S-SERIES S60

THE FIRST TOP-OF-RACK GIGABIT ETHERNET SWITCH
PURPOSE-BUILT FOR VIRTUALIZED DATA CENTER ENVIRONMENTS

- Ultra-deep packet buffering and buffer “tunability” to handle bursty traffic in virtualized environments
- Line-rate switching of 48 GbE ports and up to four 10 GbE uplinks in 1RU
- Data center-optimized design delivers the best energy efficiency and configuration flexibility in its class

S60 Feature Highlights

- Line-rate switching of 48 GbE ports and up to four 10 GbE uplinks in a compact 1RU switch saves valuable rack space
- Industry-leading packet buffering and buffer allocation “tunability” to efficiently manage network congestion at the server I/O
- Supports Force10’s Open Automation Framework and JumpStart bare metal auto-configuration to simplify network scaling, management and provisioning
- Data center optimized design supports reversible airflow (front-to-back or back-to-front), as well as redundant hot-swappable power supply and fan units
- VirtualScale stacking technology enables up to 12 S60 switches to be managed as a single unit

Product Comparison: GbE ToR Switches

<table>
<thead>
<tr>
<th>Feature</th>
<th>Force10 S60</th>
<th>Cisco 4948-10GE</th>
<th>Extreme X450a</th>
<th>Brocade FX848</th>
<th>Juniper EX4200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total GbE ports</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Max. 10 GbE ports</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Forwarding Capacity (Mpps)</td>
<td>120</td>
<td>102</td>
<td>131</td>
<td>132</td>
<td>101</td>
</tr>
<tr>
<td>Deep Packet Buffering</td>
<td>1.25 GB</td>
<td>16 MB</td>
<td>Undisclosed</td>
<td>Undisclosed</td>
<td>9 MB</td>
</tr>
<tr>
<td>Open Automation</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Purpose-built for Data Center Operations</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(Reversible Airflow, Redundant PSUs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Power Consumption (Redundant Power)</td>
<td>225W</td>
<td>300W</td>
<td>659W</td>
<td>–225W</td>
<td>320W</td>
</tr>
<tr>
<td>Stacking (Depth)</td>
<td>12</td>
<td>No</td>
<td>4</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>JumpStart Auto-Config</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>In-Service S/W Upgrades</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Best-in-Class GbE/10 GbE ToR switching — at the Best Price

Open Automation
Responsive & Resilient Data Center Network

Flexible & Energy Efficient Design

Force10 Delivers Innovation at the Rack Edge
Building on Force10 Networks heritage of delivering innovative technology solutions for the data center, the company recently introduced the newest addition to its award-winning family of Ethernet switching and routing products. The S-Series S60 is the industry’s first GbE ToR (Top-of-Rack) switch that is purpose-built for dynamic data center environments.

The S60 answers the key ToR challenges related to the rapidly growing use of server virtualization as well as bursty streaming and storage applications. Delivering best-in-class packet buffering and buffer allocation “tunability” the S60 ensures predictable network performance at the rack edge, even when faced with huge spikes in network traffic. In addition, the S60 offers a compact and scalable design that provides 48 GbE ports and up to four optional 10 GbE uplinks in just 1-RU to conserve valuable rack space. Further, the S60 ToR GbE switch delivers configuration flexibility, high reliability and of course power and cooling efficiency to reduce data center costs.

S60 Feature Highlights

- Line-rate switching of 48 GbE ports and up to four 10 GbE uplinks in a compact 1RU switch saves valuable rack space
- Industry-leading packet buffering and buffer allocation “tunability” to efficiently manage network congestion at the server I/O
- Supports Force10’s Open Automation Framework and JumpStart bare metal auto-configuration to simplify network scaling, management and provisioning
- Data center optimized design supports reversible airflow (front-to-back or back-to-front), as well as redundant hot-swappable power supply and fan units
- VirtualScale stacking technology enables up to 12 S60 switches to be managed as a single unit
S-Series S60 Specifications

**Physical**
- 44 line-rate 10/100/1000Base-T 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:
- 2 line-rate ports to Gigabit Ethernet SFP+ modules
- 2 line-rate ports 12 Gigabit Stacking**
- 1 line-rate port 24 Gigabit Stacking**

- Size: 1 RU, 1.7 x 17.37 x 16.73 in (43.4 x 44 x 42.5 cm)
- 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 10/120 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
  - Storage temperature: –40° to 150°F (–40° to 70°C)
  - Storage humidity: 5 to 95% (RH), non-condensing
  - Reliability: MTBF 169,115 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: 12K
- IPv4 routes: 16K
- IPv6 routes: 8K
- Switch fabric capacity: 136 Gbps
- 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-IP6 headers
- Switching latency: <9 µs for 64 byte frames

**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)
- 802.3i Ethernet (10BASE-T)
- 802.3u Fast Ethernet (100BASE-TX)
- 802.3x Flow Control
- 802.3z Gigabit Ethernet (1000BASE-X)
- ANSITIA-1057 LLDP-MED

**Network Management**
- 1155 SMIv1
- 1156 Internet MIB
- 1157 SNMPv1
- 1212 Concise MIB Definitions
- 1215 SNMP Traps
- 1493 Bridges MIB
- 1850 OSFPv2 MIB
- 1901 Community-based SNMPv2
- 2011 IP MIB
- 2012 TCP MIB
- 2013 UDP MIB
- 2024 DLSw MIB
- 2096 IP Forwarding Table MIB
- 2570 SNMPv3
- 2571 Management Frameworks
- 2572 Message Processing and Dispatching
- 2574 SNMPv3 USM
- 2575 SNMPv3 VACM
- 2576 Coexistence Between SNMPv1/v2/v3
- 2578 SNMPv2
- 2579 Textual Conventions for SNMPv2
- 2580 Conformance Statements for SNMPv2
- 2581 RADIUS Authentication MIB
- 2582 Ethernet-like Interfaces MIB
- 2584 Extended Bridge MIB
- 2587 802.1X MIB (groups 1, 2, 3, 9)
- 2586 Interfaces MIB
- 2585 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-iyt-tacacs+-02 TACACS+
- draft-seth-ipv4-mib-06 BGP MIBv1
- IEEE 802.1AB LLDP MIB
- IEEE 802.1AB LLDP DOT1 MIB
- IEEE 802.1AB LLDP DOT1 MIB
- ruzin-mstp-mib-02 MISTP MIB (traps)
- sFlow.org sFlow5
- sflow.org sFlowv5 (version 1.3)

**Regulatory Compliance**

**Safety**
- UL/C CSA 60950-1, 1st Edition
- EN 60950-1, 1st Edition
- IEC 60950-1, 1st Edition Including all National Deviations and Group Differences
- 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

**RoHS**
- All S-Series components are EU RoHS compliant.

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