



Dell Networking S6000-ON

High-performance 10/40GbE top-of-rack switch open networking switch

High-density, 40GbE switch (32 ports of 40GbE or 96 ports of 10GbE¹ and eight ports of 40GbE) with high performance for top-, middle- and end-of- rack deployments.

The Dell Networking S6000-ON switch is the industry's first disaggregated hardware + software data center networking solution that empowers organizations to deploy modern workloads and applications designed for the open networking era.

Organizations that benefited from utilizing the disaggregation model with their data center server platforms can now leverage even greater benefits from Dell open networking solutions. Organizations can take advantage of this disaggregated networking model using industry-leading hardware and a choice of leading network operating systems to simplify data center fabric orchestration and automation and accelerate innovation.

These new offerings provide organizations the flexibility to transform their data centers and offer high-capacity network fabrics that are easy to deploy, cost-effective and provide a clear path to a software-defined data center.

The Dell S6000-ON supports the open source Open Network Install Environment (ONIE) for zero-touch installation of alternate network operating system including feature rich Dell Networking OS.

Data center optimized

The Dell Networking S Series S6000-ON 10/40GbE top-of-rack (ToR) switch is purpose-built for applications in high-performance data center and computing environments. Leveraging a non-blocking switching architecture, the S6000-ON delivers line-rate L2 and L3 forwarding capacity to maximize network performance. The compact S6000-ON design provides industry-leading density of 32 ports of 40GbE or 96 ports of 10GbE¹ and eight additional ports of 40GbE to conserve rack space while enabling denser footprints and simplifying migration to 40Gbps in the data center core. In addition, the S6000-ON incorporates multiple architectural features that optimize data center network flexibility, efficiency and availability, including redundant, hot-swappable power supplies and fans.

S6000-ON supports feature rich Dell Networking OS, VLT, network virtualization features such as VRF-lite, VXLAN Gateway, support for Dell Embedded Open Automation Framework.

- The S6000-ON is the only switch in the industry that provides customers unbiased approach to Network Virtualization by supporting both network centric virtualization method (VRF-lite) and Hypervisor centric virtualization method (VXLAN).

- The S6000-ON also supports Dell Networking's Embedded Open Automation Framework, which provides enhanced network automation and virtualization capabilities for virtual data center environments.
- The Open Automation Framework comprises a suite of interrelated network management tools that can be used together or independently to provide a network that is flexible, available and manageable while helping to reduce operational expenses.

Key applications

- High-density 10/40GbE ToR server aggregation in high-performance data center environments
- Large deployments in conjunction with the Dell Z9000, creating a non-blocking² 10/40GbE data center network design

Additional applications:

When running the Dell Networking OS9, Active Fabric™ implementation for large deployments in conjunction with the Dell Z Series, creating a flat, two-tier, non-blocking 10/40GbE data center network design

- Small-scale Active Fabric implementation via the S6000 switch in leaf and spine along with S Series 1/10GbE ToR switches enabling cost-effective aggregation of 10/40GbE uplinks
- iSCSI storage deployment including DCB converged lossless transactions
- High-performance SDN/OpenFlow 1.3 enabled with ability to inter-operate with industry standard OpenFlow controllers
- As a high speed VXLAN Layer 2 Gateway that connects the hypervisor based overlay networks with non-virtualized infrastructures

High-density 1RU 10/40GbE switch purpose-built for virtualized data centers

¹ Using QSFP+ breakout cables (available separately)
² Performance rated over aggregate operation and with average packet transfers greater than 200 bytes

Key Features - General

- 1RU high-density 10/40GbE ToR switch with 32 ports of 40GbE (QSFP+) or 96 ports of 10GbE¹ and eight ports of 40GbE with OS support
- Up to 2.56Tbps of switching I/O bandwidth (full-duplex) and available non-blocking² switching fabric delivering line-rate performance under full load² with sub 600ns latency
- Redundant, hot-swappable power supplies and fans
- I/O panel to power supply airflow or power supply to I/O panel airflow
- Supports the open source ONIE for zero-touch installation of alternate network operating systems
- Tool-less enterprise ReadyRails™ mounting kits reduce time and resources for switch rack installation
- Power-efficient operation up to 45°C helps reduce cooling costs in temperature-constrained deployments

Key features with Dell Networking OS9

Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features, including OSPF, BGP and PBR (Policy Based Routing) support

- VRF-lite enables sharing of networking infrastructure and provides L3 traffic isolation across tenants
- Increase VM Mobility region by stretching L2 VLAN within or across two DCs with unique VLT capabilities like Routed VLT, VLT Proxy Gateway
- VXLAN gateway functionality support for bridging the nonvirtualized and the virtualized overlay networks with line rate performance.
- Embedded Open Automation Framework adding automated configuration and provisioning capabilities to simplify the management of network environments. Supports Puppet agent for DevOps
- Modular Dell Networking OS software delivers inherent stability as well as enhanced monitoring and serviceability functions.
- Enhanced mirroring capabilities including 1:4 local mirroring, Remote Port Mirroring (RPM), and Encapsulated Remote Port Mirroring (ERPM). Rate shaping combined with flow based mirroring enables the user to analyze fine grained flows
- Jumbo frame support for large data transfers
- 128 link aggregation groups with up to 16 members per group, using enhanced hashing
- Converged network support for DCB, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV support
- Fastboot feature enables min-loss software upgrade on a standalone S6000 without VLT/stacking
- S6000-ON supports Routable RoCE to enable convergence of compute and storage on Active Fabric
- User port stacking support for up to six units

Specifications: S6000-ON 10/40GbE switch

Ordering information

S6000-ON

32-Port 40G QSFP+ Ports, Redundant AC PS, Fan Subsys, w/Airflow from I/O PNL to PS PNL

32-Port 40G QSFP+ Ports, Redundant AC PS, Fan Subsys, w/Airflow from PS PNL to I/O PNL

Power supplies

AC Power Supply, I/O Panel to PSU Airflow

AC Power Supply, PSU to I/O Panel Airflow

Fans

S6000 Fan Module, I/O Panel to PSU Airflow

S6000 Fan Module, PSU to I/O Panel Airflow

Optics

Transceiver, QSFP+, 40GbE, SR4 Optics, 850 nm

Wavelength, 100–150 m Reach on OM3/OM4

Transceiver, QSFP+, 40GbE, eSR4 Optics, 850 nm

Wavelength, 300–400 m Reach on OM3/OM4

Transceiver, QSFP+, 40GbE, LR4 Optics, 10 Km Reach on Single Mode Fiber

Transceiver, QSFP+, 40GbE, PSM4 Optics 1490 nm

Cables

Cable, 40GbE QSFP+, Active Fiber Optic, 10 m and 50 m
Cable, 40GbE QSFP+, Direct Attach Cable, for 0.5 m, 1 m, 3 m, 5 m, 7 m Cable, 40GbE MTP to 4 x LC 5 m Optical Breakout Cable (optics not included)

Cable, 40GbE QSFP+ to 4xSFP+ 5 m Direct Attach Breakout Cable

Physical

32 line-rate 40 Gigabit Ethernet QSFP+ ports

1 RJ45 console and management port with RS232 signaling

1 USB 2.0 type A storage port

1 USB 2.0 type B console port

Size: 1 RU, 1.71 x 17.08 x 18.11"

Weight: 16.12 lbs (7.32 kg)

Power supply: 100–240 VAC 50/60 Hz

Max. power consumption: 371 watts

Typ. power consumption: 220 watts

Max. operating specifications:

Operating temperature: 32°F to 113°F (0°C to 45°C)

Operating humidity: 10 to 90% (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

Fresh Air Compliant to 45°C

ReadyRails rack mounting system, no tools required



Redundancy

Hot swappable redundant power
Hot swappable redundant fans

Performance general

Switch I/O bandwidth: 2.56Tbs (full-duplex)
Forwarding rate: 1462Mpps
Latency: sub 600ns
Packet buffer memory: 12MB
CPU memory: 4GB

Performance with Dell Networking OS9

MAC addresses: 160K
ARP table 128K
IPv4 routes: 128K
IPv6 hosts: 24K
IPv6 routes: 32K
Multicast hosts: 8K
Link aggregation: 16 links per group, 128 groups
Layer 2 VLANs: 4K
MST: 510 instances
VRF-Lite: 510 instances
LAG load balancing: Based on layer 2, IPv4 or IPv6 headers
Latency: Sub 600ns
QOS data queues: 8
QOS control queues: 12
QOS: Default 768 entries scalable to 2.5K
Ingress ACL: 2.5K
Egress ACL: 1K

IEEE compliance with Dell Networking OS9

802.1AB LLDP
802.1D Bridging, STP
802.1p L2 Prioritization
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP
802.1Qbb PFC
802.1Qaz ETS
802.1s MSTP
802.1w RSTP
802.1X Network Access Control
802.3ab Gigabit Ethernet (1000BASE-T) with QSA or breakout
802.3ac Frame Extensions for VLAN Tagging
802.3ad Link Aggregation with LACP
802.3ae 10 Gigabit Ethernet (10GBase-X) with QSA
802.3ba 40 Gigabit Ethernet (40GBase-SR4, 40GBase-CR4, 40GBase-LR4) on optical ports
802.3u Fast Ethernet (100Base-TX) on mgmt ports
802.3x Flow Control
802.3z Gigabit Ethernet (1000Base-X) with QSA
ANSI/TIA-1057 LLDP-MED
Force10 PVST+
MTU 12,000 bytes

RFC and I-D compliance with Dell Networking OS9

General Internet protocols

768 UDP
793 TCP
854 Telnet
959 FTP

General IPv4 protocols

791 IPv4
792 ICMP
826 ARP
1027 Proxy ARP
1035 DNS (client)
1042 Ethernet
Transmission
1305 NTPv3
1519 CIDR
1542 BOOTP (relay)
1812 Requirements for IPv4 Routers
1918 Address Allocation for Private Internets
2474 Diffserv Field in IPv4 and Ipv6 Headers
2596 Assured Forwarding PHB Group
3164 BSD Syslog
3195 Reliable Delivery for Syslog
3246 Expedited Assured Forwarding
4364 VRF-Lite (IPv4 VRF with OSPF, BGP, IS-IS and V4 multicast)
5798 VRRP

General IPv6 protocols

1981 Path MTU Discovery Features
2460 Internet Protocol, Version 6 (IPv6) Specification
2464 Transmission of IPv6 Packets over Ethernet Networks
2710 Multicast Listener Discovery (MLD) for IPv6
2711 IPv6 Router Alert Option
3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
4007 IPv6 Scoped Address Architecture
4213 Basic Transition Mechanisms for IPv6 Hosts and Routers
4291 IPv6 Addressing Architecture
4443 ICMP for IPv6
4861 Neighbor Discovery for IPv6
4862 IPv6 Stateless Address Autoconfiguration
5095 Deprecation of Type 0 Routing Headers in IPv6
IPv6 Management support (telnet, FTP, TACACS, RADIUS, SSH, NTP)
VRF-Lite (IPv6 VRF with OSPFv3, BGPv6, IS-IS)

RIP

1058 RIPv1 2453 RIPv2

OSPF (v2/v3)

1587 NSSA 4552 Authentication/
2154 OSPF Digital Signatures Confidentiality for
2328 OSPFv2 OSPFv3
2370 Opaque LSA 5340 OSPF for IPv6

BGP

1997 Communities
2385 MD5

2545 BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
2439 Route Flap Damping
2796 Route Reflection
2842 Capabilities
2858 Multiprotocol Extensions
2918 Route Refresh
3065 Confederations
4360 Extended Communities
4893 4-byte ASN
5396 4-byte ASN representations
draft-ietf-idr-bgp4-20 BGPv4
draft-michaelson-4byte-as-representation-05 4-byte ASN Representation (partial)
draft-ietf-idr-add-paths-04.txt ADD PATH

Multicast

1112 IGMPv1
2236 IGMPv2
3376 IGMPv3
MSDP

Security

2404 The Use of HMACSHA-1-96 within ESP and AH
2865 RADIUS
3162 Radius and IPv6
3579 Radius support for EAP
3580 802.1X with RADIUS
3768 EAP
3826 AES Cipher Algorithm in the SNMP User Base Security Model
4250, 4251, 4252, 4253, 4254 SSHv2
4301 Security Architecture for IPsec
4302 IPsec Authentication Header
4303 ESP Protocol
4807 IPsecv Security Policy DB MIB
draft-ietf-pim-sm-v2-new-05 PIM-SMw

Data center bridging

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

Network management

1155 SMIv1
1157 SNMPv1
1212 Concise MIB Definitions
1215 SNMP Traps
1493 Bridges MIB
1850 OSPFv2 MIB
1901 Community-Based SNMPv2
2011 IP MIB
2096 IP Forwarding Table MIB
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
3273 RMON High Capacity MIB
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 SNMP MIB
3434 RMON High Capacity Alarm MIB
3584 Coexistence between SNMP v1, v2 and v3
4022 IP MIB
4087 IP Tunnel MIB
4113 UDP MIB
4133 Entity MIB
4292 MIB for IP
4293 MIB for IPv6 Textual Conventions
4502 RMONv2 (groups 1,2,3,9)
5060 PIM MIB
ANSI/TIA-1057 LLDP-MED MIB
Dell_ITA.Rev_1_1 MIB
draft-grant-tacacs-02 TACACS+
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
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-TC-MIB
FORCE10-TRAP-ALARM-MIB
FORCE10-FORWARDINGPLANE-STATS-MIB

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

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

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