

# Dell Networking MXL blade switch

## For Dell M1000e blade enclosures

Expand the value of your blade investment. The Dell Networking MXL blade switch delivers performance and scalability in a flexible package to meet the shifting demands of your business and data center as it transitions to 1/10/40GbE.

The Dell Networking MXL blade switch provides 1/10GbE connectivity on server-facing ports for up to 32 M-Series blade servers equipped with the latest KR-based 10GbE network daughter or mezzanine cards. The MXL switch offers 1/10/40GbE connectivity on the uplinks to interface with a top of rack switch, directly to the core, or directly to an Ethernet-based SAN. The MXL switch also has enhanced bandwidth, performance and flexibility to satisfy the changing demands of data centers embracing virtualization, network convergence and other I/O-intensive applications or workloads.

### Flexibility and pay as you grow

The Dell Networking MXL blade switch provides rich functionality using 1/10/40GbE, addressing the diverse needs of environments ranging from data centers, large enterprises, government networks, education/research and high-performance computing. The MXL switch supports 32 internal 1/10GbE ports as well as two fixed 40GbE QSFP+ ports and offers two bays for optional FlexIO modules. Uplinks via the FlexIO modules can be added or swapped as needed to ensure your business has room to grow. Choose from 2-port QSFP+, 4-port SFP+, 4-port 10GBase-T FlexIO or 4-port FC modules. The MXL switch provides the flexibility to mix and match the FlexIO module types.

The MXL blade switch is an industry-first, 40GbE-capable, modular and stackable blade switch for the M1000e chassis.

### High-performing architecture and Ethernet stacking

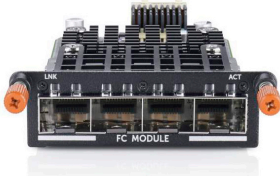
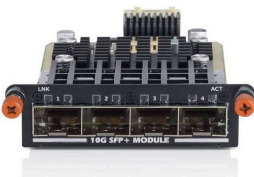


The MXL switch is an industry-first, 40GbE-capable, modular and stackable blade switch for the M1000e chassis. Ethernet stacking using two 40GbE ports enables scalable network switch growth for up to six interconnected blade switches that are managed as one logical device. Both stacking across chassis and local switching of traffic within the chassis offer high performance, efficiency and lower TCO.

### Powerful and robust OS

Dell Networking Operating System 9 (OS9) is a robust and scalable operating system comprised of feature-rich Layer 2 and Layer 3 switching and routing functionality using industry standard command line interface. Deployed by some of the most demanding data center customers, the MXL switch brings this high-performing and resilient OS9 to the M1000e chassis.

### Built-in convergence capabilities

The MXL switch is fully IEEE data center bridging (DCB) compliant, supporting iSCSI, NAS and FCoE transit. With the optional FC FlexIO module, the MXL switch is transformed into an NPIV Proxy Gateway capable of bridging Ethernet and Fibre Channel. Converged networking lowers costs by immediately reducing infrastructure requirements for blade servers and interconnects. In addition to infrastructure savings, convergence reduces complexity, simplifies management and increases efficiency in data center operations.

	4-port FC module	4-port SFP+ module	4-port 10GBASE-T module	2-port QSFP+ module
<b>Model</b>				
<b>Module differentiator</b>	<p>Designed to deliver four ports of 8Gb Fibre Channel bandwidth (NPG mode only).</p> <p>NPIV Proxy Gateway* (NPG) offering gateway capabilities to existing SAN fabrics.</p> <p>Also provides F_port capability for direct connection to Fibre channel SAN arrays.</p>	<p>Provides 4 ports of SFP+ 10Gb connectivity. Supports optical and DAC cable media.</p>	<p>Provides 4 ports of 10GBASE-T connectivity. Supports copper media over relatively longer distance.</p> <p>Maximum of one 10GBASE-T module per MXL (other module bay can be populated).</p>	<p>Provides 2 ports of QSFP+ connectivity for 2 40Gb connections.</p> <p>When the ports are in breakout mode, it provides 8 ports of 10Gb Ethernet while only using 2 cables.</p>
<b>Port speed</b>	2/4/8/Gb	10Gb/1Gb	100Mb/1Gb/10Gb (supports auto negotiation)	10Gb/40Gb
<b>Protocol support</b>	Native Fibre Channel	Ethernet	Ethernet	Ethernet
<b>Media types</b>	2/4/8Gb FC SFP+ Optics	<p>Optical Transceivers SFP+ 10Gb: SR, LR</p> <p>SFP 1 GBE: SX, LX</p> <p>SFP to RJ45 converter 1000Base-T (only capable of 1Gbps)</p> <p>SFP+ Direct Attach Cable (Twinax)</p>	RJ45/Cat6a Copper	<p>QSFP+ to 4xSFP+ Breakout Cables 5m Passive Copper</p> <p>QSFP+ to QSFP+ Direct Attach 1m and 5m, Passive Copper</p> <p>Optical Transceivers SFP+ 40Gb: SR only</p> <p>QSFP+ to QSFP+ Fibre Cables</p> <p>QSFP+ to 4xSFP+ Fibre Breakout Cables</p>

\*The Dell FC FlexIO module uses NPIV Proxy Gateway (NPG) technology, which provides the capability to use converged FCoE inside the M1000e chassis while maintaining traditional unconverged Ethernet and native Fibre Channel outside of the M1000e. With the FC FlexIO module, the MXL provides bridging capabilities between Ethernet and Fibre Channel via FCoE. The MXL manages the following items when the FC FlexIO module is installed:

1. DCB (PFC, ETS and DCBx)
2. FIP discovery and initialization
3. FLOGI and FDISC conversion process
4. FIP keep alives

For communication outside the chassis, the MXL directs all Ethernet traffic out the external Ethernet ports (these ports can be in DCB or non-DCB mode) and convert all FCoE packets to native FC packets and directs them out the native Fibre Channel ports of the FC FlexIO module(s). The MXL acts as an NPG connecting the converged network adapters (CNAs) in the servers to the external Fibre Channel fabric. When the FC FlexIO module is installed, the MXL appears as an FCF to the CNAs while the FC FlexIO ports appear as NPIV N\_ports (i.e. HBA ports) to the external Fibre Channel Fabric.



# Specifications: Dell Networking MXL blade switch

## Port attributes

Up to 32 line-rate 10GbE KR ports  
2 line-rate fixed 40GbE QSFP+ ports  
2 optional FlexIO plug-in modules with flexible media choices:

- 2-port QSFP+ 40GbE module
- 4-port SFP+ 10GbE module
- 4-port 10GBase-T 10GbE copper module (1/10Gb, only 1 module per MXL is supported)
- 4-port 2/4/8Gb FC FlexIO module

1 USB (Type A) port for storage  
1 USB (Type A) port for console/management

## Performance

MAC addresses: 128K  
IPv4 routes: 16K  
Switch fabric capacity: 1.28Tbps (full-duplex)  
Forwarding capacity: 960Mpps  
Link aggregation: Up to 16 members per group, 128 LAG groups  
Queues per port: 4 queues  
VLANs: 4094  
Line-rate Layer 2 switching: All protocols, including IPv4  
Line-rate Layer 3 routing: IPv4 and IPv6  
ACLs: 2K ingress, 1K egress  
Packet buffer memory: 9MB  
CPU memory: 2GB

## Stacking

Stacked units: Up to 6 MXLs (using 40GbE ports only)  
Stacking bandwidth: Up to 320Gbps (using 2 x 40GbE ring)  
Stacking topology: Ring and daisy chain  
Virtual Link Trunking (VLT): mVLT and L2/L3 over VLT

## IEEE compliance

802.1AB LLDP  
802.1p L2 Prioritization  
802.2 LLC  
802.3ab Gigabit Ethernet (1000Base-T)  
802.3ad Link Aggregation with LACP  
802.3ae 10GbE (10GBase-X)  
802.3ba 40GbE (40GBase-SR4, 40GBase-CR4) on optical ports  
802.3u Fast Ethernet (100Base-TX)  
802.3x Flow Control  
802.3z Gigabit Ethernet (1000Base-X)  
ANSI/TIA-1057 LLDP-MED  
MTU 12KB

## Availability

802.1D Bridging, STP  
802.1s MSTP  
802.1w RSTP  
2358 VRRP

## Layer 3 routing

1058 RIPv1  
2453 RIPv2  
2154 MD5 (OSPF)  
1587 NSSA (OSPF)  
2328 OSPFv2  
2740 OSPFv3  
4222 Prioritization and congestion avoidance  
4552 OSPFv3 IPsec authentication

## BGP

1997 BGP Communities  
2385 BGP MD5  
2439 BGP Route Flap Damping  
2796 BGP Route Reflection  
2918 BGP Route Refresh  
3065 BGP Confederations  
4360 BGP Extended Communities  
4893 BGP 4-byte ASN  
5396 BGP 4-byte ASN representations  
draft-ietf-idr-restart-06 BGP Graceful Restart  
1195 Routing IPv4 with IS-IS  
5308 Routing IPv6 with IS-IS

## VLAN

802.1Q VLAN Tagging, Double VLAN Tagging, GVRP  
802.3ac Frame Extensions for VLAN Tagging  
Force10 PVST+  
Native VLAN

## Data center bridging

IEEE 802.1Qbb Priority-Based Flow Control (PFC)  
IEEE 802.1Qaz Enhanced Transmission Selection (ETS)  
Data Center Bridging eXchange (DCBx)  
DCBx Application TLV (iSCSI, FCoE)

## Fibre channel

NPIV Proxy Gateway (NPG)  
Fibre Channel port types: N  
Bridging to FC SAN  
Up to 8 FCoE\_Maps per switch

## FC/ FCoE

INCITS FC-BB-5 Ver 2.00 (FSB, NPIV & F-Port parts only).  
Fibre Channel Generic Services (FC-GS, FC-GS2, GC-GS3)

FC-FG (F\_PORT only)  
FC-VI  
NPIV Proxy Gateway (NPG)  
Fibre Channel port types: N, F  
Bridging to FC SAN  
Up to 8 FCoE\_Maps per switch  
Native FCoE forwarding  
FCoE Initialization Protocol (FIP) v1  
FCoE Transit (FIP Snooping Bridge)  
FCoE to FC Forwarding  
Dynamic FCoE to FC Load Balancing  
Zoning  
Name server  
Login server

## Open automation

Bare metal provisioning  
Virtual server networking  
Smart scripting

## Security options

854 Telnet  
959 FTP  
1321 MD5  
1350 TFTP  
2474 Differentiated Services  
2856 RADIUS  
3164 Syslog  
4254 SSHv2  
draft-grant-tacacs-02  
TACACS+  
4807 IPsec SPD MIB  
4301 IPsec

## General IPv4 protocols

768 UDP  
791 IPv4  
792 ICMP  
793 TCP  
826 ARP  
1027 Proxy ARP  
1035 DNS (client)  
1042 Ethernet Transmission  
1191 Path MTU Discovery  
1305 NTPv3  
1519 CIDR  
1542 BOOTP (relay)  
1812 Routers  
1858 IP Fragment Filtering  
2131 DHCP (relay, client, server)  
3021 31-bit Prefixes  
3046 DHCP Option 82  
3069 Private VLAN  
3128 Tiny Fragment Attack Protection

## General IPv6 protocols

2460 IPv6  
1858 IP Fragment Filtering  
2461 Neighbor Discovery  
2675 Jumbograms (partial)  
3587 Global Unicast Address Format  
2462 Stateless Address Autoconfiguration (partial)  
4291 Addressing  
2463 ICMPv6  
4861 IPv6 Host for management port  
1981 IPv6 Path MTU discovery

## Multicast

1112 IGMPv1  
3569 SSM for IPv4  
2236 IGMPv2  
4541 IGMPv1/v2 Snooping  
3376 IGMPv3  
draft-ietf-pim-sm-v2-new-05 PIM-SM

## SDN/Openflow

Openflow standard 1.0 with extensions

## Network management

1155 SMIv1  
1156 Internet MIB  
1157 SNMPv1  
1212 Concise MIB Definitions  
1215 SNMP Traps  
1493 Bridges MIB  
1850 OSPFv2 MIB  
1901 Community-based SNMPv2  
2011 IP MIB  
2012 TCP MIB  
2013 UDP MIB  
2096 IP Forwarding Table MIB  
2570 SNMPv3  
2571 Management Frameworks

2572 Message Processing and Dispatching  
2575 SNMPv3 VACM  
2576 Coexistence Between SNMPv1/v2/v3  
2578 SMIv2  
2579 Textual Conventions for SMIv2  
2580 Conformance Statements for SMIv2  
2618 RADIUS Authentication MIB  
2665 Ethernet-like Interfaces MIB  
2787 VRRP MIB  
2819 RMON MIB (groups 1, 2, 3, 9)  
2863 Interfaces MIB  
3273 RMON High Capacity MIB  
3416 SNMPv2  
3418 SNMP MIB  
3434 RMON High Capacity Alarm MIB  
ANSI/TIA-1057 LLDP-MED MIB  
IEEE 802.1AB LLDP MIB  
IEEE 802.1AB LLDP DOT1 MIB  
IEEE 802.1AB LLDP DOT3 MIB  
sFlow.org sFlowv5  
FORCE10-IF-EXTENSION-MIB  
FORCE10-LINKAGG-MIB  
FORCE10-COPY-CONFIG-MIB  
FORCE10-MON-MIB  
FORCE10-PRODUCTS-MIB  
FORCE10-MS-CHASSIS-MIB  
FORCE10-SMI  
FORCE10-SYSTEM-COMPONENT-MIB  
FORCE10-TC-MIB  
FORCE10-TRAP-ALARM-MIB  
FORCE10-FIPSNPOPING-MIB  
FORCE10-DCB-MIB  
LLDP-EXT-DOT1-DCBX-MIB  
IEEE8021-PFC-MIB  
DELL\_ITA.REV\_1.1.MIB  
F10-JUMPSTART-MIB  
FORCE10-MSTP-MIB

## Chassis

Single-wide I/O module for M1000e blade enclosure

## Environmental

Power supply: 100–240V AC 50/60Hz  
Max. thermal output: 955.36 BTU/h  
Max. current draw per system: 2A at 100/120V AC, 1A at 200/240V AC  
Max. power consumption: 123 Watts  
ISO 7779 A-weighted sound pressure level: 59.6dBA at 73.4°F (23°C)  
Operating temperature: 32° to 104°F (0° to 40°C)  
Operating humidity: 10 to 85% (RH), non-condensing  
Max. non-operating specifications:  
- Storage temperature: -40° to 158°F (-40° to 70°C)  
- Storage humidity: 5 to 95% (RH), non-condensing

## Regulatory and environment compliance

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 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:2009, Class A  
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  
All components are RoHS compliant

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