add-paths-04.txt ADD PATH

Linux Distribution
Debian Linux version 8
Linux Kernel 3.16

Network Management and Monitoring
SNMPv1/2c
IPv4/IPv6 Management support (Telnet, FTP, TACACS, RADIUS, SSH, NTP)
Syslog
Port Mirroring
RPM/ERPM
3176 SFlow
Support Assist (Phone Home)
RestConf APIs (Layer 2 features)
XML Schema
CLI Commit (Scratchpad)
Uplink Failure Detection
Object Tracking
Bidirectional Forwarding Detection (BFD)

Automation
Control Plane Services APIs
Linux Utilities and Scripting Tools
CLI Automation (Multiline Alias)
Zero Touch Deployment (ZTD)
Ansible, Puppet, Chef, SaltStack

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Quality of Service
Prefix List
Route-Map
Rate Shaping (Egress)
Rate Policing (Ingress)
Scheduling Algorithms
    Round Robin
    Weighted Round Robin
    Deficit Round Robin
    Strict Priority
Weighted Random Early Detect

Data center bridging
802.1Qbb   Priority-Based Flow Control
802.1Qaz   Enhanced Transmission
   Selection (ETS)
Explicit Congestion Notification
Data Center Bridging eXchange (DCBx)
DCBx Application TLV (iSCSI, FCoE)
RoCEv2

Software Defined Networking
OpenFlow 1.3 (Native)

MIBS
IP MIB
IP Forward MIB
Host Resources MIB
IF MIB
LLDP EXT1/3 MIB
Entity MIB
LAG MIB
Dell-Vendor MIB
TCP MIB
UDP MIB
SNMPv2 MIB
ETHERLIKE-MIB
SFLOW-MIB
PFC-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:
   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 S Series components are EU RoHS compliant.

Certifications
Available with US Trade Agreements Act
   (TAA) compliance
USGv6 Host and Router Certified on Dell
   Networking OS 9.5 and greater
IPv6 Ready for both Host and Router
UCR DoD APL (core and distribution
ALSAN switch

Warranty
1 year return to depot constrained

IT Lifecycle Services for Networking

Experts, insights and ease
Our highly trained experts, with innovative tools and proven processes, help you transform your IT investments into strategic advantages.

Plan & Design
Let us analyze your multivendor environment and deliver a comprehensive report and action plan to build upon the existing network and improve performance.

Deploy & Integrate
Get new wired or wireless network technology installed and configured with ProDeploy. Reduce costs, save time, and get up and running fast.

Educate
Ensure your staff builds the right skills for long-term success. Get certified on Dell EMC Networking technology and learn how to increase performance and optimize infrastructure.

Manage & Support
Gain access to technical experts and quickly resolve multivendor networking challenges with ProSupport. Spend less time resolving network issues and more time innovating.

Optimize
Maximize performance for dynamic IT environments with Dell EMC Optimize. Benefit from in-depth predictive analysis, remote monitoring and a dedicated systems analyst for your network.

Retire
We can help you resell or retire excess hardware while meeting local regulatory guidelines and acting in an environmentally responsible way.

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