



# Dell Networking S6000

High-performance 10/40GbE top-of-rack switch for virtualized data centers

High-density 40GbE switch (32 ports of 40GbE or 96 ports of 10GbE<sup>1</sup> and eight ports of 40GbE) with high performance for ToR, MoR and EoR deployments. The S6000 includes feature-rich Dell FTOS, VLT, and built-in network virtualization features with support for Dell Open Automation Framework.

## Data center optimized

The Dell Networking S Series S6000 is a 10/40GbE top-of-rack (ToR) switch purpose-built for applications in high-performance data center and computing environments. Leveraging a non-blocking, cut-through switching architecture, the S6000 delivers line-rate L2 and L3 forwarding capacity to maximize network performance. The compact S6000 design provides industry-leading density of 32 ports of 40GbE or 96 ports of 10GbE<sup>1</sup> and eight additional ports of 40GbE to conserve rack space while enabling denser footprints and simplifying migration to 40Gbps in the data center core. Priority-Based Flow Control (PFC), Data Center Bridge Exchange (DCBX) and Enhanced Transmission Selection (ETS) make the S6000 ideally suited for DCB environments. In addition, the S6000 incorporates multiple architectural features that optimize data center network flexibility, efficiency and availability, including redundant, hot-swappable power supplies and fans.

The S6000 also supports Dell Networking's Open Automation Framework, which provides enhanced network automation and virtualization capabilities for virtual data center environments. The Open Automation Framework comprises a suite of inter-related 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. Furthermore, built-in support for key network virtualization and software-defined networking initiatives help enable customers with future-ready agility, optimized for virtual services deployment and delivery.

## Key applications

- High-density 10/40GbE ToR server aggregation in high-performance data center environments
- Active Fabric™ implementation for large deployments in conjunction with the Dell Z9000, creating a flat, two-tier, non-blocking<sup>2</sup> 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 1.0 enabled with ability to inter-operate with industry standard OpenFlow controllers

## Key features

- 1RU high-density 10/40GbE ToR switch with 32 ports of 40GbE (QSFP+) or 96 ports of 10GbE<sup>1</sup> and eight ports of 40GbE
- Up to 2.56Tbps of switching I/O bandwidth (full-duplex) and available non-blocking<sup>2</sup> cut-through switching fabric delivering line-rate performance under full load<sup>2</sup> with sub 600ns latency
- 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
- L2 multipath support via Virtual Link Trunking (VLT) and multiple VLT (mVLT) multi-chassis link aggregation technology
- VXLAN gateway functionality<sup>3</sup> support for optimized virtual operation
- Open Automation Framework adding automated configuration and provisioning capabilities to simplify the management of network environments
- Modular Dell FTOS software delivering inherent stability as well as enhanced monitoring and serviceability functions
- Jumbo frame support for large data transfers
- 128 link aggregation groups with up to eight members per group, using enhanced hashing
- Redundant, hot-swappable power supplies and fans
- Converged network support for DCB, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV support
- I/O panel to power supply airflow or power supply to I/O panel airflow
- Tool-less enterprise ReadyRails™ mounting kits reducing time and resources for switch rack installation
- Power-efficient operation up to 45°C helping reduce cooling costs in temperature-constrained deployments
- Fastboot feature enables min-loss software upgrade on a standalone S6000 without VLT/stacking

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

<sup>1</sup> Using QSFP+ breakout cables (available separately)  
<sup>2</sup> Performance rated over aggregate operation and with average packet transfers greater than 200 bytes  
<sup>3</sup> Future feature

# Specifications: S6000 10/40GbE switch

## Ordering information

### S6000

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

### Power supplies

AC Power Supply, I/O Panel to PSU Airflow  
AC Power Supply, PSU to I/O Panel Airflow  
DC Power Supply, I/O Panel to PSU Airflow  
DC 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, 850nm Wavelength, 100–150m Reach on OM3/OM4  
Transceiver, QSFP+, 40GbE, eSR4 Optics, 850nm Wavelength, 300–400m Reach on OM3/OM4  
Transceiver, QSFP+, 40GbE, LR4 Optics, 10Km Reach on Single Mode Fiber  
Transceiver, QSFP+, 40GbE, PSM4 Optics 1490nm

### Cables

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

### Software

Software, FTOS: Dell Networking Operating System Software, S6000

**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 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

MAC addresses:	160K
ARP table	48K
IPv4 routes:	16K
IPv6 hosts:	24K
IPv6 routes:	8K
Multicast hosts:	8K
Switching I/O bandwidth	2.56Tbps (Full-Duplex)
Forwarding rate:	1462Mpps
Link aggregation:	8 links per group, 128 groups per stack
Layer 2 VLANs:	4K
MST:	64 instances
LAG load balancing:	Based on layer 2, IPv4 or IPv6 headers
Latency:	Sub 600ns
Packet buffer memory:	12MB
CPU memory:	4GB
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

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)  
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-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)  
ANSI/TIA-1057 LLDP-MED  
Force10 PVST+  
MTU 12,000 bytes

## RFC and I-D compliance

### General Internet protocols

768	UDP	854	Telnet
793	TCP	959	FTP

### General IPv4 protocols

791	IPv4	1042	Ethernet Transmission
792	ICMP	1305	NTPv3
826	ARP	1519	CIDR
1027	Proxy ARP	1542	BOOTP (relay)
1035	DNS (client)		

### General IPv6 protocols

1981	Path MTU Discovery	IPv6	Management
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Features

2460	(partial) IPv6		(telnet, FTP, TACACS, RADIUS, SSH, NTP)
2461	Neighbor Discovery (partial)	2462	Stateless Address Autoconfiguration (partial)

### RIP

1058	RIPv1	2453	RIPv2
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### OSPF

1587	NSSA	2328	OSPFv2
2154	MDS	2370	Opaque LSA

### BGP

1997	Communities
2385	MDS
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
draft-ietf-idr-add-paths-04.txt	ADDITIONAL PATHS

### Multicast

1112	IGMPv1
2236	IGMPv2
3376	IGMPv3

MSDP  
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	SMIPv1
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	SMIPv2

2579	Textual Conventions for SMIPv2
2580	Conformance Statements for SMIPv2
2618	RADIUS Authentication MIB
2665	Ethernet-Like Interfaces MIB
2674	Extended Bridge MIB
2787	RRRP 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
3580	802.1X with RADIUS
4133	Entity MIB
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)
SSHv2 RFC 4250, 4251, 4252, 4253, 4254	
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	

## 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

3 Future feature

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