

Dell EMC Networking Transceivers and Cables

Features and benefits

- Hot-swappable for simplified maintenance (no power- down required for installation or replacement)
- Some of the smallest and lowest-power 10GbE, 25GbE, 40GbE and 100GbE optical form factors in the industry
- Optical interoperability with SFP, SFP+ and selected QSFP modules
- Offers “pay-as-you-use” model for lower total cost of ownership (TCO) and ease of technology migration
- Reliability ensured by rigorous optics validation, qualification and certification
- Dell EMC product specification encoding feature allows Dell EMC Networking platforms to recognize certified and supported transceivers
- Guaranteed to work with Dell EMC Networking platforms under temperature and process variations with optimal performance

Dell EMC provides optical and cabling options for each Ethernet speed. Long- and short-range optical connectivity options are suited to a wide range of data center and campus applications. For the shortest connections, passive copper direct attach cable (DAC) is a simple and cost-effective solution.

1GbE solutions

1GbE SFP optical transceivers include short-reach (SX), long-reach (LX) and extended long-reach (ZX). A 1000BASE-T transceiver facilitates twisted-pair copper connections.

10GbE solutions

10GbE SFP+ optical transceivers include short-reach-lite (USR), short-reach (SR), long-reach (LR) and extended long-reach (ER and ZR). The 10GbE SFP+ receptacle will also recognize 1GbE SFP transceivers. An LRM transceiver supports links up to 220m over older OM1 and OM2 grade multimode fiber. A 10GBASE-T transceiver facilitates twisted-pair copper connections.

25GbE solutions

25GbE SFP28 optical transceivers include short-reach (SR) and long-reach (LR) variations. In 25GbE networking environments, the 100GbE ports on our Z9100-ON, S6100-ON, S4124-ON and S4148-ON switches can be broken out into four 25GbE lanes by use of either active optical (AOC) or passive copper (DAC) breakout cables.

40GbE solutions

40GbE (4×10GbE) QSFP+ optical transceivers include short-reach (SR4), long-reach (LR4) and extended long-reach (ER4). In many cases, 1GbE SFP and 10GbE SFP+ optics can be readily inserted, recognized, and utilized in the 40GbE QSFP+ receptacle through the use of a (QSA28) pluggable adapter. The adapter supports standard SFP and SFP+ optics in a QSFP+ socket providing backwards compatibility, while the 40GbE port for future bandwidth expansion. 40GbE QSFP+ ports support both optical and passive copper (DAC) breakout cables where the four 10GbE lanes are broken out into four individual 10GbE SFP+ interfaces. This solution can be deployed with a single active optical cable (AOC) with integrated QSFP+ and SFP+ transceivers or through the use of a passive fiber breakout cable.



SFP+ DAC



QSFP+ DAC



QSFP+ AOC



QSFP+ DAC breakout



SFP SFP+



QSFP+



QSFP+ MPO pigtail



SFP RJ45

Dell EMC enables cost-savings through the reuse of a legacy 10GbE fiber plant to support new 40GbE connections with our 40GbE duplex (multimode) fiber solutions. These solutions use wavelength multiplexing (SM4) and/or directional multiplexing (BIDI) to transport 40GbE over a single (multimode) fiber pair.

50GbE solutions

The 50GbE (consortium) specification utilizing half-populated QSFP28 modules. In 50GbE networking environments, the 100GbE ports on our Z9100-ON, S6100-ON, S4124-ON and S4148-ON switches can be broken out into two pairs of 2x25GbE through a QSFP28 to 2xQSFP28+ passive copper direct attach breakout cable (breakout DAC). (The QSFP28+ is a half-populated QSFP28 with 2x25GbE lanes.)

100GbE solutions

100GbE (4x25GbE) QSFP28 optical transceivers include short-reach (SR4), intermediate-reach (CWDM4), long-reach (LR4) and extended long-reach (ER4-lite). Standard 10GbE SFP+ and 25GbE SFP28 optics can be readily inserted, recognized, and utilized in the 100GbE QSFP28 receptacle through the use of a (QSA28) pluggable adapter. Although this reduces the effective throughput of the 100GbE port to 25GbE, it provides an immediate low-cost transceiver solution while preserving the option for later bandwidth expansion. 100GbE QSFP28 ports support both optical and passive copper breakout cables. Each of the four 25 GbE lanes can be broken out into four individual SFP28 interfaces. This solution can be deployed with a single active optical cable (AOC) with integrated QSFP28 and SFP28 transceivers or through the use of a passive fiber breakout cable/multiplexer. Dual 100GbE solutions

To maximize front panel density, some Dell EMC switches support QSFP28-DD (double density) modules which transport two 100GbE data streams while consuming the same face plate area as a single 100GbE QSFP28 module. For multimode fiber distances of 100 meters or less a pluggable transceiver module can be used. Point-to-point DACs and AOCs will facilitate shorter links as well as breakout applications.

Testing and warranties

Dell EMC Networking applies a rigorous process in qualifying and maintaining all optics to guarantee a strict adherence to IEEE standards, as well as stringent reliability testing to guarantee a consistent and trustworthy solution. All optics and cables released by Dell EMC Networking have passed a comprehensive optical analytics check as well as an extensive dynamic test suite. Dell-labeled optics are warranted alongside the Dell EMC switches in which they are deployed.

DELL EMC TRANSCEIVERS

Model	Connector type	Wavelength (s) (nm)	Transmission medium	Distance (max.)	Transmitter power (dBm)	Receiver power (dBm)	Power dissipation (max.; W)	Notes
Fast Ethernet (100 Mb/s) SFP transceivers								
SFP-100M-FX	duplex LC	1310	MMF FDDI MMF OM1 MMF OM2 MMF OM3 MMF OM4	2 km	-15.0 to -20.0	-31.0 to -14.0	1.1	operates up to 85°C
Gigabit Ethernet SFP transceivers								
SFP-1G-SX	duplex LC	850	MMF OM1 MMF OM2 MMF OM3 MMF OM4	300 m 550 m 550 m 550 m	-9.0 to -2.5	-18.0 to 0.0	0.5	operates up to 85°Ct
SFP-1G-LX	duplex LC	1310	SMF	10 km	-9.5 to -3.0	-19.0 to -3.0	1.1	operates up to 85°C
SFP-1G-ZX	duplex LC	1310	SMF	80 km	0.0 to +5.0	-22.0 to 0.0	1.1	
SFP-1G-BX10-U	simplex LC	1310	SMF	10 km	-9.0 to -3.0	-20.0 to -3.0	1.0	
SFP-1G-BX10-D	simplex LC	1490	SMF	10 km	-9.0 to -3.0	-20.0 to -3.0	1.0	
SFP-1G-T	RJ-45	N/A	CAT5	100 m	N/A	N/A	1.5	operates up to 85°C
8G Fibre Channel SFP+ transceivers								
SFP-8GFC-SW	duplex LC	850	MMF OM1 MMF OM2 MMF OM3 MMF OM4	21 m 50 m 120 m 150 m	-8.2 to -2.0	-14.2 to 0.0	0.8	may operate at lower optical power in 4GFC and 2GFC modes
SFP-8GFC-LW	duplex LC	1310	SMF	10 km	-8.4 to +0.5	-16.8 to +0.5	1.2	may operate at lower optical power in 4GFC and 2GFC modes
10-Gigabit Ethernet SFP+ transceivers								
SFP-10G-USR	duplex LC	850	MMF OM1 MMF OM2 MMF OM3 MMF OM4	10 m 25 m 100 m 150 m	-5.0 to -1.0	-11.1 to +0.5	1.0	
SFP-10G-SR	duplex LC	850	MMF FDDI MMF OM1 MMF OM2 MMF OM3 MMF OM4	26 m 33 m 82 m 300 m 400 m	-7.3 to -1.0	-9.9 to -1.0	1.0	
SFP-10G-LRM	duplex LC	1310	MMF FDDI MMF OM1 MMF OM2 MMF OM3 MMF OM4	220 m	-6.5 to -0.5	-10.5 to +0.5	1.0	

All transceivers operate at 0 to 70°C unless otherwise indicated.

Transceivers comply with appropriate standards and MSAs including IEEE 802.3ab, 802.3z, 802.3ae, 802.3ba, 802.3bm, 802.3by and 802.3cc.

DELL EMC TRANSCEIVERS

Model	Connector type	Wavelength (s) (nm)	Transmission medium	Distance (max.)	Transmitter power (dBm)	Receiver power (dBm)	Power dissipation (max.; W)	Notes
10-Gigabit Ethernet SFP+ transceivers								
SFP-10G-LR	duplex LC	1310	SMF	10 km	-8.2 to +0.5	-14.4 to +0.5	1.5	
SFP-10G-ER	duplex LC	1550	SMF	40 km	-4.7 to +4.0	-15.8 to -1.0	1.5	
SFP-10G-ZR	duplex LC	1550	SMF	80 km	0.0 to +4.0	-22.0 to -7.0	1.5	
SFP-10G-T-DWDM	duplex LC	1528.7 to 1568.7	SMF	80 km	-1.0 to +3.0	-18.0 to -7.0	1.7	tunable; assumes receiver OSNR > 26 dB
SFP-10G-BX10-U	simplex LC	1330	SMF	10 km	-8.0 to +0.5	-14.8 to +0.5	1.0	
SFP-10G-BX10-D	simplex LC	1270	SMF	10 km	-8.0 to +0.5	-14.8 to +0.5	1.0	
SFP-10G-T	RJ-45	N/A	CAT6A (10G) CAT5A (1G)	30 m 100 m	N/A	N/A	2.5	
16G Fibre Channel SFP+ transceivers								
SFP-16GFC-SW	duplex LC	850	MMF OM3 MMF OM4	100 m 125 m	-7.8 to 0.0	-13.5 to 0.0	1.0	
SFP-16GFC-LW	duplex LC	1310	SMF	10 km	-5.0 to +2.0	-15.0 to +2.0	1.2	operates up to 85°C
Quad 16G Fibre Channel QSFP+ transceivers								
QSFP-64GFC-SW4	MPO-12	850	MMF OM3 MMF OM4	100 m 125 m	-6 to +1.0 /lane	-13.0 to +2.4 /lane	2.5	compatible with 4 × 16GFC, 4 × 8GFC or 4 × 4GFC
25-Gigabit Ethernet SFP28 transceivers								
SFP28-25G-SR	duplex LC	850	MMF OM3 MMF OM4	70 m 100 m	-8.4 to +2.4	-10.3 to +2.4	1.2	capable of 10 ¹² BER over 30 m of OM3 or 40 m of OM4 when FEC is disabled
SFP28-25G-ESR	duplex LC	850	MMF OM3 MMF OM4	200 m 300 m	-8.4 to +2.4	-11.9 to +3.0	1.2	
SFP28-25G-LR	duplex LC	1310	SMF	10 km	-7.0 to +2.0	-11.3 to +2.0	1.5	
Quad 32G Fibre Channel QSFP28 transceivers								
Q28-128GFC-SW4	MPO-12	850	MMF OM3 MMF OM4	70 m 100 m	-8.5 to +2.4 /lane	-10.4 to +2.4 /lane	3.5	compatible with 4 × 32GFC or 4 × 16GFC breakout

All transceivers operate at 0 to 70°C unless otherwise indicated.

DELL EMC TRANSCEIVERS

Model	Connector type	Wavelength (s) (nm)	Transmission medium	Distance (max.)	Transmitter power (dBm)	Receiver power (dBm)	Power dissipation (max.; W)	Notes
40-Gigabit Ethernet QSFP+ transceivers								
QSFP-40G-SR4	MPO-12	850	MMF OM3 MMF OM4	100 m 125 m	-7.6 to +2.4 /lane	-9.0 to +2.4 /lane	1.5	can operate in 1 × 4 breakout mode
QSFP-40G-ESR4	MPO-12	850	MMF OM3 MMF OM4	300 m 400 m	-6.3 to -1.0 /lane	-13.3 to -1.0 /lane	1.5	can operate in 1 × 4 breakout mode
QSFP-40G-LM4	duplex LC	1271 1291 1311 1331	MMF OM3 MMF OM4 SMF	140 m 160 m 1 km	-7.0 to +4.3 /lane (MMF) -10.0 to +2.3 /lane (SMF)	-10.0 to +4.3 /lane (MMF) -13.7 to +2.3 /lane (SMF)	3.5	
QSFP-40G-SM4	duplex LC	850 880 910 940	MMF OM3 MMF OM4 MMF OM5	200 m 250 m 350 m	-7.6 to +3.0 /lane	-9.0 to +3.0 /lane	2.0	not compliant with SWDM4 40GbE MSA
QSFP-40G-BIDI	duplex LC	850 900	MMF OM3 MMF OM4 MMF OM5	100 m 150 m 200 m	-4.0 to +5.0 /lane	-7.5 to +5.0 /lane	3.5	+10°C minimum operating temperature
QSFP-40GPSM4-LR	MPO-12	1310	SMF	10 km	-5.5 to +1.5 /lane	-12.6 to +1.5 /lane	3.5	can operate in 1 × 4 breakout mode
QSFP-40G-LR4	duplex LC	1271 1291 1311 1331	SMF	10 km	-7.0 to +2.3 /lane	-13.7 to +2.3 /lane	3.5	
QSFP-40G-ER4	duplex LC	1271 1291 1311 1331	SMF	40 km	-2.7 to +4.5 /lane	-21.2 to -4.5 /lane	3.5	links longer than 30 km are considered engineered links
100-Gigabit Ethernet QSFP28 transceivers								
Q28-100G-SR4	MPO-12	850	MMF OM3 MMF OM4	70 m 100 m	-8.4 to +2.4 /lane	-10.3 to +2.4 /lane	3.5	can operate in 1 × 4 breakout mode; 10 ¹² BER over 30 m of OM3 or 40 m of OM4 when FEC disabled
Q28-100G-ESR4	MPO-12	850	MMF OM3 MMF OM4	170 m 300 m	-8.3 to +2.4 /lane	-10.3 to +2.4 /lane	3.5	can operate in 1 × 4 breakout mode

All transceivers operate at 0 to 70°C unless otherwise indicated.

DELL EMC TRANSCEIVERS

Model	Connector type	Wavelength (s) (nm)	Transmission medium	Distance (max.)	Transmitter power (dBm)	Receiver power (dBm)	Power dissipation (max.; W)	Notes
100-Gigabit Ethernet QSFP28 transceivers								
Q28-100G-BIDI	duplex LC	850 910	MMF OM3 MMF OM4 MMF OM5	70 m 100 m 150 m	-6.0 to +4.0 /lane	-7.9 to +4.0 /lane	3.5	
Q28-100G-SWDM4	duplex LC	850 880 910 940	MMF OM3 MMF OM4 MMF OM5	75 m 100 m 150 m	-7.5 to +3.4 /lane	-9.4 to +3.4 /lane	3.5	
Q28-100G-CWDM4	duplex LC	1271 1291 1311 1331	SMF	2 km	-6.5 to +2.5 /lane	-11.5 to +2.5 /lane	3.5	
Q28-100G-LR4	duplex LC	1296 1300 1305 1309	SMF	10 km	-4.3 to +4.5 /lane	-10.6 to +4.5 /lane	3.5	
Q28-100G-ER4-lite	duplex LC	1296 1300 1305 1309	SMF	40 km (with FEC)	-2.9 to +4.5 /lane	-20.9 to -4.9 /lane	4.5	specifications for use with FEC, max. distance is 30 km (Rx min. -16.9 dBm) without FEC
Q28-100G-DWDM2-xx	duplex LC	1530.33 to 1561.42	SMF	80 km	-11.0 to -8.0 /lane	-2.0 to +6.0 /lane	5.0	Use only with EDFA + dispersion compensator; OSNR ≥ 31 dB; center wavelength is on 100 GHz ITU grid
QSA-Q28-S28	“SFP+ or SFP28”	N/A	N/A	N/A	N/A	N/A	N/A	adaptor to use SFP+ or SFP28 modules in QSFP+ SFP28 receptacles
Dual 100-Gigabit Ethernet QSFP28-DD transceivers								
Q28DD-200G-2SR4	MPO-12DD	850	MMF OM3 MMF OM4	70 m 100 m	-8.4 to +2.4 /lane	10.3 to +2.4 /lane	5.0	MPO-12DD is a two-row double density MPO-12; capable of 10 ¹² BER over 30 m of OM3 or 40 m of OM4 when FEC is disabled

DELL EMC ACTIVE OPTICAL CABLES (AOC) AND DIRECT ATTACH CABLES (DAC)

Model	Available lengths (m)	Connection	Transmission medium	Power dissipation per end (max.; W)	Notes
10-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-SFP-10G-xM	0.5, 1, 2, 3, 5, 7	SFP+ to SFP+	copper		
AOC-SFP-10G-xM	2, 3, 5, 10, 15, 20	SFP+ to SFP+	optical	1.5	
25-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-SFP-25G-xM*	1, 2, 3, 5	SFP28 to SFP28	copper		1, 2, 3 m can operate without FEC
AOC-SFP-25G-xM*	7, 10, 15, 20	SFP28 to SFP28	optical	1.5	operates with FEC
40-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-QSFP-40G-xM	0.5, 1, 2, 3, 5, 7	QSFP+ to QSFP+	copper		
AOC-QSFP-40G-xM	3, 10, 50	QSFP+ to QSFP+	optical	1.5	
DAC-QSFP-4SFP-10G-xM	0.5, 1, 2, 3, 5, 7	QSFP+ to 4 × SFP+	copper		
AOC-QSFP-4SFP-10G-xM	10, 30	QSFP+ to 4 × SFP+	optical	1.5, 1.0	supports 4×10G or 4×1G
DAC-QSFP-4RJ45-1G-1M	1	QSFP+ to 4 × RJ-45	copper	1.5	active copper
Dual 40-Gigabit Ethernet Active Optical Cable					
AOC-Q28DD-2Q-40G-xM	7	QSFP28-DD to 2 × QSFP+	optical		
AOC-Q28DD-8SFP-10G-xM	7, 10	QSFP28-DD to 8 × SFP+	optical		
100-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-QSFP-100G-xM	0.5, 1, 2, 3, 5	QSFP28 to QSFP28	copper		
AOC-QSFP-100G-xM	3, 7, 10, 30	QSFP28 to QSFP28	optical	3.5	
DAC-QSFP-2QSFP28-50G-xM	1, 2, 3	QSFP28 to 2 × QSFP28†	copper		QSFP28† modules are half populated
DAC-QSFP-4SFP28-25G-xM	1, 2, 3	QSFP28 to 4 × SFP28	copper		
AOC-QSFP-4SFP28-25G-xM	10, 15, 30	QSFP28 to 4 × SFP28	optical	3.5, 1.5	
Dual 100-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-Q28DD-200G-xM	1, 2, 3	QSFP28-DD to QSFP28-DD	copper		
AOC-Q28DD-200G-xM	5, 10, 20	QSFP28-DD to QSFP28-DD	optical	5	
DAC-Q28DD-2Q28-100G-xM	1, 2, 3	QSFP28-DD to 2 × QSFP28	copper		
AOC-Q28DD-2Q28-100G-xM	5, 7, 15, 30	QSFP28-DD to 2 × QSFP28	optical	5.0, 3.5	

DELL EMC ACTIVE OPTICAL CABLES (AOC) AND DIRECT ATTACH CABLES (DAC)

Model	Available lengths (m)	Connection	Transmission medium	Power dissipation per end (max.; W)	Notes
Dual 100-Gigabit Ethernet Active Optical and Direct Attach Cable					
DAC-Q28DD-8S28-25G-xM	1, 2, 3	QSFP28-DD to 8 × SFP28	copper		
AOC-Q28DD-8S28-25G-xM	7, 10	QSFP28-DD to 8 × SFP28	optical	5.0, 1.2	

DELL EMC PASSIVE FIBER CABLES

Model	Available lengths (m)	Connection	Transmission medium	Notes
Passive optical cables				
CBL-MTP12-OM4-xM	1, 3, 5, 7, 10, 25	MPO-12 to MPO-12	MMF OM4	
CBL-LC-OM4-xM	1, 2, 3, 5, 10, 30	LC to LC	MMF OM4	
CBL-MTP12-4LC-OM4-xM	1, 3, 5, 7	MPO-12 to 4 × LC	MMF OM4	
CBL-MPO12-4LC-SMF-5M	5	MPO-12 to 4 × LC	SMF	
CBL-MPO12DD-2MPO12-OM4-xM	1, 3, 5, 7	MPO-12DD to 2 × MPO-12	MMF OM4	
CBL-MPO12DD-OM4-xM	1, 3, 5, 7	MPO-12DD to MPO-12DD	MMF OM4	
Breakout boxes				
64× breakout box OM4	1.5	16 × MPO-12 to 64 × LC	MMF OM4	
64× breakout box SMF	1.5	16 × MPO-12 to 64 × LC	SMF	

PRODUCT SUPPORT

10-GbE transceivers	SFP-10G-USR	SFP-10G-SR	SFP-10G-LRM	SFP-10G-LR	SFP-10G-ER	SFP-10G-ZR	SFP-10G-T-DWDM	SFP-10G-BX10	SFP-10G-T
Z9100		√		√	√	√	√	√	√
Z9264	√	√		√	√	√	√	√	√
Z9500		√		√	√	√	√	√	√
S6100		√		√	√	√	√	√	√
S6010	√	√		√	√	√	√	√	√
S6000		√		√	√	√	√	√	√
S41x8	√	√	√	√	√	√	√	√	√**
S4248	√	√		√	√	√	√	√	√**

**population of SFP-10G-T transceivers in switch may be limited due to power constraints.

*** only supported on S4148FE

PRODUCT SUPPORT

10-GbE transceivers	SFP-10G-USR	SFP-10G-SR	SFP-10G-LRM	SFP-10G-LR	SFP-10G-ER	SFP-10G-ZR	SFP-10G-T-DWDM	SFP-10G-BX10	SFP-10G-T
S4112	√	√		√	√			√	√ ^{**}
S5000		√	√	√	√	√	√		√ ^{***}
S4048		√		√	√	√	√	√	√ ^{**}
8132/64; N4032/64	√	√	√	√	√	√			
S5048	√	√		√	√	√	√		√
S5148	√	√		√	√	√	√		√
S5232	√	√		√	√	√	√		
S3048	√	√	√	√	√	√	√		
S3100	√	√	√	√	√	√	√	√	
N3132/2128	√	√		√	√	√			
N20xx/30xx	√	√	√	√	√	√		√	
N1500	√	√		√	√	√			
N1100	√	√		√	√	√			
X4012	√	√		√	√	√			
X1052	√	√		√	√				
VRTX R1-2210		√		√					
FN IOM		√	√	√			√	√	
MXL IO Agg.		√	√	√	√		√	√	
M8024K		√	√	√					
M6220		√	√	√					
M6348		√	√	√					
10Gb passthru-K		√		√					
C7000 comb. line card		√		√	√				
C7000 SFP+ line card		√	√	√	√				
C9010	√	√	√	√	√	√	√		
C7000 QSFP+ ports	√	√	√	√	√	√			

**population of SFP-10G-T transceivers in switch may be limited due to power constraints.

*** only supported on S4148FE

PRODUCT SUPPORT

40-GbE transceivers	QSFP-40G-SR4	QSFP-40G-ESR4	QSFP-40G-LM4	QSFP-40G-SM4	QSFP-40G-BIDI	QSFP-40G-PSM4-LR	QSFP-40G-LR4	QSFP-40G-ER4
S5000	√	√	√	√	√		√	√
S4048	√	√	√	√	√	√	√	√
8132/64; N4032/64	√						√	
S5048	√	√	√	√	√	√	√	√
S5148	√	√	√	√	√	√	√	√
S5232	√	√	√	√	√	√	√	√
N3132/2128	√	√					√	
MXL IO Agg.	√	√	√	√	√	√	√	
MX9116n	√		√	√	√		√	
MX5108n	√		√	√	√		√	
C9010	√	√	√	√	√	√	√	√
C7000 QSFP+ ports	√	√						
MX5108n	√		√	√	√		√	

100GbE transceivers	Q28-100G-SR4	Q28-100G-ESR4	Q28-100G-BIDI	Q28-100G-SWDM4	Q28-100G-CWDM4	Q28-100G-LR4	Q28-100G-ER4-lite	Q28-100G-DWDM2
Z9100	√	√	√	√	√	√	√	√
Z9264	√	√	√	√	√	√	√	
Z9500								
S6100	√	√	√	√	√	√	√	√
S6010								
S6000								
S41x8	√	√	√	√	√	√	√	
S4248	√	√	√	√		√	√	
S4112	√		√	√		√		√
S5048	√	√	√	√	√	√	√	√
S5148	√	√	√	√	√	√	√	
S5232	√	√	√	√	√	√	√	
MX9116n	√			√	√	√		
MX5108n	√				√	√		

25GbE transceivers	SFP28-25G-SR	SFP28-25G-ESR	SFP28-25G-LR
Z9100	√	√	√
S6100	√	√	√
S5048	√	√	√
S5148	√	√	√
S5232	√	√	√
MX 25G PTM	√		

Dual 100GbE transceivers	Q28DD-200G-2SR4
MX9116n	√

ORDERING INFORMATION

Model	Product description
Fast Ethernet (100 Mb/s) SFP transceivers	
SFP-100M-FX	100MbE SFP optical module, up to 2 km over 2 parallel MMFs
Gigabit Ethernet SFP transceivers	
SFP-1G-SX	1GbE SFP optical module, short-reach, up to 500 m over 2 parallel MMFs
SFP-1G-LX	1GbE SFP optical module, long-reach, up to 10 km over 2 parallel SMFs
SFP-1G-ZX	1GbE SFP optical module, extended-reach, up to 80 km over 2 parallel SMFs
SFP-1G-BX10-U	1GbE SFP optical module, bi-directional, long-reach, up to 10 km over single SMF - U version
SFP-1G-BX10-D	1GbE SFP optical module, bi-directional, long-reach, up to 10 km over single SMF - D version
SFP-1G-T	1GbE SFP electrical 1000BASE-T module, up to 100 m over single CAT5 cable.
8G Fibre Channel SFP+ transceivers	
SFP-8GFC-SW	8GFC SFP+ optical module, short-reach, up to 150 m over 2 parallel MMFs
SFP-8GFC-LW	8GFC SFP+ optical module, long-reach, up to 10 km over 2 parallel SMFs
10-Gigabit Ethernet SFP+ transceivers	
SFP-10G-USR	10GbE SFP+ optical module, ultra-short-reach, up to 150 m over 2 parallel MMFs
SFP-10G-SR	10GbE SFP+ optical module, short-reach, up to 400 m over 2 parallel MMFs
SFP-10G-SR-12	10GbE SFP+ optical module, short-reach, up to 400 m over 2 parallel MMFs, package of 12
SFP-10G-LRM	10GbE SFP+ optical module, long-reach multi-mode, up to 220 m over 2 parallel FDDI, OM1 or OM2 MMFs
SFP-10G-LR	10GbE SFP+ optical module, long-reach, up to 10 km over 2 parallel SMFs
SFP-10G-ER	10GbE SFP+ optical module, extended-reach, up to 40 km over 2 parallel SMFs
SFP-10G-ZR	10GbE SFP+ optical module, extended-reach, up to 80 km over 2 parallel SMFs
SFP-10G-T-DWDM	10GbE SFP+ optical module, tunable DWDM, extended-reach, up to 80 km over 2 parallel SMFs
SFP-10G-BX10-U	10GbE SFP+ optical module, bi-directional, long-reach, up to 10 km over single SMF - U version
SFP-10G-BX10-D	10GbE SFP+ optical module, bi-directional, long-reach, up to 10 km over single SMF - D version
SFP-10G-T	10GbE SFP+ electrical 10GBASE-T module, up to 30 m over single CAT6A cable
16G Fibre Channel SFP+ transceivers	
SFP-16GFC-SW	16GFC SFP+ optical module, short-reach, up to 125 m over 2 parallel MMFs
SFP-16GFC-LW	16GFC SFP+ optical module, long-reach, up to 10 km over 2 parallel SMFs
Quad 16G Fibre Channel QSFP+ transceivers	
QSFP-64GFC-SW4	Quad 16GFC QSFP+ optical module, short-reach, up to 100 m over 8 parallel MMFs

ORDERING INFORMATION

Model	Product description
25-Gigabit Ethernet SFP28 transceivers	
SFP28-25G-SR	25GbE SFP28 optical module, short-reach, up to 100 m over 2 parallel MMFs
SFP28-25G-ESR	25GbE SFP28 optical module, extended- short-reach, up to xxx m over 2 parallel MMFs
SFP28-25G-LR	25GbE SFP28 optical module, long-reach, up to 10 km over 2 parallel SMFs
40-Gigabit Ethernet QSFP+ transceivers	
SFP-40G-SR4	40GbE QSFP+ optical module, short-reach, up to 150 m over 8 parallel MMFs
QSFP-40G-ESR4	40GbE QSFP+ optical module, extended short-reach, up to 400 m over 8 parallel MMFs
QSFP-40G-LM4	40GbE QSFP+ optical module, WDM, short-reach, up to 160 m over 2 parallel MMFs
QSFP-40G-SM4	40GbE QSFP+ optical module, SWDM, short-reach, up to 300 m over 2 parallel MMFs
QSFP-40G-BIDI	40GbE QSFP+ optical module, bi-directional, short-reach, up to 160 m over 2 parallel MMFs
QSFP-40G-PSM4-LR	40GbE QSFP+ optical module, long-reach, up to 10 km over 8 parallel SMFs
QSFP-40G-LR4	40GbE QSFP+ optical module, long-reach, up to 10 km over 2 parallel SMFs
QSFP-40G-ER4	40GbE QSFP+ optical module, extended-reach, up to 40 km over 2 parallel SMFs
100-Gigabit Ethernet QSFP28 transceivers	
Q28-100G-SR4	100GbE QSFP28 optical module, short-reach, up to 100 m over 8 parallel MMFs
Q28-100G-ESR4	100GbE QSFP28 optical module, extended short-reach, up to 300 m over 8 parallel MMFs
Q28-100G-SWDM4	100GbE QSFP28 optical module, SWDM, short-reach, up to 150 m over 2 parallel MMFs
Q28-100G-BIDI	100GbE QSFP28 optical module, bi-directional, short-reach, up to 150 m over 2 parallel MMFs
Q28-100G-CWDM4	100GbE QSFP28 optical module, intermediate-reach, up to 2 km over 2 parallel SMFs
Q28-100G-LR4	100GbE QSFP28 optical module, long-reach, up to 10 km over 2 parallel SMFs
Q28-100G-ER4-lite	100GbE QSFP28 optical module, extended-reach, up to 35 km over 2 parallel SMFs
Q28-100G-DWDM2-xx	100GbE QSFP28 optical module, DWDM, up to 80 km over 2 parallel SMFs
QSA-Q28-S28	100GbE QSFP28 to 25GbE SFP28 adapter
Dual 100-Gigabit Ethernet QSFP28-DD transceivers	
Q28DD-200G-2SR4	Dual 100GbE QSFP28-DD optical module, short-reach, up to 100 m over 16 parallel MMFs

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DELL EMC NETWORKING OPENMANAGE NETWORK MANAGER (OMNM) 6.5.2

Powerful converged network management for the Dell EMC networking portfolio and multi-vendor infrastructures

Simplify and centralize network management

Managing your growing network doesn't have to be a full-time job. OpenManage Network Manager lets you easily discover, configure, monitor and manage your network infrastructure. OMNM Converged Network Management makes management of physical and virtual networking easy. Networking from multiple vendors are supported, including Dell EMC, Cisco, HP, Juniper, Brocade, Arista, Aruba, SonicWALL, F5, Ruckus, Aerohive, Extreme and more.

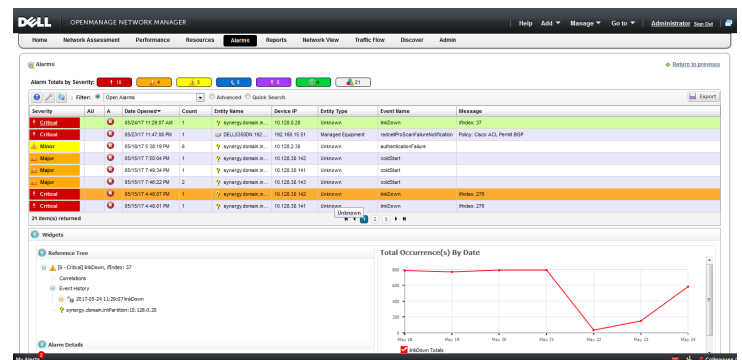
Single pane of glass for all your converged networking management requirements

Unify your network management and simplify deployment of Dell EMC and multi-vendor networking environments with a rich suite of tools available in OMNM's integrated management console. OMNM's centralized management solution provides automated discovery, configuration management, network compliance, performance monitoring, reporting, automation and scripting — right out of the box. OMNM provides the following advantages:

- **Automates the discovery** of network devices, and provides detailed information on the devices and their connectivity, including the ability to draw physical and logical topology maps.
- Provides the ability to **easily configure and manage** groups of network devices; configuration changes and firmware deployments can be made to multiple devices in one operation, and many network operations can be scheduled for pre-determined times.
- Enables network administrators to **monitor the health and performance** of their network, allowing the creation of dashboards to capture important events and trends, and display them over time.
- Helps **reduce TCO** by proactively monitoring for network problems, automating common configuration actions and enabling easy firmware deployment, allowing network administrators to focus on more critical activities.

Key features

- Resource Discovery Wizard simplifies discovery of IPv4 and IPv6 network elements and other devices
- Active Performance Monitors allow for proactive customization of performance monitoring
- Proactive scanning policies for network configuration compliance and auditing helps you track down and correct configuration issues



- Easy to install and get running quickly
- Flexible dashboards for visualizing data
- Robust performance monitoring and reporting helps you identify network bottlenecks
- Event Management correlation forwards filtered events and traps
- Automate responses to system or network events, send e-mail and SMS notifications and invoke customizable actions
- Resource group management for one-to-many device configuration
- Inventory reporting shows what you have and where it is located
- Warranty reporting and alerting helps you keep critical infrastructure under warranty
- Integration with OpenManage
- Traffic flow (sFlow) analysis and reporting
- Advanced scheduling schedules key tasks such as backup, restore and deploy configuration changes
- Customizable web-based user interface
- Deploy on Windows, Linux, or as a Virtual appliance
- RADIUS, LDAP/AP and CAS authentication integration
- Supports single server as well as high availability deployment options with Mysql and Oracle databases
- Scale from 25 nodes to thousands

Supported devices

- Dell EMC Networking C-Series, N-Series, S-Series, Z-Series and X-Series switches
- Dell EMC Networking M-Series, FN-Series, and VRTX Modular Networking I/O Modules
- Dell EMC Networking , 8100, 8000, 7000, 6000, 5000 and 3000 series devices
- Dell EMC Networking W-Series wireless controllers, access points and instant access points
- Select Cisco, HP, Juniper, Brocade, Ruckus, Aerohive, Arista, Aruba, Extreme, Cumulus, Enterasys, 3COM, SonicWALL, Vyatta, F5, VMware and other devices
- SonicWALL SuperMassive, E-Class NSA, TZ and NSA Series
- Dell EMC Unity Storage Array
- Additional Dell EMC Networking and third-party device support included via regular service pack updates

Supported operating systems (64-bit)

- Microsoft Windows Server 2008, 2012 and 2016
- Linux for Redhat and CentOS v6.5/v6.6/v7.2
- Virtual Appliance

Supported web browsers

- Chrome
- Safari
- Firefox
- Internet Explorer

Pricing and upgrades

For a free 30-day trial, visit marketing.dell.com/omnmfree trial.

Purchase directly from Dell EMC at dell.com/omnm, or contact your Dell EMC Sales Representative for affordable subscription-based options.

Learn more at Dell.com/OMNM

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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.

Learn more at Dell.com/LifecycleServices



Dell Networking S3100 series

High-performance managed Ethernet switches designed for non-blocking access

The S3100 switch series offers a power-efficient and resilient Gigabit Ethernet (GbE) switching solution with integrated 10GbE uplinks for advanced Layer 3 distribution for offices and campus networks. The S3100 switch series has high-performance capabilities and wire-speed performance utilizing a non-blocking architecture to easily handle unexpected traffic loads. Use dual internal hot-swappable 80PLUS-certified power supplies for high availability and power efficiency. The switches offer simple management and scalability via an 84Gbps (full-duplex) high-availability stacking architecture that allows management of up to 12 switches from a single IP address.

Modernize campus network architectures

Modernize campus network architectures with a power-efficient and resilient 1/10GbE switching solution with dense Power over Ethernet Plus (PoE+). Select S3100 models offer 24 or 48 ports of PoE+ to deliver clean power to network devices such as wireless access points (APs), Voice-over-IP (VoIP) handsets, video conferencing systems and security cameras. For greater interoperability in multivendor networks, S3100 series switches offer the latest open-standard protocols and include technology to interface with Cisco protocol PVST+. The S3100 series supports Dell Networking OS9, VLT and network virtualization features such as VRF-lite and support for Dell Embedded Open Automation Framework.

Leverage familiar tools and practices

All S3100 switches include Dell Networking OS9 for easier deployment and greater interoperability. One common command line interface (CLI) using a well-known command language means a faster learning curve for network administrators.

Deploy with confidence at any scale

S3100 series switches help create performance assurance with a data rate up to 260Gbps (full duplex) and a forwarding rate up to 193Mpps. Scale easily with built-in rear stacking ports. Switch stacks of up to 624 ports can be managed from a single screen using the highly-available stacking architecture for high-density aggregation with seamless redundant availability.

Hardware, performance and efficiency

- Up to 48 line-rate GbE ports of copper or 24 line-rate ports of fiber, two combo ports for fiber/copper flexibility, and two integrated 10GbE SFP+ ports
- Up to 48 ports of PoE+ in 1RU without an external power supply
- Hot swappable expansion module supporting dual-port SFP+ or dual-port 10GBaseT
- Integrated stacking ports with support up to 84Gbps
- Up to 624 ports in a 12-unit stack for high-density, high-availability aggregation and distribution in wiring closets/MDFs. Non-stop forwarding and fast failover in stack configurations
- Available with dual 80PLUS-certified hot swappable power supplies. Variable speed fan operation helps decrease cooling and power costs

- Energy-Efficient Ethernet and lower-power PHYs reduce power to inactive ports and idle links, providing energy savings from the power cord to the port
- Dell Fresh Air compliance for operation in environments up to 113°F (45°C) helps reduce cooling costs in temperature constrained deployments

Deploying, configuring and managing

- Tool-less ReadyRails™ significantly reduces rack installation time
- Management via an intuitive and familiar CLI, SNMP-based management console application (including Dell Open-Manage Network Manager), Telnet or serial connection
- Private VLAN support
- AAA authorization, TACACS+ accounting and RADIUS support for comprehensive secure access
- Authentication tiering allows network administrators to tier port authentication methods such as 802.1x, MAC Authentication Bypass in priority order so that a single port can provide flexible access and security
- Achieve high availability and full bandwidth utilization with VLT and support firmware upgrades without taking the network offline
- Interfaces with PVST+ protocol for greater flexibility and interoperability in Cisco networks
- Advanced Layer 3 IPv4 and IPv6 functionality
- Flexible routing options with policy-based routing to route packets based on assigned criteria beyond destination address
- Routed Port Monitoring (RPM) covers a Layer 3 domain without costly dedicated network taps
- OpenFlow 1.3 provides the ability to separate the control plane from the forwarding plane for deployment in SDN environments

Get more starting on day one

Trust Dell experts to lead deployments from planning and basic hardware installations to configuration and complex integrations. The Dell ProDeploy Enterprise Suite saves you time, reduces the cost of implementing new technology, and offers you confidence that your new systems will be easy to maintain.

Learn more at Dell.com/ProDeploy.

1GbE switches utilizing a comprehensive enterprise-class Layer 2 and 3 advanced feature set in Dell Networking OS9

Specifications: Dell Networking S3100 series

Ordering information

S3124: 24x RJ45 10/100/1000Mb auto-sensing ports, 2x SFP+ ports, 2x GbE combo media ports, 1x hot swap expansion module bay, 1x 200W PSU included

S3124F: 24x 1000-SX (up to 500m distance) or 1000-LX (up to 10km distance) SFP GbE ports, 2x SFP+ ports, 2x GbE combo media ports, 1x hot swap expansion module bay, 1x 200W PSU included

S3124P: 24x RJ45 10/100/1000Mb PoE+ (up to 30.8W) auto-sensing ports, 2x SFP+ ports, 2x GbE combo media ports, 1x hot swap expansion module bay, 1x 715W PSU included

S3148: 48x RJ45 10/100/1000Mb auto-sensing ports, 2x SFP+ ports, 2x GbE combo media ports, 1x hot swap expansion module bay, 1x 200W PSU included

S3148P: 48x RJ45 10/100/1000Mb PoE+ (up to 30.8W) auto-sensing ports, 2x SFP+ ports, 2x GbE combo media ports, 1x hot swap expansion module bay, 1x 1100W PSU included*

Power cords
C13 to NEMA 5-15, 3M; C13 to C14, 2M; C15 to NEMA 5-15, 2M (C15 for PoE S-Series only)

Modules (optional)
2-port 10GBASE-T RJ-45 hot swappable uplink module
2-port 10GbE SFP+ hot swappable uplink module

Power supplies (optional)
200W AC hot swappable with V-Lock, adds redundancy to non-PoE switches (S3124, S3124F and S3148 only)
715W AC hot swappable, adds redundancy to S3124P (S3124P only)
1100W AC hot swappable, adds redundancy to S3148P or upgrade S3124P for additional PoE+ power (S3124P and S3148P only)

Optics (optional)
Transceiver, SFP, 100BASE-FX, 1310nm wavelength, up to 2km reach
Transceiver, SFP, 1000BASE-T
Transceiver, SFP, 1000BASE-SX, 850nm wavelength, up to 550m reach
Transceiver, SFP, 1000BASE-LX, 1310nm wavelength, up to 10km reach
Transceiver, SFP, 1000BASE-ZX, 1550nm wavelength, up to 80km reach
Transceiver, SFP+, 10GbE, LRM, 1310nm wavelength, up to 220m reach
Transceiver, SFP+, 10GbE, SR, 850nm wavelength, up to 300m reach
Transceiver, SFP+, 10GbE, LR, 1310nm wavelength, up to 10km reach
Transceiver, SFP+, 10GbE, ER, 1550nm wavelength, up to 40km reach

Cables (optional)
Stacking cable 0.25m, 1m and 3m
Dell Networking cable, SFP+ to SFP+, 10GbE, copper twinax direct attach cable, 0.5m, 1m, 3m, 5m and 7m
*Requires C15 plug

Physical

2 rear stacking ports (21Gbps) supporting up to 84Gbps (full-duplex)

2 integrated front 10GbE SFP+ dedicated ports
Out-of-band management port (10/100/1000BASE-T)
USB (Type A) port for configuration via USB flash drive
Auto-negotiation for speed and flow control
Auto-MDI/MDIX, port mirroring
Energy-Efficient Ethernet per port settings
Redundant variable speed fans
Air flow: I/O to power supply
RJ45 console/management port with RS232 signaling (RJ-45 to female DB-9 connector cable included)
Dual firmware images on-board
Switching engine model: Store and forward

Chassis
Size (1RU): 1.7126in x 17.0866in x 16.0236in (43.5mm x 434.0mm x 407.0mm) (H x W x D)
Approximate weight: 13.2277lbs/6kg (S3124 and S3124F), 14.5505lbs/6.6kg (S3124P), 15.2119lbs/6.9kg (S3148P)
ReadyRails rack mounting system, no tools required

Environmental
Power supply: 200W (S3124, S3124F and S3148), 715W or 1,100W (S3124P), 1,100W (S3148P)
Power supply efficiency: 80% or better in all operating modes
Max. thermal output (BTU/hr): 182.55 (S3124), 228.96 (S3124F), 4391.42 (S3124P), 221.11 (S3148), 7319.04 (S3148P)
Power consumption max (watts): 52.8 (S3124), 67.1 (S3124F), 1,287 (S3124P), 74.8 (S3148), 2,145 (S3148P)
Operating temperature: 32° to 113°F (0° to 45°C)
Operating relative humidity: 95%
Storage temperature: -40° to 149°F (-40° to 65°C)
Storage relative humidity: 85%

Performance

MAC addresses: 56K (80K in L2 scaled mode)
Static routes: 16K (IPv4)/8K (IPv6)
Dynamic routes: 16K (IPv4)/8K (IPv6)
Switch fabric capacity: 212Gbps (S3124, S3124F and S3124P) (full duplex) and 260Gbps (S3148 and S3148P)
Forwarding rate: 158Mpps (S3124, S3124F and S3124P) and 193Mpps (S3148 and S3148P)
Link aggregation: 16 links per group, 128 groups
Priority queues per port: 8
Line-rate Layer 2 switching: All (non-blocking)
Line-rate Layer 3 routing: All (non-blocking)
Flash memory: 1G
Packet buffer memory: 4MB
CPU memory: 2GB DDR3
Layer 2 VLANs: 4K
MSTP: 64 instances
VRF-lite: 511 instances
Line-rate Layer 2 switching: All protocols, including IPv4 and IPv6
Line-rate Layer 3 routing: IPv4 and IPv6
IPv4 host table size: 22K (42K in L3 scaled hosts mode)

IPv6 host table size: 16K (both global + Link Local) (32K in L3 scaled hosts mode)
IPv4 Multicast table size: 8K
LAG load balancing: Based on Layer 2, IPv4 or IPv6 headers

IEEE compliance
802.1AB
802.1D
802.1P
802.1Q

802.1Qbb
802.1Qaz
802.1s
802.1w
802.1x
802.1x-2010

802.3ab
802.3ac

802.3ad
802.1ax

802.3ae
802.3af
802.3at
802.3az
802.3u

802.3x
802.3z
ANSI/TIA-1057
Force10
MTU

RFC and I-D compliance

General Internet protocols

768 UDP
793 TCP
854 Telnet
959 FTP

General IPv4 protocols

791 IPv4 2474 Diffserv Field in IPv4 and IPv6 Headers
792 ICMP 2596 Assured Forwarding PHB Group
826 ARP 3164 BSD Syslog
1027 Proxy ARP 3195 Reliable Delivery for Syslog
1035 DNS (client)
1042 Ethernet Transmission
1305 NTPv3 3246 Expedited Assured Forwarding
1519 CIDR 4364 VRF-lite (IPv4 VRF with OSPF and BGP)
1542 BOOTP (relay)
1812 Requirements for IPv4 Routers 5798 VRRP
1918 Address Allocation for Private Internets

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)

RIP
1058 RIPv1 2453 RIPv2

OSPF (v2/v3)
1587 NSSA 4552 Authentication/OSPF with Digital Signatures
2154 OSPFv2 OSPFv3
2328 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 2858 Multiprotocol Extensions
2385 MD5 2918 Route Refresh
2545 BGP-4 Multiprotocol Extensions for IPv6 3065 Confederations
Inter-Domain Routing 4360 Extended Communities
2439 Route Flap Damping
2796 Route Reflection 4893 4-byte ASN
2842 Capabilities 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 3376 IGMPv3
2236 IGMPv2 MSDP

draft-ietf-pim-sm-v2-new-05 PIM-SMw

Security

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

Network management

1155 SMIPv1 3411 SNMPv3
1157 SNMPv1 Management Framework
1212 Concise MIB Definitions 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
1215 SNMP Traps 3413 SNMP Applications
1493 Bridges MIB 3414 User-based Security Model (USM) for SNMPv3
1850 OSPFv2 MIB 3415 VACM for SNMP
1901 Community-Based SNMPv2 3416 SNMPv2
2011 IP MIB 3417 Transport mappings for SNMP
2096 IP Forwarding Table MIB 3418 SNMP MIB
2578 SMIPv2 3434 RMON High Capacity Alarm MIB
2579 Textual Conventions for SMIPv2 3584 Coexistence between SNMP v1, v2 and v3
2618 RADIUS Authentication MIB 4022 IP MIB
2665 Ethernet-Like Interfaces MIB 4087 IP Tunnel MIB
2674 Extended Bridge MIB 4113 UDP MIB
2787 VRRP MIB 4133 Entity MIB
2819 RMON MIB (groups 1, 2, 3, 9) 4292 MIB for IP
2863 Interfaces MIB 4293 MIB for IPv6 Textual Conventions
3273 RMON High Capacity MIB 4502 RMONv2 (groups 1,2,3,9)
3410 SNMPv3 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, environment and other 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

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

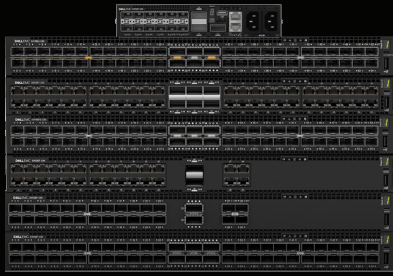
Available with US Trade Agreements Act (TAA) compliance
USGv6 Host and Router Certified on Dell Networking OS 9.7 and greater
IPv6 Ready for both Host and Router
DoD UC-APL approved switch
FIPS 140-2 Approved Cryptography
Warranty
Lifetime Limited Hardware Warranty



Learn More at Dell.com/Networking

July 2016 | Version 1.6
Dell_Networking_S3100_Series_spec_sheet

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DELL EMC NETWORKING S4100-ON

High-performance open networking top-of-rack switches with multirate Gigabit Ethernet and unified ports

The S4100-ON 10GbE switches comprise Dell EMC's latest disaggregated hardware and software data center networking solutions, providing state-of-the-art 100GbE uplinks, fibre channel connectivity and a broad range of functionality to meet the growing demands of today's data center environment. These innovative, next-generation top-of-rack open networking switches offer optimum flexibility and cost-effectiveness for the enterprise, mid-market and Tier2 cloud service provider with demanding compute and storage traffic environments.

The compact S4100-ON models provide industry-leading density with up to 48 ports of 10GbE or up to 48 ports of 10GBaseT ports, 2 ports of 40GbE and 4 ports of 100GbE in a 1RU form factor. The S4148U-ON model can support up to 28 8/16G fibre channel ports, or 16 ports of 32G* fibre channel ports. The S4112-ON is a half-rack width model that supports up to 12 ports of 10GbE or 12 ports 10GBaseT, and 3 ports of 100GbE.

Using industry-leading hardware and a choice of Dell EMC's OS10 or select 3rd party network operating systems and tools, the S4100-ON Series offers flexibility by provision of configuration profiles and delivers non-blocking performance for workloads sensitive to packet loss. The compact S4100-ON models provide multirate speed, enabling denser footprints and simplifying migration to 100Gbps.

Also unique to the S4100-ON series is the ability to meet the demands of converged and virtualized data centers by offering unified ports (S4148U) and hardware support for L2 and L3 VXLAN Gateway. Priority-based flow control (PFC), data center bridge exchange (DCBX) and enhanced transmission selection (ETS) make the S4100-ON ideally suited for DCB environments.

Dell Networking S4100-ON switches support the open source Open Network Install Environment (ONIE) for zero touch installation of Dell EMC's OS10 networking operating system, as well as of alternative network operating systems.

Maximum performance and functionality

The S4100-ON series are high-performance, multi-function, 1/10/25/40/50/100 GbE and 8/16/32G FC Top-of-Rack (ToR) switches purpose-built for applications in high-performance data center, cloud and computing environments.

Architectural features to optimize data center network flexibility, efficiency and availability include IO panel to PSU airflow or PSU to IO panel airflow for hot/cold aisle environments and redundant, hot-swappable power supplies and fans.

Key applications

- Organizations looking to enter the software-defined data center era with a choice of networking technologies designed to maximize flexibility
- Multi-functional 1/10/25/40/50/100 GbE switching in High Performance Computing Clusters or other business-sensitive deployments requiring the highest bandwidth. High-density 1/10 GbE ToR server access in high-performance data center environments
- iSCSI and FC storage deployment, including DCB converged lossless transactions
- Small-scale data center fabric implementation via the S4100-ON switch in leaf and spine along with S-Series 1/10GbE ToR switches
- VXLAN layer 2/layer 3 gateway support (available in hardware only)

Key features

- 1RU high-density 10/40/100 GbE ToR switches with up to 48 ports of 10 GbE (SFP+) or up to 48 ports of 10GBaseT ports, or up to 28 ports of 8/16 fibre channel, two ports of 40 GbE (QSFP+), and up to four ports of 100GbE (QSFP28) or four ports of 8/16/32G fibre channel
- The S4112 is a 1RU, half-rack width 10/100GbE ToR switch with up to 12 ports of 10GbE (SFP+) or up to 12 ports of 10GBaseT ports, and up to three ports of 100GbE (QSFP28).
- Multi-rate 100GbE ports support 10/25/40/50 GbE. 40GbE ports support 10GbE. 10GbE ports support 1GbE. Up to four different simultaneous speeds are possible in a given profile.
- Supports dynamic reconfiguration of unified ports on S4148U product as 10GbE or 8/16G FC on SFP+ ports, and 25GbE or 16/32Gb FC on QSFP28 ports

- 1.76Tbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance under full load on S4148F-ON, S4148FE-ON, S4148T-ON and S4148U-ON.
- 960Gbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance under full load on S4128F-ON and S4128T-ON.
- 840Gbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance under full load on S4112F-ON and S4112T-ON.
- VXLAN gateway functionality support for bridging and routing the non-virtualized and the virtualized overlay networks with line rate performance
- Converged Network support with DCB
- IO panel to PSU airflow or PSU to IO panel airflow
- Redundant, hot-swappable power supplies and fans (S4112-ON has redundant, fixed power supplies and fans)
- Support for 10GBASE-LRM optics over OM1/OM2 fiber on S4148FE-ON product (not supported on other products in S4100 product family)
- IEEE 1588v2 supported (hardware only) on 48 port models

Key Features with Dell EMC Networking OS10

- Consistent DevOps framework across compute, storage and networking elements
- Standard networking features, interfaces and scripting functions for legacy network operations integration
- Standards-based switching hardware abstraction via Switch Abstraction Interface (SAI)
- Pervasive, unrestricted developer environment via Control Plane Services (CPS)
- OS10 Enterprise Edition software enables Dell EMC layer 2 and 3 switching and routing protocols with integrated IP services, quality of service, manageability and automation features
- Leverage common open source tools and best practices (data models, commit rollbacks)
- Increase VM Mobility region by stretching L2 VLAN within or across two DCs with unique VLT capabilities
- Scalable L2 and L3 Ethernet Switching with QoS, ACL and a full complement of standards based IPv4 and IPv6 features including OSPF, BGP and PBR
- Enhanced mirroring capabilities including local mirroring, Remote Port Mirroring (RPM), and Encapsulated Remote Port Mirroring (ERPM).
- Converged network support for Data Center Bridging, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV

	S4112F-ON	S4112T-ON	S4128F-ON	S4128T-ON	S4148F-ON	S4148FE-ON	S4148T-ON	S4148U-ON
Ports	12xSFP+ 3xQSFP28	12x10GbT 3xQSFP28	28xSFP+ 2xQSFP28	28x10GbT 2x QSFP28	48xSFP+ 2xQSFP+ 4xQSFP28	48xSFP+ 2xQSFP+ 4xQSFP28	48x10GbT 2xQSFP+ 4xQSFP28	48xSFP+ 2xQSFP+ 4xQSFP28
Unified port								●
Max 10GbE density	24	24 (12 10GbT and 12 SFP+)	36	36 (28 10GbT and 8 SFP+)	72	72	72 (48 10GbT and 24 SFP+)	72
Max 25GbE density	12	12	8	8	16	16	16	16
Max 40GbE density	3	3	2	2	6	6	6	6
Max 50GbE density	6	6	4	4	8	8	8	8
Max 100GbE density	3	3	2	2	4	4	4	4
Max FC 8G/16G ports (over-subscribed)	0	0	0	0	0	0	0	40
Max FC 16G line rate	0	0	0	0	0	0	0	28
Max FC 32G ports (over-subscribed)	0	0	0	0	0	0	0	16
Max FC 32G line rate	0	0	0	0	0	0	0	8
Switching capacity	840Gbps	840Gbps	960Gbps	960Gbps	1.76Tbps	1.76Tbps	1.76Tbps	1.76Tbps
Throughput	630Mpps	630Mpps	720Mpps	720Mpps	1320Mpps	1320Mpps	1320Mpps	1320Mpps
Latency (nano sec)	800	2500	800	2500	800	850	2500	800
LRM optics support						●		
1588v2 PTP timing					●	●	●	●
Maximum power consumption	180W	200W	260W	300W	370W	400W	440W	460W
Typical operating power	90W	120W	160W	250W	200W	240W	320W	300W
Number of fan trays	Fixed	Fixed	4	4	4	4	4	4
Fans per fan tray	3	3	1	1	1	1	2	2
Weight	8.30lbs	8.45lbs	19.66 lbs (8.92 kg)	20.67 lbs (9.38 kg)	20.15 lbs (9.14 kg)	20.85 lbs (9.46 kg)	22.37 lbs (10.15 kg)	20.52 lbs (9.31 kg)
Max thermal output	614 BTU/ hour	682 BTU/ hour	886 BTU/h	1,023 BTU/h	1261 BTU/h	1,364 BTU/h	1,500 BTU/h	1,568 BTU/h

● Supported

Product	Description
S4100-ON	<p>S4112F, 12x 10GbE SFP+, 3x 100GbE QSFP28, 2x AC Fixed PSU, 3x Fixed Fan, I/O Panel to PSU Airflow S4112F, 12x 10GbE SFP+, 3x 100GbE QSFP28, 2x AC Fixed PSU, 3x Fixed Fan, I/O PSU to I/O Panel Airflow S4112T, 12x 10GBASE-T, 3x 100GbE QSFP28, 2x AC Fixed PSU, 3x Fixed Fan, I/O Panel to PSU Airflow S4112T, 12x 10GBASE-T, 3x 100GbE QSFP28, 2x AC Fixed PSU, 3x Fixed Fan, I/O PSU to I/O Panel Airflow S4112F, 12x 10GbE SFP+, 3x 100GbE QSFP28, 2x DC Fixed PSU, 3x Fixed Fan, I/O Panel to PSU Airflow S4112F, 12x 10GbE SFP+, 3x 100GbE QSFP28, 2x DC Fixed PSU, 3x Fixed Fan, I/O PSU to I/O Panel Airflow S4112T, 12x 10GBASE-T, 3x 100GbE QSFP28, 2x DC Fixed PSU, 3x Fixed Fan, I/O Panel to PSU Airflow S4112T, 12x 10GBASE-T, 3x 100GbE QSFP28, 2x DC Fixed PSU, 3x Fixed Fan, I/O PSU to I/O Panel Airflow S4128F, 28x 10GbE SFP+, 2x 100GbE QSFP28, 2x AC PSU, 4x Fan module, I/O Panel to PSU Airflow S4128F, 28x 10GbE SFP+, 2x 100GbE QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow S4128T, 28x 10GBASE-T, 2x 100GbE QSFP28, 2x AC PSU, 4x Fan module, I/O Panel to PSU Airflow S4128T, 28x 10GBASE-T, 2x 100GbE QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow S4148F, 48x 10GbE SFP+, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fan module, I/O Panel to PSU Airflow S4148F, 48x 10GbE SFP+, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow S4148FE, 48x 10GbE SFP+, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fans, I/O Panel to PSU Airflow S4148FE, 48x 10GbE SFP+, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow S4148T, 48x 10GBASE-T, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fan module, I/O Panel to PSU Airflow S4148T, 48x 10GBASE-T, 2x QSFP+, 4x 100GbE QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow S4148U, 24x Unified port SFP+, 24x 10GbE SFP+, 2x QSFP+, 4x Unified port QSFP28, 2x AC PSU, 4x Fan module, I/O Panel to PSU Airflow S4148U, 24x Unified port SFP+, 24x 10GbE SFP+, 2x QSFP+, 4x Unified port QSFP28, 2x AC PSU, 4x Fan module, PSU to I/O Panel Airflow</p>
Redundant power supplies (not applicable to S4112)	<p>S4100, AC Power Supply, IO Panel to PSU Airflow S4100, AC Power Supply, PSU to IO Panel Airflow S4100, DC Power Supply, IO Panel to PSU Airflow (available as custom kit) S4100, DC Power Supply, PSU to IO Panel Airflow (available as custom kit) S4100, HV DC Power Supply, IO Panel to PSU Airflow S4100, HV DC Power Supply, PSU to IO Panel Airflow</p>
Fans (not applicable to S4112)	<p>S4100 fan module, IO Panel to PSU Airflow S4100 fan module, PSU to IO Panel Airflow</p>
Optics	<p>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 10G, Transceiver, 10GbE, USR, SFP+ Transceiver, 10GbE, LRM, SFP+ (for S4148FE only) Transceiver, 10GBASE-T use with QSA in QSFP+ port, 30m reach on CAT6a/7 Transceiver, 40GbE, SR4 optic QSFP+ Transceiver, 40GbE, eSR4 optic QSFP+ Transceiver, 40GbE, LR4 optic QSFP+ Transceiver, 40GbE, ER4 optics QSFP+ Transceiver, 40GbE, PSM4-LR MPO 10Km QSFP+ to LC Transceiver, 40GbE, LM4 / SM4 Duplex QSFP+ Transceiver, 100GbE, SR4 QSFP28 Transceiver, 100GbE, LR4 QSFP28 Transceiver, 100GbE, LR4Lite QSFP28 Transceiver, 100GbE, CWDM4 2Km QSFP28 Transceiver, 100GbE, PSM4 500m QSFP28 Transceiver, 100GbE, PSM4-IR, QSFP28 Transceiver, SFP+, 16Gbps Fibre Channel, SWL, 850nm, LC Duplex (S4148U model only) Transceiver, SFP+, 16Gbps Fibre Channel, LWL, 1310nm, LC SMF (S4148U model only) Transceiver, QSFP+, 4x16Gbps Fibre Channel, SW4, 850nm, MPO MMF (S4148U model only) Transceiver, QSFP28, 4x32Gbps Fibre Channel, SW4, 850nm, MPO MMF (S4148U model only)</p>
Cables	<p>40GbE, QSFP+ to QSFP+, active optical 40GbE, QSFP+ to QSFP+, passive DAC 40GbE, MTP to 4xLC optical breakout 40GbE, 4x10GbE, QSFP+ to 4xSFP+, passive DAC 100GbE, 4x25GbE, QSFP28 to 4xSFP28, passive DAC 100GbE, QSFP28 to QSFP28, active optical 100GbE, QSFP28 to QSFP28, passive DAC 100GbE, 2x50GbE, QSFP28 to 2xQSFP28, passive DAC, breakout (*)</p>

Physical

1 RJ45 console/management port with RS232 signaling
1 RJ45 micro-USB-B console port
1 RJ45 10/100/1000Base-T management Ethernet port

Size: 1 RU, 1.75"(h) x 17"(w) x 18"(d)
(4.4cm (h) x 43.1cm (w) x 45.7cm (d))
S4112: 1.7"(h) x 8.28"(w) x 18"(d)
(4.125cm (h) x 20.9cm (w) x 45cm (d))

Power supply: 100–240 VAC 50/60 Hz

Power supply (DC), applicable to S4412: rated -40 to -72 VDC

Max. current draw per system: 6A/5A at 100/120V AC; 3A/2.5A at 200/240V AC

S4112: 2A/1.7A at 100/120V AC; 1A/0.8A at 200/240V AC

S4112 (DC): -40V/5A, -48V/4.2A, -72V/2.8A

Max. operating specifications:

Operating temperature: 41° to 104° F (5° to 40° C)

Operating humidity: 5 to 85% (RH), non-condensing

Max. non-operating specifications:

Storage temperature: -40° to 149°F (-40° C to 65° C)

Storage humidity: 5 to 95% (RH), non-condensing

Redundancy

Hot swappable redundant power (not applicable to S4112)

Hot swappable redundant fans (not applicable to S4112)

Fixed, redundant power supply and fan for S4112

Performance

Packet buffer memory 12MB

CPU memory: 4GB

MAC addresses: 272K (in Scaled L2 mode)

PVST: 128 instances

ARP table 200K (in Scaled L3 host mode)

IPv4 routes: 200K (in Scaled L3 routes mode)

IPv6 hosts: 64K

IPv6 routes: 130K (in Scaled L3 routes mode)

Multicast hosts: 8K

Link aggregation: 32 links per group, 128 groups

Layer 2 VLANs: 4K

Layer 3 VLANs: 500

MSTP: 32 instances

LAG load balancing: Based on layer 2, IPv4 or IPv6 headers

L2 Ingress ACL: 6K

L2 Egress ACL: 1K

IPv4 Ingress ACL: 6K

IPv4 Egress ACL: 1K

IPv6 Ingress ACL: 3K

IPv6 Egress ACL: 500

Storage performance parameters

iSCSI Sessions: 255

iSCSI Target: 16

F-Port: Max F-Port Sessions: 526

F-Port: Max members in a zone: 526

Dell EMC Networking OS10.3 Enterprise Edition Software Specifications

IEEE Compliance

802.1AB LLDP

TIA-1057 LLDP-MED

802.1s MSTP

802.1w RSTP

802.3ab Gigabit Ethernet (1000Base-T)

802.3ad Link Aggregation with LACP

802.3ae 10 Gigabit Ethernet (10GBase-X)

802.3ba 40 Gigabit Ethernet (40GBase-X)

802.3i Ethernet (10Base-T)

802.3u Fast Ethernet (100Base-TX)

802.3z Gigabit Ethernet (1000Base-X)

802.1D Bridging, STP

802.1p L2 Prioritization

802.1Q VLAN Tagging, GVRP

802.1Qbb PFC

802.1Qaz ETS

802.1s MSTP

802.1w RSTP

PVST+

802.1X Network Access Control

802.3ab Gigabit Ethernet (1000BASE-T) or breakout

802.3ac Frame Extensions for VLAN Tagging

802.3ad Link Aggregation with LACP

802.3ae 10 Gigabit Ethernet (10GBase-X)

802.3ba 40 Gigabit Ethernet (40GBase-SR4, 40GBase-CR4, 40GBase-LR4, 100GBase-LR4, 100GBase-ER4) on optical ports

802.3bj 100 Gigabit Ethernet

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

Jumbo MTU support 9,416 bytes

Layer2 Protocols

802.1D Compatible

802.1p L2 Prioritization

802.1Q VLAN Tagging

802.1s MSTP

802.1w RSTP

802.1t RPVST+

802.3ad Link Aggregation with LACP

VLT (Virtual Link Trunking)

VLT Enhancements

Minloss Upgrades

VLT Proxy Gateway

RVPST over VLT

DCB, FSB, iSCSI over VLT

RSPAN over VLT

RFC Compliance

768 UDP

793 TCP

854 Telnet

959 FTP

1321 MD5

1350 TFTP

2474 Differentiated Services

2698 Two Rate Three Color Marker

3164 Syslog

4254 SSHv2

General IPv4 Protocols

791 IPv4

792 ICMP

826 ARP

1027 Proxy ARP

1035 DNS (client)

1042 Ethernet Transmission

1191 Path MTU Discovery

1305 NTPv4

1519 CIDR

1812 Routers

1858 IP Fragment Filtering

2131 DHCP (server and relay)

5798 VRRP

3021 31-bit Prefixes

3046 DHCP Option 82 (Relay)

1812 Requirements for IPv4 Routers

1918 Address Allocation for Private

2474 Internets

Diffserv Field in IPv4 and Ipv6

Headers

2597 Assured Forwarding PHB Group

3195 Reliable Delivery for Syslog

3246 Expedited Forwarding PHB

4364 VRF-lite (IPv4 VRF with OSPF and BGP)*

COPP: Control Plane Policing

Policy Based Routing

General IPv6 Protocols

1981 Path MTU Discovery*

2460 IPv6

2461 Neighbor Discovery*

2462 Stateless Address AutoConfig

2463 ICMPv6

2464 Ethernet Transmission

2675 Jumbo grams

3587 Global Unicast Address Format

4291 IPv6 Addressing

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

5095 Deprecation of Type 0 Routing

Headers in IPv6

IPv6 Management support (telnet, FTP, TACACS, RADIUS, SSH, NTP)

OSPF

1587 NSSA

1745 OSPF/BGP interaction

1765 OSPF Database overflow

2154 MD5

2328 OSPFv2

2370 Opaque LSA

3101 OSPF NSSA

3623 OSPF Graceful Restart (Helper mode)*

Security

2865 RADIUS

3162 Radius and IPv6

4250, 4251, 4252, 4253, 4254 SSHv2

4301 Security Architecture for IPsec*

4302 IPsec Authentication Header*

4303 ESP Protocol*

BGP

1997 Communities

2385 MD5

2439 Route Flap Damping

2796 Route Reflection

2842 Capabilities

2918 Route Refresh

3065 Confederations

4271 BGP-4

4360 Extended Communities

4893 4-byte ASN

5396 4-byte ASN Representation

5492 Capabilities Advertisement

Linux Distribution

Debian Linux version 8.4

Linux Kernel 3.16

MIBS

IP MIB– Net SNMP

IP Forward MIB– Net SNMP

Host Resources MIB– Net SNMP

IF MIB – Net SNMP

LLDP MIB

Entity MIB

LAG MIB

Dell-Vendor MIB

TCP MIB – Net SNMP
UDP MIB – Net SNMP
SNMPv2 MIB – Net SNMP

Network Management

SNMPv1/2
SSHv2
FTP, TFTP, SCP
Syslog
Port Mirroring
RADIUS
802.1X
Support Assist (Phone Home)
Netconf APIs
XML Schema
CLI Commit (Scratchpad)
sFlow

Automation

Control Plane Services APIs
Linux Utilities and Scripting Tools

Quality of Service

Access Control Lists
Prefix List
Route-Map
Rate Shaping (Egress)
Rate Policing (Ingress)
Scheduling Algorithms
Round Robin
Weighted Round Robin
Deficit Round Robin
Strict Priority

Weighted Random Early Detect

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*)

Fibre Channel (applicable only to S4148U-ON)

FC F-Port
FC Zoning

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 32: Class A
Canada: ICES-003, Issue-4, Class A

Europe: EN 55032: 2015+A1:2007 (CISPR 32),
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.

Learn more at
Dell.com/LifecycleServices

Learn more at Dell.com/Networking



Dell EMC PowerSwitch S5200-ON Series Switches

High-performance, open networking 25GbE top-of-rack and 100GbE spine/leaf switches

The PowerSwitch S5200-ON 25/100GbE fixed switches comprise Dell EMC's latest disaggregated hardware and software data center networking solutions, providing state-of-the-art, high-density 25/100GbE ports and a broad range of functionality to meet the growing demands of today's data center environment. These innovative, next-generation open networking switches offer optimum flexibility and cost-effectiveness for web 2.0, enterprise, mid-market and cloud service provider with demanding compute and storage traffic environments.

The S5200-ON is a complete family of switches: 12-port, 24-port, and 48-port 25GbE/100GbE ToR switches, 96-port 25GbE/100GbE Middle of Row (MoR)/End of Row (EoR) switch, and a 32-port 100GbE Multi-Rate Spine/Leaf switch. From the compact half-rack width S5212F-ON providing an ideal form factor for hyper-converged deployments, to the high density S5296F-ON for Middle of Row deployments, the S5200-ON series offers performance and flexibility for a variety of network designs.

In addition to 100GbE Spine/Leaf deployments, the S5232F-ON can also be used in high density deployments using breakout cables to achieve up to 128 10GbE or 128 25GbE ports.

Using industry-leading hardware and a choice of Dell EMC's OS10 or select 3rd party network operating systems and tools, the S5200-ON switches incorporate multiple architectural features that optimize data center network flexibility, efficiency and availability, including IO panel to PSU or PSU to IO panel airflow for hot/cold aisle environments, redundant, hot-swappable power supplies and fans and deliver non-blocking performance for workloads sensitive to packet loss.

Priority-based flow control (PFC), data center bridge exchange (DCBX) and enhanced transmission selection

(ETS) make the S5200-ON family ideally suited for DCB environments.

Dell EMC PowerSwitch S5200-ON switches support the open source Open Network Install Environment (ONIE) for zero touch installation of Dell EMC's OS10 networking operating system, as well as alternative network operating systems.

Key applications

- Organizations looking to enter the software-defined data center era with a choice of networking technologies designed to maximize flexibility
- High-density 10/25GbE ToR server aggregation in high-performance data center environments at the desired fabric speed with the S5248F-ON or S5296F-ON
- Low-density 10/25GbE server and storage aggregation with the S5212F-ON and S5224F-ON
- Small-scale Fabric implementation via the S5232F-ON switch in leaf and spine along with S5248F-ON 1/10/25GbE ToR switches enabling cost-effective aggregation of 10/25/40/50/100 uplinks
- Multi-functional 10/25/40/50/100GbE switching in High Performance Computing Clusters or other business-sensitive deployments requiring the highest bandwidth.
- iSCSI deployments, including DCB converged lossless transactions
- Single-pass VXLAN routing (future software release)

Key features

- 1 or 2RU high-density ToR switches with up to 48 or 96 ports of 25GbE or 32 ports of 100GbE
- Multi-rate 100GbE ports support 10/25/40/50/100GbE
- Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features, including OSPF and BGP routing support
- Line-rate performance via non-blocking switch fabrics: 3.2Tbps (6.4Tbps full-duplex) on S5296F-ON and S5232F-ON, 2.0Tbps (4.0Tbps full-duplex) on S5248F-ON, and 1.08Tbps (2.16Tbps full-duplex) on S5224F-ON and S5212F-ON
- L2 multipath support via Virtual Link Trunking (VLT) and Routed VLT support
- VXLAN gateway functionality support for bridging and routing the non-virtualized and the virtualized overlay networks with line rate performance (hardware only)
- Support for OS10 Enterprise Edition
- Converged network support for DCB, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV support
- Routable RoCE to enable convergence of compute and storage on Leaf/Spine Fabric
- IO panel to PSU airflow or PSU to IO panel airflow Redundant, hot-swappable power supplies and fans on most models
- Supports the open source Open Network Install Environment (ONIE) for zero touch installation of alternate network operating systems
- L2 VXLAN (Static VXLAN with VLT, BGP EVPN)
- Tool-less enterprise ReadyRails™ mounting kits for most models reducing time and resources for switch

rack installation (S5212F-ON will utilize a tandem tray for mounting)

- Power-efficient operation and Dell Fresh Air 2.0 compliant up to 45°C helps reduce cooling costs in temperature constrained deployments

Key features with Dell EMC Networking OS10

- Consistent DevOps framework across compute, storage and networking elements
- Standard networking features, interfaces and scripting functions for legacy network operations integration
- Standards-based switching hardware abstraction via Switch Abstraction Interface (SAI)
- Pervasive, unrestricted developer environment via Control Plane Services (CPS)
- OS10 Enterprise Edition software enables Dell EMC layer 2 and 3 switching and routing protocols with integrated IP services, quality of service, manageability and automation features
- Leverage common open source tools and best practices (data models, commit rollbacks*)
- Increase VM Mobility region by stretching L2 VLAN within or across two DCs with unique VLT capabilities
- Scalable L2 and L3 Ethernet Switching with QoS, ACL and a full complement of standards based IPv4 and IPv6 features including OSPF, BGP and PBR
- Enhanced mirroring capabilities including local mirroring, Remote Port Mirroring (RPM), and Encapsulated Remote Port Mirroring (ERPM)
- Converged network support for Data Center Bridging, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx and iSCSI TLV

Features	S5212F-ON	S5224F-ON	S5248F-ON	S5296F-ON	S5232F-ON
Ports	12xSFP28 3xQSFP28	24xSFP28 4xQSFP28	48xSFP28 2xQSFP28-DD 4xQSFP28	96xSFP28 8xQSFP28	32xQSFP28 2xSFP+
Max 10GbE density	24	40	80	128	128
Max 25GbE density	24	40	80	128	128
Max 40GbE density	3	4	8	8	32
Max 50GbE density	6	8	16	16	64
Max 100GbE density	3	4	8	8	32
Switching capacity	1.08Tbps (2.16Tbps full-duplex)	1.08Tbps (2.16Tbps full-duplex)	2.0Tbps (4.0Tbps full-duplex)	3.2Tbps (6.4Tbps full-duplex)	3.2Tbps (6.4Tbps full-duplex)
Throughput	892Mpps	1488Mpps	1.5Bpps	2.4Bpps	2.4Bpps

*Roadmap

Features	S5212F-ON	S5224F-ON	S5248F-ON	S5296F-ON	S5232F-ON
Latency (nano sec)	906	881	847	850	877
1588v2 PTP timing (hardware)		●	●	●	●
CPU Memory	8GB	16GB	16GB	16GB	16GB
SSD	16GB	32GB	64GB	64GB	64GB
Packet Buffer	32MB	32MB	32MB	32MB	32MB
Maximum power	304W	455W	647W	893W	635W
Typical power	140W	200W	310W	457W	360W
Maximum current	2.8A@110VAC / 1.4A@220VAC	4.2A@110VAC / 2.1A@220VAC	5.8A@110VAC / 2.9A@220VAC	8.2A@110VAC / 4.1A@220VAC	5.8A@110VAC / 2.9A@220VAC
Fan modules	Fixed	4	4	4	4
Form Factor	1RU (half-width)	1RU	1RU	2RU	1RU
Dimensions	17.1"Wx18.1"D x1.7"H 43.4Wx46.0D x4.4H (cm)	17.1"Wx18.1"D x1.7"H 43.4Wx46.0D x4.4H (cm)	17.1"Wx18.1"D x1.7"H 43.4Wx46.0D x4.4H (cm)	17.4"Wx20.1"D x3.4"H 44.2Wx51.1D x8.7H (cm)	17.1"Wx18.1"D x1.7"H 43.4Wx46.0D x4.4H (cm)
Weight	4.5kg (10.05lbs)	9.7kg (21.4lbs)	9.7kg (21.4lbs)	15.1kg (33.2lbs)	9.8kg (21.6lbs)
Max thermal output	1037 BTU/h	1552 BTU/h	2208 BTU/h	3047 BTU/h	2167 BTU/h

Product	Description
S5200-ON	<p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x DC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x DC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, NO-OS</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, NO-OS</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition, TAA</p> <p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition, TAA</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, NO-OS</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, NO-OS</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition, TAA</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition, TAA</p>

Product	Description
S5200-ON	<p>S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x DC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x DC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, NO-OS S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, NO-OS S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, I/O Panel to PSU Airflow, OS10 Enterprise Edition, TAA S5212F, 12x 25GbE SFP28 + 3x 100GbE QSFP28, 2x AC PSU, PSU to I/O Panel Airflow, OS10 Enterprise Edition, TAA</p> <p>S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, NO-OS S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, NO-OS S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition, TAA S5224F, 24x 25GbE SFP28 + 4x 100GbE QSFP28, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition, TAA</p> <p>S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, NO-OS S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, NO-OS S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, I/O Panel to PSU Airflow, OS10 Enterprise Edition, TAA S5232F, 32x QSFP28 + 2x 10GbE SFP+, 2x AC PSU, Fan modules, PSU to I/O Panel Airflow, OS10 Enterprise Edition, TAA</p>
Redundant power supplies	AC Power Supply, IO Panel to PSU Airflow AC Power Supply, PSU to IO Panel Airflow DC Power Supply, IO Panel to PSU Airflow (available as custom kit) DC Power Supply, PSU to IO Panel Airflow (available as custom kit)
Fans	Fan module, IO Panel to PSU Airflow Fan module, PSU to IO Panel Airflow
Optics	Transceiver, 2x100GbE, 2xSR4, QSFP28-DD Transceiver, 2x100GbE, 2xPSM4-IR, QSFP28-DD Transceiver, 2x100GbE, 2xCWDM4, QSFP28-DD Transceiver, 100GbE, SR4 QSFP28 Transceiver, 100GbE, PSM4 (500m) QSFP28 Transceiver, 100GbE, CWDM4 (2Km) QSFP28 Transceiver, 100GbE, LR4 QSFP28 Transceiver, 40GbE, SR4 optic QSFP+ Transceiver, 40GbE, BIDI optic QSFP+ (Duplex) Transceiver, 40GbE, SM4 optic QSFP+ (Duplex) Transceiver, 40GbE, LM4 optic QSFP+ (Duplex) Transceiver, 40GbE, PSM4 10Km, QSFP+ Transceiver, 40GbE, LR4 optic QSFP+ Transceiver, 40GbE, ER4 optics QSFP+ Transceiver, 25GbE, SR, NOF SFP28 Transceiver, 25GbE, LR, SFP28 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 10G, Transceiver, 10GBASE-T use with QSA in QSFP+ port, 30m reach on CAT6a/7 Transceiver, 1GbE, SX SFP Transceiver, 1GbE, LX SFP Transceiver, 1GbE, ZX SFP Transceiver, 1GbE, 10km, BiDi SFP Transceiver, 1GbE, 40km, BiDi SFP Transceiver, 1GbE, 80km, BiDi SFP Transceiver, 1GbE, 1000BASE-T, Gen2, SFP

Product	Description
Cables	100GbE, 4x25GbE, QSFP28 to 4xSFP28, passive DAC 100GbE, QSFP28 to QSFP28, active optical 100GbE, QSFP28 to QSFP28, passive DAC 100GbE, 2x50GbE, 2xQSFP to 2xQSFP28, passive DAC, breakout 40GbE, QSFP+ to QSFP+, active optical 40GbE, QSFP+ to QSFP+, passive DAC 40GbE, MTP to 4xLC optical breakout 40GbE, 4x10GbE, QSFP+ to 4xSFP+, passive DAC
Cable management	Z9100 Cable Breakout Kit, MTP to LC (1RU 64-port LC over MMF) Z9100 Cable Breakout Kit, MTP to LC (1RU 64-port LC over SMF)

Technical specifications

Physical

1 RJ45 console/management port with RS232 signaling
S5212F-ON: 12x25GbE SFP28 + 3x 100GbE QSFP28
S5224F-ON: 24x25GbE SFP28 + 4x 100GbE QSFP28
S5248F-ON: 48x25GbE SFP28 + 4x 100GbE QSFP28 + 2x 2x100GbE QSFP28-DD
S5296F-ON: 96x25GbE SFP28 + 8x 100GbE QSFP28
S5232F-ON: 32x100GbE QSFP28 ports + 2xSFP+ 10GbE

Environmental

Power supply: 100–240 VAC 50/60 Hz
Max Operating specifications:
AC Max. Operating specifications:
Operating temperature: 32° to 113°F (0° to 45°C)
Operating humidity: 5 to 90% (RH), non-condensing
Max. Non-operating specifications:
Storage temperature: –40° to 158°F (–40° to 70°C)
Storage humidity: 5 to 90% (RH), non-condensing
Fresh air Compliant to 45°C

Redundancy

Hot swappable redundant power
Hot swappable redundant fans (fixed power supply and fans on S5212F-ON)

Performance

Packet buffer memory: 32MB
CPU memory: 16GB
MAC addresses: 160K
ARP table: 128K
IPv4 routes: 128K
IPv6 routes: 64K
Multicast hosts: 32K
Link aggregation: 16 links per group, 128 groups
Layer 2 VLANs: 4K
MSTP: 64 instances
LAG load balancing: Based on layer 2, IPv4 or IPv6 headers

IEEE Compliance

802.1AB LLDP
TIA-1057 LLDP-MED
802.3ad Link Aggregation
802.1D Bridging, STP
802.1p L2 Prioritization
802.1Q VLAN Tagging
802.1Qbb PFC

802.1Qaz

802.1X
802.3ac
802.3x
Layer2
802.1D
802.1p
802.1Q
802.1s
802.1w
802.1t
VLT (Virtual Link Trunking)
VRRP Active/Active
RSTP & RPVST+
Port Mirroring on VLT ports
DCB, iSCSI, FSB on VLT
RPM/ERPM over VLT
VLT Minloss upgrade

RFC Compliance

768 UDP
793 TCP
854 Telnet
959 FTP
1321 MD5
1350 TFTP
2474 Differentiated Services
2698 Two Rate Three Color Marker
3164 Syslog
4254 SSHv2

General IPv4 Protocols

791 IPv4
792 ICMP
826 ARP
1027 Proxy ARP
1035 DNS (client)
1042 Ethernet Transmission
1191 Path MTU Discovery
1305 NTPv4
1519 CIDR
1812 Routers, Static Routes
1858 IP Fragment Filtering
2131 DHCPv4 (server and relay)
5798 VRRPv3
3021 31-bit Prefixes
1812 Requirements for IPv4 Routers
1918 Address Allocation for Private Internets
2474 Diffserv Field in IPv4 and Ipv6 Headers
2597 Assured Forwarding PHB Group
3195 Reliable Delivery for Syslog
3246 Expedited Forwarding PHB Group
VRF (BGPv4/v6)

ETS

Network Access Control
Frame Extensions for VLAN Tagging
Flow Control
Protocols
Compatible
L2 Prioritization
VLAN Tagging
MSTP
RSTP
RPVST+

General IPv6 Protocols

1981 Path MTU for IPv6
2372 IPv6 Addressing
2460 IPv6 Protocol Specification
2461 Neighbor Discovery
2462 Stateless Address AutoConfig
2711 IPv6 Router alert
2463 ICMPv6
2464 Ethernet Transmission
2675 IPv6 Jumbograms
3484 Default Address Selection
3493 Basic Socket Interface
4291 Addressing Architecture
3542 Advanced Sockets API
3587 Global Unicast Address Format
4291 IPv6 Addressing
2464 Transmission of IPv6 Packets over Ethernet Networks
2711 IPv6 Router Alert Option
4007 IPv6 Scoped Address Architecture
4213 Transition Mechanisms for IPv6 Hosts and Routers
3315 DHCPv6 Server & Relay
IPv6 Static Routes

OSPF
1745 OSPF/BGP interaction
1765 OSPF Database overflow
2154 OSPF with DigitalSignatures
2328 OSPFv2
5340 OSPF for IPv6 (OSPFv3)
2370 Opaque LSA
3101 OSPF NSSA
4552 OSPFv3 Authentication

Multicast

4541 IGMPv1/v2/v3 and MLDv1/v2 Snooping

Security

2865 RADIUS
3162 Radius and IPv6
3579 Radius support for EAP
3580 802.1X with RADIUS
3826 AES Cipher in SNMP
1492 TACACS (Authentication, Accounting) Control Plane, VTY & SNMP ACLs
IP Access Control Lists

BGP

1997 Communities
2385 MD5
2439 Route Flap Damping
2796 Route Reflection
2918 Route Refresh

3065 Confederations
4271 BGP-4
2545 BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
2858 Multiprotocol Extensions
4360 Extended Communities
4893 4-byte ASN
5396 4-byte ASN Representation
5492 Capabilities Advertisement
draft-ietf-idr-add-paths-04.txt ADD PATH

Linux Distribution

Debian Linux version 9
Linux Kernel 4.9

Network Management and Monitoring

SNMPv1/2c
IPv4/IPv6 Management support (Telnet, FTP, TACACS, RADIUS, SSH, NTP)
Syslog
Port Mirroring
RPM/ERPM
3176 SFlow
Support Assist (Phone Home)
RestConf APIs (Layer 2 features)
XML Schema
CLI Commit (Scratchpad)
Uplink Failure Detection
Object Tracking
Bidirectional Forwarding Detection (BFD)
Automation
Control Plane Services APIs
Linux Utilities and Scripting Tools
CLI Automation (Multiline Alias)
Zero Touch Deployment (ZTD)
Ansible, Puppet, Chef, SaltStack
8040 RESTCONF APIs (L3)

Quality of Service

Prefix List
Route-Map
Rate Shaping (Egress)
Rate Policing (Ingress)
Scheduling Algorithms

Round Robin
Weighted Round Robin
Deficit Round Robin
Strict Priority
Weighted Random Early Detect

Data center bridging

802.1Qbb Priority-Based Flow Control
802.1Qaz Enhanced Transmission Selection (ETS)
Explicit Congestion Notification
Data Center Bridging eXchange (DCBx)
DCBx Application TLV (iSCSI, FCoE)
RoCEv2
Software Defined Networking
OpenFlow 1.3 (Native)

MIBS

IP MIB
IP Forward MIB
Host Resources MIB
IF MIB
LLDP EXT1/3 MIB
Entity MIB
LAG MIB
Dell-Vendor MIB
TCP MIB
UDP MIB
SNMPv2 MIB
ETHERLIKE-MIB
SFLOW-MIB
PFC-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

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.

Learn more at DellEMC.com/Services

Learn more at DellEMC.com/Networking



República Federativa do Brasil
Agência Nacional de Telecomunicações

Certificado de Homologação

(Intransferível)

Nº **04032-13-02723**

Validade: **Indeterminada**

Emissão: **07/04/2016**

Requerente:

**DELL COMPUTADORES DO BRASIL LTDA
AV. DA EMANCIPAÇÃO N°5000
PARQUE DOS PINHEIROS
13184654 HORTOLÂNDIA SP**

Fabricante:

**DELTA NETWORKS, INC.
252, SHANG YING ROAD, KUEI SAN DISTRICT,
TAOYUAN CITY 33341,
TAIWAN**

Este documento homologa, nos termos da regulamentação de telecomunicações vigente, o Certificado de Conformidade nº 3563, emitido pelo **FUNDACAO CENTRO DE PESQUISA E DESENVOLVIMENTO DE TELECOMUNICACOES- CPQD**. Esta homologação é expedida em nome do solicitante aqui identificado e é válida somente para o produto a seguir discriminado, cuja utilização deve observar as condições estabelecidas na regulamentação de telecomunicações.

Tipo - Categoria:

Equipamento de Rede de Dados - III

Modelo - Nome Comercial (s):

E06W002 (N3048P e S3148P) - (E06W002 (N3048P e S3148P)) /E07W002 (N3048 e S3148) - (E07W002 (N3048 e S3148)) /E06W001 (N3024P e S3124P) - (E06W001 (N3024P e S3124P)) /E07W001 (N3024 e S3124) - (E07W001 (N3024 e S3124)) /E07W003 (N3024F e S3124F) - (E07W003 (N3024F e S3124F))

Características técnicas básicas:

Equipamento utilizado em redes Ethernet.

Observações

Este certificado substitui o de mesmo número emitido em 21/02/2014.

Módulos de interface e protocolos de sinalização, especificados em documentos técnicos do produto, não estão cobertos por este certificado, sendo obrigatória sua certificação e homologação, caso venham a ser fornecidos ou utilizados.

Constitui obrigação do fabricante do produto no Brasil providenciar a identificação do produto homologado, nos termos da regulamentação de telecomunicações, em todas as unidades comercializadas, antes de sua efetiva distribuição ao mercado, assim como observar e manter as características técnicas que fundamentaram a certificação original.

As informações constantes deste certificado de homologação podem ser confirmadas no SCH - Sistema de Gestão de Certificação e Homologação, disponível no portal da Anatel. (www.anatel.gov.br).

Marcos de Souza Oliveira
Gerente de Certificação e Numeração



REPÚBLICA FEDERATIVA DO BRASIL
AGÊNCIA NACIONAL DE TELECOMUNICAÇÕES.

Certificado de Homologação
(Intransferível)

Nº **4032-13-2723**

Validade: **Indeterminada**

Emissão: **07/04/2016**

Solicitante:

DELL COMPUTADORES DO BRASIL LTDA.
AVENIDA DA EMANCIPAÇÃO 5000 PARQUE DOS PINHEIROS
13184-654 - HORTOLANDIA - SP

Fabricante:

DELTA NETWORKS, INC.
252, SHANG YING ROAD, KUEI SAN
TAOYUAN HSIEN 333 - TAIWAN

Este documento homologa, nos termos do Regulamento para Certificação e Homologação de Produtos para Telecomunicações, aprovado pela Resolução Anatel nº 242, de 30 de novembro de 2000, o Certificado de Conformidade nº 3563, emitido pelo **OCD - Fundação CPqD**. Esta homologação é expedida em nome do solicitante aqui identificado e é válida somente para o produto a seguir discriminado, cuja utilização deve observar as condições estabelecidas na regulamentação do serviço ou aplicação a que se destina.

Tipo:

Equipamento de Rede de Dados - Categoria III

Modelo(s):

E06W002 (N3048P e S3148P)
E07W002 (N3048 e S3148)
E06W001 (N3024P e S3124P)
E07W001 (N3024 e S3124)
E07W003 (N3024F e S3124F)



Serviço/Aplicação:

Redes de Dados

Características técnicas básicas:

Equipamento utilizado em redes Ethernet.

Observações:

Este certificado substitui o de mesmo número emitido em 21/02/2014.

Módulos de interface e protocolos de sinalização, especificados em documentos técnicos do produto, não estão cobertos por este certificado, sendo obrigatória sua certificação e homologação, caso venham a ser fornecidos ou utilizados.

Constitui obrigação do fornecedor do produto no Brasil providenciar a identificação do produto homologado, nos termos do art. 39 do Regulamento anexo à Resolução Anatel nº 242, em todas as unidades comercializadas, antes de sua efetiva distribuição ao mercado, assim como observar e manter as características técnicas que fundamentaram a certificação original.

As informações constantes deste certificado de homologação podem ser confirmadas no SGCH - Sistema de Gestão de Certificação e Homologação, disponível no portal da Anatel. (www.anatel.gov.br).

Marcos de Souza Oliveira
Gerente de Certificação e Numeração



Declaração do Fabricante

DELL COMPUTADORES DO BRASIL LTDA. ("Dell"), inscrita no CNPJ sob o n. 72.381.189/0001-10, na qualidade de fabricante do(s) equipamento(s) de marca Dell, (abaixo identificado(s)), ofertado(s) pela empresa LTA-RH INFORMÁTICA COMÉRCIO, REPRESENTAÇÕES LTDA, no certame licitatório n. Pregão Eletrônico RP Nº 20/2019, promovido pelo TRIBUNAL REGIONAL ELEITORAL DO DISTRITO FEDERAL – TRE/DF. vem, através, desta, declarar que:

- o(s) modelo(s) NETWORKING S5232F-ON, NETWORKING S4148T-ON, NETWORKING S5248F-ON, NETWORKING S3148P, NETWORKING S3124P, NETWORKING TRANSCEIVER SFP+, NETWORKING TRANSCEIVER SFP28 SR, NETWORKING TRANSCEIVER QSFP28 SR4, NETWORKING CABLE QSFP28 TO QSFP28, NETWORKING MPO TO 4xLC FIBER BREAKOUT CABLE, DELL OPENMANAGE NETWORK MANAGER e TRANSCEIVER 1000BASE-SX possui(em) garantia de 60 meses, on-site, com atendimento telefônico 24 horas por dia, 7 dias na semana.

Declaramos, ainda, que:

- A Dell será responsável pelo SLA (tempos de atendimento) exigido no edital, por sua central de atendimento de tele-suporte com discagem pelo telefone 0800-9703355 ou pelo chat de suporte técnico no site www.dell.com.br.

- Os equipamentos por nós fabricados serão novos, sem uso e não são produtos descontinuados.

- A LTA-RH INFORMÁTICA COMÉRCIO, REPRESENTAÇÕES LTDA está autorizada a comercializar os equipamentos propostos para esse certame.

Eldorado do Sul, 11 de novembro de 2019

Dell Computadores do Brasil Ltda.
Priscila Cardoso Basso Melo - Gerente de Vendas