



# DELL EMC NETWORKING S4048-ON SWITCH

## 10/40GbE top-of-rack open networking switch

The Dell EMC Networking S4048-ON switch empowers organizations to deploy 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. Using industry-leading hardware and a choice of leading network operating systems to simplify data center fabric orchestration and automation, organizations can accelerate innovation by tailoring their network to their unique requirements.

These new offerings provide the needed flexibility to transform data centers. High-capacity network fabrics that are cost-effective and easy to deploy provide a clear path to a software-defined data center of the future, as well as freedom from vendor lock-in.

The Dell EMC S4048-ON supports the open source Open Network Install Environment (ONIE) for zero-touch installation of alternate network operating systems including feature-rich Dell Networking OS.

### Ultra-low-latency, data center optimized

The Dell EMC 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

When running the Dell Networking OS9, Active Fabric™ implementation for large deployments in conjunction with the Dell EMC Z-Series, creating a flat, two-tier, nonblocking 10/40GbE data center network design:

- 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 nonvirtualized infrastructure

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- 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 600ns 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

## Key features with Dell EMC 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 Routed 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 and a total stack bandwidth of up to 320Gbps bandwidth

Product	Description
<b>S4048-ON</b>	S4048, 48x 10GbE SFP+, 6x QSFP+, 1x AC PSU, 2x Fans, I/O Panel to PSU Airflow S4048, 48x 10GbE SFP+, 6x QSFP+, 1x AC PSU, 2x Fans, PSU to I/O Panel Airflow S4048, 48x 10GbE SFP+, 6x QSFP+, 2xDC PSU, 3x Fans, PSU to I/O Panel Airflow - NEBS Certified
<b>Redundant power supplies</b>	S4048, AC Power Supply, I/O Panel to PSU Airflow S4048, AC Power Supply, PSU to I/O Panel Airflow S4048, DC Power Supply, I/O Panel to PSU Airflow S4048, DC Power Supply, PSU to I/O Panel Airflow
<b>Fans</b>	S4048 Fan Module, I/O Panel to PSU Airflow S4048 Fan Module, PSU to I/O Panel Airflow
<b>Optics</b>	Transceiver, 40GbE, SR QSFP+, short reach Transceiver, 40GbE, ESR QSFP+, extended short reach Transceiver, 40GbE, LM4 QSFP+, universal duplex short reach Transceiver, 40GbE, SM4 QSFP+, duplex short reach Transceiver, 40GbE PSM4 QSFP+, parallel single mode long reach 1m, 5m, 15m tail Transceiver, 40GbE, PSM4-LR QSFP+, MPO to 4x SFP+ long reach Transceiver, 40GbE LR4 QSFP+, long reach Transceiver, 40GbE QSFP+ to SFP+/SFP Adapter (QSA) Transceiver, 10GbE, SR SFP+, short reach Transceiver, 10GbE, LR SFP+, long reach Transceiver, 10GbE, ER SFP+, extended reach Transceiver, 10GbE, ZR SFP+ extra extended reach Transceiver, 1GbE, SX SFP, short reach Transceiver, 1GbE, LX SFP, long reach Transceiver, 1GbE, ZX SFP, extended reach Transceiver, 1GbE, 1000Base-T SFP, copper
<b>Cables</b>	Optical Cable 40/100GbE, MTP Fiber Cables in 3, 5, 7, 10, 25, 50, 75, 100 meter Optical Cable 40GbE, QSFP+, AOC 10, 50 meter Optical Cable 40GbE, Breakout QSFP+ to 4xSFP+, Fiber Cables in 10 and 30 meter Cable 10GbE, SFP+, AOC 2, 3, 5, 7, 10, 15, 20 meter* 40GbE, QSFP+ to QSFP+, passive DAC 0.5, 1, 3, 5, 7, meters 40GbE, QSFP+, Breakout QSFP+ to 4x10GbE, passive DAC 0.5, 1, 3, 5, 7 meters 40GbE, QSFP+, Breakout QSFP+ to 4x1000base-T, passive DAC 1 meter 10GbE, SFP+ to SFP+, passive DAC 0.5, 1, 3, 5, 7 meters
<b>Supported operating systems</b>	Cumulus Linux OS Big Switch Networks Switch Light OS Dell Networking Operating System v9 Pluribus OS

## Technical specifications

### Physical

48 10 Gigabit Ethernet SFP+ ports  
6 40 Gigabit Ethernet QSFP+ ports  
1 RJ45 console/management port with RS232 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  
DC Power supply: -40.5V ~ -60V  
Max. thermal output: 799.64 BTU/h  
Max. current draw per system:  
2.344A/1953A at 100/120V AC,  
1.145A/0.954A at 200/240V AC  
Max. DC current : -40.5V/23.8A , -48V/19A ,  
-60V/15.6A.  
Max. power consumption: 234.35 Watts (AC),  
800 Watts (DC)  
Typical power consumption: 153 Watts  
Max. operating specifications:  
Operating temperature: 32°F to 113°F (0°C to 45°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)  
Forwarding Capacity: 1080 Mpps  
Latency: Sub 600ns  
Packet buffer memory: 12MB  
CPU memory: 4GB  
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  
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 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 GSA or breakout  
802.3ac Frame Extensions for VLAN Tagging  
802.3ad Link Aggregation with LACP  
802.3ae 10 Gigabit Ethernet (10GBase-X) with GSA  
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 GSA  
ANSI/TIA-1057 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 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)

#### RIP

1058 RIPv1 2453 RIPv2  
OSPF (v2/v3)  
1587 NSSA 4552 Authentication/  
2154 OSPF Digital Signatures Confidentiality for  
2328 OSPFv2 OSPFv3  
2370 Opaque LSA 5340 OSPF for IPv6

#### IS-IS

5301 Dynamic hostname exchange mechanism for IS-IS  
5302 Domain-wide prefix distribution with two-level IS-IS  
5303 Three way handshake for IS-IS point-to-point adjacencies  
5308 IS-IS 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

#### 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  
3768 EAP  
3826 AES Cipher Algorithm in the SNMP User Base Security Model

4250, 4251, 4252, 4253, 4254 SSHv2  
4301 Security Architecture for IPSec  
4302 IPSec Authentication Header  
4303 ESP Protocol  
4807 IPsecv Security Policy DB MIB  
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 Coexistence 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: 2009,  
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:2009, 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

Japan: VCCI V3/2009 Class A  
USA: FCC CFR 47 Part 15, Subpart B:2009, Class A

##### Warranty

1 Year Return to Depot

## IT Lifecycle Services for Networking

### Experts, insights and ease

Our highly trained experts, with innovative tools and proven processes, help you transform your IT investments into strategic advantages.



#### Plan & Design

Let us analyze your multivendor environment and deliver a comprehensive report and action plan to build upon the existing network and improve performance.



#### Deploy & Integrate

Get new wired or wireless network technology installed and configured with ProDeploy. Reduce costs, save time, and get up and running fast.



#### Educate

Ensure your staff builds the right skills for long-term success. Get certified on Dell EMC Networking technology and learn how to increase performance and optimize infrastructure.



#### Manage & Support

Gain access to technical experts and quickly resolve multivendor networking challenges with ProSupport. Spend less time resolving network issues and more time innovating.



#### Optimize

Maximize performance for dynamic IT environments with Dell EMC Optimize. Benefit from in-depth predictive analysis, remote monitoring and a dedicated systems analyst for your network.



#### Retire

We can help you resell or retire excess hardware while meeting local regulatory guidelines and acting in an environmentally responsible way.

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