The Dell Networking S4048-ON switch is the industry’s latest data center networking solution empowering organizations to deploy modern workloads and applications designed for the open networking era.

Businesses who have made the transition away from monolithic proprietary mainframe systems to industry standard server platforms can now enjoy even greater benefits from Dell open networking platforms. By using industry-leading hardware and a choice of leading network operating systems to simplify data center fabric orchestration and automation, organizations can tailor their network to their unique requirements and accelerate innovation.

These new offerings provide the needed flexibility to transform data centers and offer high-capacity network fabrics that are cost-effective, easy to deploy and provide a clear path to a software-defined data center of the future without having to worry about vendor lock-in.

The Dell S4048-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.

Ultra-low-latency, data center optimized

The Dell Networking S-Series S4048-ON is an ultra-low-latency 10/40GbE top-of-rack (ToR) switch built for applications in high-performance data center and computing environments. Leveraging a non-blocking switching architecture, the S4048-ON delivers line-rate L2 and L3 forwarding capacity with ultra-low-latency to maximize network performance. The compact S4048-ON design provides industry-leading density of 48 dual-speed 1/10GbE (SFP+) ports as well as six 40GbE QSFP+ uplinks to conserve valuable rack space and simplify the migration to 40Gbps in the data center core (Each 40GbE QSFP+ uplink can also support four 10GbE ports with a breakout cable). In addition, the S4048-ON incorporates multiple architectural features that optimize data center network flexibility, efficiency and availability, including I/O panel to PSU airflow or PSU to I/O panel airflow for hot/cold aisle environments, and redundant, hot-swappable power supplies and fans.

S4048-ON supports feature-rich Dell Networking OS, VLT, network virtualization features such as VRF-lite, VXLAN Gateway and support for Dell Embedded Open Automation Framework.

- The S4048-ON is the only switch in the industry that provides customers an unbiased approach to Network Virtualization by supporting both network centric virtualization method (VRF-lite) and Hypervisor centric virtualization method (VXLAN).
- The S4048-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

Dynamic data centers ready to make the transition to software defined environments

- Ultra-low-latency 10GbE switching in HPC, high-speed trading or other business-sensitive deployments that require the highest bandwidth and lowest latency
- High-density 10GbE ToR server access in high-performance data center environments

Ultra-low-latency 10GbE top-of-rack switch optimized for data center efficiency.
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 S4048-ON 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

**Key features - General**

- 48 dual-speed 1/10GbE (SFP+) ports and six 40GbE (QSFP+) uplinks (totaling 72 10GbE ports with breakout cables) with OS support
- 1.44Tbps (full-duplex) non-blocking switching fabric delivers line-rate performance under full load with sub 700ns latency
- I/O panel to PSU airflow or PSU to I/O panel airflow
- Supports the open source ONIE for zero-touch installation of alternate network operating systems
- Redundant, hot-swappable power supplies and fans
- Low power consumption
- Support for multi-tenancy like VXLAN and NVGRE in hardware

**Specifications: S4048-ON 10/40-GbE top-of-rack open networking switch**

**Ordering information**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4048-ON</td>
<td>48x 10GBase SFP+, 1x QSFP+, 1x AC PSU, 2x Fans, PSU to I/O Panel Airflow</td>
</tr>
<tr>
<td>S4048, AC</td>
<td>Power Supply, PSU to I/O Panel Airflow</td>
</tr>
<tr>
<td>S4048, AC</td>
<td>Only PSU to I/O Panel Airflow</td>
</tr>
<tr>
<td>Redundant</td>
<td>Power supplies</td>
</tr>
<tr>
<td>fans</td>
<td>S4048 Fan Module, PSU to I/O Panel Airflow</td>
</tr>
<tr>
<td>S4048 Fan</td>
<td>Module, PSU to I/O Panel Airflow</td>
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</tr>
</tbody>
</table>

**Optics**

- Transceiver, SFP, 1000BASE-LX, 1310nm Wavelength, 10km reach
- Transceiver, SFP, 1GBase, TX, 1550nm Wavelength, 80km Reach, typical on 9/125um SMF
- Transceiver, SFP, 1000BASE-T
- Transceiver, SFP+, 10GBase, ER, 1550nm Wavelength, 40km reach
- Transceiver, 40GE QSFP+ Short Reach Optic, 850nm Wavelength, 100-150m reach on OM3/OM4
- Transceiver, 40GE QSFP+ ERL, 300m reach on OM3/OM4
- Transceiver, 40GE QSFP+ PSM4 with 3m pigtail to male MPO SMF, 2km reach
- Transceiver, 40GE QSFP+ PSM4 with 5m pigtail to male MPO SMF, 2km reach
- Transceiver, 40GE QSFP+ LR4, 10km SMF, 300m reach on OM3/OM4
- Transceiver, 40GE QSFP+ LR4, 10km SMF, 300m reach on OM3/OM4
- Transceiver, 40GE QSFP+ LR4, 10km SMF, 300m reach on OM3/OM4
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 3 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 10 meter QSFP+ to 10G Copper Twinax Direct Attach Cable, Requires QSFP+ Optics
- 25 meter QSFP+ to QSFP+ OM3 MTP Fiber Cable, Requires QSFP+ Optics
- 50 meter QSFP+ to QSFP+ OM3 MTP Fiber Cable, Requires QSFP+ Optics
- 75 meter QSFP+ to QSFP+ OM3 MTP Fiber Cable, Requires QSFP+ Optics
- 100 meter QSFP+ to QSFP+ OM3 MTP Fiber Cable, Requires QSFP+ Optics

**Cables**

- Cable, SFP+ to SFP+, 10GBase, Copper Twinax Direct Attach, 0.5 Meter
- Cable, SFP+ to SFP+, 10G, Copper Twinax Direct Attach, 1 Meter
- Cable, SFP+ to SFP+, 10GBase, Copper Twinax Direct Attach, 3 Meters
- Cable, SFP+ to SFP+, 10G, Copper Twinax Direct Attach, 5 Meters
- Cable, SFP+ to SFP+, 10GBase, Copper Twinax Direct Attach, 7 Meters
- Cable, SFP+ to SFP+, 10G, Copper Twinax Direct Attach, 0.5 Meter
- Cable, QSFP+ to QSFP+, 40GBase Passive Copper Direct Attach, 15m
- Cable, QSFP+ to QSFP+, 40GBase Passive Copper Direct Attach, 10GBase, Active Optical Cable, 15m
- Cable, QSFP+ to QSFP+, 40GBase Passive Copper Direct Attach, 0.5 Meter

**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 Route 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 S4048-ON without VLT/stacking
- S4048-ON supports Routable RoCE to enable convergence of compute and storage on Active Fabric
- User port stacking support for up to six units
Layer 2 VLANs: 4K
MSTP: 64 instances
VRF-Lite: 511 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 d2 Prioritization
802.1Q VLAN Tagging, Double VLAN Tagging, GVRP
802.1QbP FPC
802.1Qaz ETS
802.1s MSTP
802.1w RSTP
802.3X 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
802.3e 10 Gigabit Ethernet (10GBase-X) with QSA
802.3f 40 Gigabit Ethernet (40GBase-CR4, 40GBase-LR4) on 100GBase-SR4, SFP+ & breakout
802.3u Fast Ethernet (10Base-T) on mgmt ports
802.3x Flow Control
802.3z Gigabit Ethernet (1000Base-X) with QSA
ANSI/TIA-1057-107 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 VRPRP
General IPv6 protocols
1991 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
4295 IPv6 Addressing Architecture
4443 ICMP for IPv6
4861 Neighbor Discovery for IPv6
4862 IPv6 Stateless Address Autoconfiguration
5095 Deprecation of Type 0 OSCP 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/1
2154 OSPF Digital Signatures Confidentiality for
2328 OSPFv2 OSPFv3
2370 Opake USA 5340 OSPF for IPv6
BGP
1991 Communities
1992 MD5
2545 BGP-4 Multihop Extensions for IPv6 Inter-Domain Routing
2439 Route Rapp Damping
2796 Route Reflection
2842 Capabilities
2858 Multihop Protocol Extensions
2918 Route Refresh
3005 Confederations
4360 Extended Communities
4893 4-byte ASN
5396 4-byte ASN representations
draft-ietf-idr-bgp-4-20 BGPv4
draft-michaelson-4byte-as-representation-05
4-byte ASN Representation (partial)
draft-ietf-idr-add-paths-04.txt ADD PATH
Multicast
1112 IGMPv4
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
3786 EAP
4326 AES Cipher Algorithm in the SNMP User Base Security Model
4521, 4522, 4523, 4524 SSHv2
4531 Security Architecture for IPSec
4532 IPSec Authentication Header
4533 ESP Protocol
4807 IPv6 Security Policy DB MIB
draft-ietf-pim-sm-v2-new-05 PIM-SMw
Data center bridging
802.1Qaz Priority-Based Flow Control
802.1Qaz Enhanced Transmission Selection (ETS)
Data Center Bridging eXchange (DCBX)
DCBx Application TVU (IGSL, FCoE)
Network management
1155 SMIv1
1157 SMIv2
1212 Concise MIB Definitions
1215 SNMP Traps
1495 Bridges MIB
1850 OSPPv2 MIB
1901 Community-Based SNMPv2
2011 IP MIB
2096 IP Forwarding Table MIB
2578 SMv2
2579 Textual Conventions for SMv2
2580 Conformance Statements for SMv2
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)

Physical
48 10 Gigabit Ethernet SFP+ ports
6 40 Gigabit Ethernet SFP+ ports
1 RUAS console/management port with R5232 signaling
1 USB 2.0 Type A to support mass storage device
1 Micro-USB 2.0 type B Serial Console Port
Size: 1RU, 1.71 x 17.09 x 17.13” (4.35 x 43.4 x 43.5cm (H x W x D)
Weight: 18.52 lbs (8.4kg)
ISO 7779 A-weighted sound pressure level: 59.6 dBA at 73.4°F (23°C)
Power supply: 100–240V AC 50/60Hz
Max. thermal output: 799.64 BTU/h
Max. current draw per system: 2.344A/1595A at 100/120V AC,
1.145A/954A at 200/240V AC
Max. power consumption: 234.35 Watts (AC)
Typical power consumption: 153 Watts
Max. operating specifications:
Operating temperature: 32°F to 104°F (0°C to 40°C)
Operating humidity: 10 to 85% (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

Redundancy
Hot swappable redundant power
Hot swappable redundant fans

Performance general
Switch fabric capacity: 1.44Tbps (full-duplex)
720Gbps (half-duplex)
Latency: Sub 600ns
Packet buffer memory: 12MB
CPU memory: 2GB

Performance with Dell Networking OS9
OS9 Performance:
MAC addresses: 160K
ARP table 128K
IPv4 routes: 128K
IPv6 hosts: 64K
IPv6 routes: 64K
Multicast hosts: 8K
Link aggregation: 16 links per group, 128 groups