



Force10

Dell Force10 S-Series

S60 high-performance 1/10 GbE access switch with Ultra-deep packet buffering

Non-blocking, line-rate switching and routing; stackable 48-port GbE switch with up to four 10 GbE ports in just 1RU; ultra-deep packet buffering; integrated network automation and virtualization technology with Dell Force10's Open Automation Framework; flexible, resilient and energy-efficient design.

S-Series S60 high-performance access switch

The Dell Force10 S-Series S60 is a high-performance 1/10 GbE access switch optimized for lowering operational costs at the network edge. The S60 answers the key challenges related to network congestion in data center ToR (Top-of-Rack) and service provider aggregation deployments. As the use of bursty applications and services continue to increase, huge spikes in network traffic that can cause network congestion and packet loss, also become more common. The S60 is equipped with the industry's largest packet buffer (1.25 GB), enabling it to deliver lower application latency and maintain predictable network performance even when faced with significant spikes in network traffic. Providing 48 line-rate GbE ports and up to four optional 10 GbE uplinks in just 1-RU, the S60 conserves valuable rack space. Further, the S60 design delivers unmatched configuration flexibility, high reliability, and power and cooling efficiency to reduce costs.

In addition to delivering a compact and scalable design, the S60 also supports the Dell Force10 Open Automation Framework, which provides advanced network automation and virtualization capabilities for virtual data center environments. The Open Automation Framework is comprised of a suite of inter-related network management tools that can be used together or independently to provide a network that is more flexible, available and manageable while reducing operational expenses.

Applications

- Line-rate 1/10 GbE server aggregation at the ToR in high-performance data center environments
- Design with the E-Series virtualized switch/router to create a flat, two-tier, non-blocking 1/10 GbE data center network design
- High-performance GbE aggregation, switching and routing in service provider edge or access networks

Key features

- The 1-RU S60 switch delivers 48 GbE access interfaces
 - 44 10/100/1000Base-T copper ports (RJ45)
 - 4 GbE ports that can be configured for fiber or copper (SFP)

- Plus, the S60 provides two optional high-speed slots that support any of the following uplink modules:
 - 2-port 10 GbE (SFP+ modules)
 - 2-port 12 Gbps stacking module
 - 1-port 24 Gbps stacking module
- Ultra-deep packet buffering (1.25 GB) eliminates congestion associated with bursty applications and services
- Energy-efficient, versatile design supports the lowest power consumption in its class as well as reversible front-to-back or back-to-front airflow
- High-capacity 176 Gbps switch fabric delivers line-rate, low-latency switching
- Highly scalable Layer-2 and Layer-3 switching with a full complement of standards-based IPv4 and IPv6 features for unicast and multicast applications
- Force10's Open Automation Framework adds VM-awareness as well as automated configuration and provisioning capabilities to simplify the management of virtual network environments
- Carrier-class, NEBS Level 3 Certified product design supports redundant, hot-swappable power supplies (AC or DC) and fans
- Stacking technology enables up to 12 S60 switches to be managed as a single unit
- Modular Dell Force10 Operating System (FTOS) software delivers inherent stability as well as advanced monitoring and serviceability functions
- VirtualView™ real-time network and application traffic monitoring for virtualized data centers
- Supports 9,252 byte jumbo frames

Wire-speed 1/10GbE
with Ultra-deep packet
buffering delivers
consistent & efficient
application performance

Specifications: S60 high-performance 1/10 GbE access switch

Ordering Information

Order Number	Description
225-2499	S60 switch*, AC, rear to front airflow
225-2450	S60 switch*, AC, front to rear airflow
225-2451	S60 switch*, DC, rear to front airflow
225-2500	S60 switch*, DC, front to rear airflow
331-5233	2-port 10 GbE high-speed uplink module (SFP+)
331-5235	2-port 12 Gigabit high-speed stacking module
331-5234	1-port 24 Gigabit high-speed stacking module
331-5261	4m 12 Gbps S60/S50/S25 stacking cable
331-5263	4m 24 Gbps S60/S50/S25 stacking cable
331-5264	60cm 12 Gbps S60/S50/S25 stacking cable
331-5265	60cm 24 Gbps S60/S50/S25 stacking cable
331-5231	Fan module with rear to front airflow
331-5232	Fan module with front to rear airflow
331-5225	AC power supply module
331-5226	AC power supply module, reverse airflow
331-5227	DC power supply module
331-5228	DC power supply module, reverse airflow
421-6955	Layer 3 FTOS software upgrade, latest version

SFP and SFP+ modules are ordered separately

*Each S60 switch includes 44 10/100/1000 Base-T ports, 4 GbE (SFP) interfaces and 2 high-speed slots, dual hot-swappable fans, and 1 AC or DC power supply module. The S60 I/O panel is considered the rear, the power supply panel is considered the front.

Physical

44 10/100/1000Base-T RJ45 ports
4 GbE SFP ports
1 RJ45 console/management port with RS232 signaling
2 USB 2.0 ports (1 USB A, 1 USB B)

Optional uplink modules: 2 line-rate ports 10 Gigabit Ethernet SFP+
2 line-rate ports 12 Gigabit Stacking
1 line-rate port 24 Gigabit Stacking

Size: 1 RU, 1.7 h x 17.32 w x 16.73" d (4.3 h x 44 w x 42.5 cm d)
Weight: 14.39 lbs (6.54 kg)
ISO 7779 A-weighted sound pressure level: 59.6 dBA at 73.4°F (23°C)
Power supply: 100–240 VAC 50/60 Hz, –44 to –60 VDC
Max. thermal output: 531 BTU/h
Max. current draw per system:
2 A at 100/120 VAC, 1 A at 200/240 VAC, 3.6 A at –48 VDC
Max. power consumption: 225 W
Max. operating specifications:
Operating temperature: 32° to 122°F (0° to 50°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 169,315 hours

Redundancy

Ring stacking topology with dynamic master election
Dual modular slots with up to four 10 GbE ports
Link aggregation across stack members
Hot swappable redundant AC or DC power
Hot swappable redundant fans

Performance

MAC addresses: 32K
IPv4 routes: 16K
IPv6 routes: 8K
Switch fabric capacity: 176 Gbps
Forwarding capacity: 132 Mpps
Link aggregation: 8 links per group, 128 groups per stack
Stacking capacity: 96 Gbps per stack member
Queues per port: 4 queues
VLANs: 4096
Line-rate Layer 2 switching: all protocols, including IPv4 and IPv6
Line-rate Layer 3 routing: IPv4 and IPv6
LAG load balancing: based on Layer 2, IPv4 or IPv6 headers
Switching latency: <9 µs for 64 byte frames
Packet buffer memory: 1.25GB
CPU memory: 2GB

IEEE Compliance

802.1AB LLDP
802.1ag Connectivity fault Management
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)
802.3ac Frame Extensions for VLAN Tagging
802.3ad Link Aggregation with LACP
802.3ae 10 Gigabit Ethernet (10GBASE-X)
802.3ak 10 Gigabit Ethernet (10GBASE-CX4)
802.3i Ethernet (10BASE-T)
802.3u Fast Ethernet (100BASE-TX)
802.3x Flow Control
802.3z Gigabit Ethernet (1000BASE-X)
ANSI/TIA-1057 LLDP-MED
Force10 PVST+
MTU 9,252 bytes

RFC and I-D Compliance

General Internet Protocols

768	UDP	1321	MD5
793	TCP	1350	TFTP
854	Telnet	2474	Differentiated Services
959	FTP	3164	Syslog

General IPv4 Protocols

791	IPv4	1812	Routers
792	ICMP	1858	IP Fragment Filtering
826	ARP	2131	DHCP (relay)
1027	Proxy ARP	2338	RRRP
1035	DNS (client)	3021	31-bit Prefixes
1042	Ethernet Transmission	3046	DHCP Option 82
1191	Path MTU Discovery	3069	Private VLAN
1305	NTv3	3128	Tiny Fragment Attack Protection
1519	CIDR		
1542	BOOTP (relay)		

General IPv6 Protocols

1981	Path MTU Discovery (partial)	2463	ICMPv6
		1858	IP Fragment Filtering
2460	IPv6	2675	Jumbograms
2461	Neighbor Discovery (partial)	3587	Global Unicast Address Format Addressing
2462	Stateless Address Autoconfiguration (partial)	4291	

RIP

1058 RIPv1

OSPF

2154 MD5
1587 NSSA
2328 OSPFv2
2370 Opaque LSA

BGP

1997 Communities
2385 MD5
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-ietf-idr-restart-06 Graceful Restart
draft-michaelson-4byte-as-representation-05 4-byte ASN Representation (partial)

Multicast

1112 IGMPv1
2236 IGMPv2
3376 IGMPv3
draft-ietf-pim-sm-v2-new-05 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
2024 DLsw MIB
2096 IP Forwarding Table MIB
2570 SNMPv3 Management Frameworks
2571 Message Processing and Dispatching
2572 SNMPv3 USM
2573 SNMPv3 VACM
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
3580 802.1X with RADIUS
5060 PIM MIB

ANSI/TIA-1057 LLDP-MED 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
rulin-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-MON-MIB

FORCE10-PRODUCTS-MIB

FORCE10-SS-CHASSIS-MIB

FORCE10-SMI

FORCE10-SYSTEM-COMPONENT-MIB

FORCE10-TC-MIB

FORCE10-TRAP-ALARM-MIB

Regulatory Compliance

Safety

UL/CSA 60950-1, 1st Edition
EN 60950-1, 1st Edition
IEC 60950-1, 1st 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 (CISPR 22: 2006), Class A
Japan: VCCI V3/2007.04 Class A
USA: FCC CFR 47 Part 15, Subpart B, Class A

Immunity

EN 300 386 V1.3.3: 2005 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.

