Dell Networking S6000

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

High-density 40GbE switch (104 x 10GbE or 96 x 10GbE and 8 x 40GbE or 32 x 40GbE) with high performance for ToR, MoR and EoR deployments. The S6000 includes feature-rich Dell Networking OS, VLT, network virtualization features such as VRF-lite, VXLAN Gateway, support for Dell Embedded Open Automation Framework.

Data center optimized

The Dell Networking S Series S6000 10/40GbE switch is built for applications in high-performance data center and computing environments. Leveraging a non-blocking 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[1] 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 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 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 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.

Key features

- 1RU high-density 10/40GbE ToR switch with 32 ports of 40GbE (QSFP+) or 96 ports of 10GbE[1] and eight ports of 40GbE or 104 ports of 10GbE (with no provision for 40GbE ports)
- Up to 2.56Tbps of switching I/O bandwidth (full-duplex) and available non-blocking[2] cut-through switching fabric delivering line-rate performance under full load[3] 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, 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 non-virtualized 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 In-Box 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
- 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
- S6000 supports Routable RoCE to enable convergence of compute and storage on Active Fabric
- User port stacking support for up to six units

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 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 infrastructure

High-density 1RU 10/40GbE switch 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.

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
Transceiver, QSFP+, 40GbE, LM4 Optics. 2 fiber (1-TX, 1-RX, 4 wavelengths) MMF, 100m
Transceiver, QSFP+, 40GbE, PSM4-LR. QSFP+ to 4xSFP+LR MPO, SMF
Transceiver, QSFP+, 40GbE, QSFP+ to SFP+ adaptor, QSA. Supported SFP/+ modules supported include SFP+ (ER, LR, SR), SFP+ ZR and SFP (LX, SX, Copper SFP)

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 SM and 1M, 3M, 5M, 7M MM Optical Breakout Cable (optics not included)
Cable, 40GbE QSFP+ to 4xSFP+0.5M, 1M, 3M, 5M and 7M Direct Attach Breakout Cable
Cable, 40GbE QSFP+ to 4xRJ45 Megabit Breakout cable
Cable, 40GbE QSFP+ to 4 x 10GbE SFP+, Active Optical Breakout Cable
Cable, SFP+ to SFP+, 10GbE, Active Optical Cable, 15m

Cable management
S6000 Cable Breakout Kit, MTP to LC (1RU 48 or 64 port LC)

Software
Software: Dell Networking Operating System Software, S6000

Note: In-field change of airflow direction only supported when unit is powered down and all fan and power supply units are replaced with air flow moving in a uniform direction.

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: 20.1lbs (9.12kg), (16.12lbs (7.32kg) no PSUs)
Power supply: 100–240 VAC 50/60 Hz
Max. power consumption: 371 Watts
Typ. power consumption: 150 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 supplies
Hot swappable redundant fans

Performance
MAC addresses:	160K
ARP table	128K
IPv4 routes:	128K
IPv6 hosts:	64K
IPv6 routes:	64K
Multicast hosts:	8K
Switching I/O bandwidth	2.56Tbps (Full-Duplex)
Forwarding rate:	1462Mpps
Link aggregation:	16 links per group, 128 groups per stack
Layer 2 VLANs:	4K
MST:	64 instances
VRF-Lite:	511 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) 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

General Internet protocols
768	UDP	854	Telnet
793	TCP	959	FTP

General IPv4 protocols
791	IPv4	2474	Diffserv Field in IPv4 and Ipv6 Headers
792	ICMP		
826	ARP		
1027	Proxy ARP	2596	Assured Forwarding PHB Group
1035	DNS (client)		
1042	Ethernet Transmission	3164	BSD Syslog
1305	NTPv3	3195	Reliable Delivery for Syslog
1519	CIDR	3246	Expedited Assured Forwarding
1542	BOOTP (relay)		
1812	Requirements for IPv4 Routers	4364	VRF-Lite (IPv4 VRF with OSPF, BGP, IS-IS and v4 multicast)
1918	Address Allocation for Private Internets	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
2711	IPv6 Router Alert Option
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)

Security
2404	The Use of HMAC-SHA-1-96 within ESP and AH	4250, 4251, 4252, 4253, 4254	SSHv2
2865	RADIUS	4301	Security Architecture for IPSec
3162	Radius and IPv6		
3579	Radius support for EAP	4302	IPSec Authentication Header
3580	802.1X with RADIUS	4303	ESP Protocol
3768	EAP	4807	IPsecv Security Policy DB MIB
3826	AES Cipher Algorithm in the SNMP User Base Security Model		

RIP
1058	RIPv1	2453	RIPv2

OSPF (v2/v3)
1587	NSSA	4552	Authentication/ Confidentiality for OSPFv3
2154	OSPF Digital Signatures		
2328	OSPFv2		
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
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	Coexistance 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

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)

Learn More at Dell.com/Networking