The Dell PowerEdge M I/O Aggregator is an extremely flexible and easy to deploy 1/10GbE aggregation device. Its simplified network management and configuration enable instant plug-and-play connectivity to Dell and multi-vendor networks. In addition, the M I/O Aggregator extends the consolidation benefits of virtualization by replacing multiple GbE NICs, mezzanine cards and switches with fewer, higher bandwidth 10GbE NICs and I/O modules per blade chassis.

Converge with confidence
The Dell PowerEdge M I/O Aggregator is part of Dell Active System framework, a simple, complete and flexible integrated framework for convergence. The M I/O Aggregator blade is a component of the Dell Active System 800, a pre-integrated converged infrastructure solution. Dell’s pre-engineered and pre-assembled converged solutions offer outstanding agility and efficiency for data center optimization.

Maximize your bandwidth
Take advantage of 10GbE capability to meet the bandwidth demands of multi-core CPUs and to build your server capacity without overprovisioning your data center. With support for 10GbE in the PowerEdge M I/O Aggregator and support for 10GbE NICs in the server, your network can utilize the additional bandwidth of each individual server. This helps provide support for the growing number of virtual machines (VMs) per physical server.

Efficient installation and easy expandability
With no-fuss installation and simple network integration, the Dell PowerEdge M I/O Aggregator is ready to work right out of the box. The M I/O Aggregator comes install-ready with all ports active, enabling quick integration without concern for license upgrades. It can connect to 16 or 32 blade servers internally via SNAs or mezzanine cards located in the servers. IT administrators can start with the base model’s standard 40 10GbE ports (32 internal + eight external), then expand their network with the addition of up to two optional FlexIO modules. Choose from 2-port QSFP+, 4-port SFP+, 4-port 10GBaseT or 4-port FC FlexIO modules. The M I/O Aggregator provides the flexibility to mix and match the FlexIO module types.

Flexible connectivity for maximum versatility
Optimize your IT schedule and create a nimble and flexible data center with an aggregator that offers simple deployment and plug-and-play connectivity. The Dell PowerEdge M I/O Aggregator blade offers low- to no-touch deployment with exceptional flexibility. Its simplified network management and configuration enable instant plug-and-play connectivity to Dell and multi-vendor networks.

Built-in convergence capabilities
The PowerEdge M I/O Aggregator is fully IEEE data center bridging (DCB) compliant, supporting iSCSI, NAS and FCoE transit. With the optional FC FlexIO module, the M I/O Aggregator 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.
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 IOA provides bridging capabilities between Ethernet and Fibre Channel via FCoE. The IOA 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 IOA 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 IOA 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 IOA 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.

Note: The IOA NPIV Proxy Gateway does not currently provide fabric services.

<table>
<thead>
<tr>
<th>Model</th>
<th>4-port FC module</th>
<th>4-port SFP+ module</th>
<th>4-port 10GBASE-T module</th>
<th>2-port QSFP+ module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module differentiator</td>
<td>Designed to deliver four ports of 8Gb Fibre Channel bandwidth (NPG mode only). NPIV Proxy Gateway* (NPG) offering gateway capabilities to existing SAN fabrics.</td>
<td>Provides 4 ports of SFP+ 10Gb connectivity. Supports optical and DAC cable media.</td>
<td>Provides 4 ports of 10BASE-T connectivity. Supports copper media over relatively longer distance. Maximum of one 10GBASE-T module per IOA (other module bay can be populated).</td>
<td>Provides 2 ports of QSFP+ connectivity. The ports are fixed in breakout mode, providing up to 8 ports of 10Gb Ethernet while only using 2 cables.</td>
</tr>
<tr>
<td>Port speed</td>
<td>2/4/8/Gb</td>
<td>10/1Gb</td>
<td>100Mb/1Gb/10Gb (supports auto negotiation)</td>
<td>10Gb</td>
</tr>
<tr>
<td>Protocol support</td>
<td>Native Fibre Channel</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
</tr>
<tr>
<td>Media types</td>
<td>2/4/8Gb FC SFP+ Optics</td>
<td>Optical Transceivers SFP+ 10Gb: SR, LR SFP 1Gbe: SX, LX SFP to RJ45 converter 10000Base-T (only capable of 1Gbps) SFP+ Direct Attach Cable (Twinax)</td>
<td>RJ45/Cat6a Copper</td>
<td>QSFP+ to 4xSFP+ Breakout Cables 5m Passive Copper QSFP+ to QSFP+ Direct Attach 1m and 5m, Passive Copper Optical Transceivers SFP+ 40Gb: SR only QSFP+ to QSFP+ Fiber Cables QSFP+ to 4xSFP+ Fiber Breakout Cables</td>
</tr>
</tbody>
</table>

*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 IOA provides bridging capabilities between Ethernet and Fibre Channel via FCoE. The IOA manages the following items when the FC FlexIO module is installed:

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Note: The IOA NPIV Proxy Gateway does not currently provide fabric services.
Specifications: Dell PowerEdge M I/O Aggregator

Port attributes
- Up to 32 line-rate 10GbE KR ports
- 2 line-rate fixed QSFP+ ports (in 4x 10GbE breakout mode)
- 2 optional FlexIO modules with flexible media choices:
  - 2-port QSFP+ module (in 4x 10GbE breakout mode)
  - 4-port SFP+ 10GbE module
  - 4-port 10GBASE-T 10GbE copper module
  (1/2/3/4Gb, only one 10GBASE-T module is supported per IOA)
- 4-port 2/4/8Gb FC FlexIO module

Native 40GbE when IOA is in Manual Mode
- 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
- Packet buffer memory: 9MB
- CPU memory: 2GB

Stacking
- Stacked units: Up to 6 IOAs (using fixed 40GbE ports only and deployed via CLI)
- Stacking bandwidth: Up to 160Gbps (using 1x 40GbE ring)
- Stacking topology: Ring and daisy chain
- Virtual Link Trunking (VLT): mVLT and L2 over VLT
  (deployed via CLI)

IEEE compliance
- 802.1AB LLDP
- 802.1p L2 Prioritization
- 802.3ad Link Aggregation with LACP
- 802.3ac Frame Extensions for VLAN Tagging
- 802.3af Power over Ethernet
- 802.3af Power over Ethernet
- 802.3ba Gigabit Ethernet (1000Base-T)

VLAN
- 802.1Q VLAN Tagging
- 802.3ac Frame Extensions for VLAN Tagging
- 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)

Fiber channel
- NPIV Proxy Gateway (NPG)
- Fiber Channel port types: N
- Bridging to FC SAN
- FCoE_Maps per IOM
- FC features
- Native FCoE forwarding
- FCoE Initialization Protocol (FIP) v1
- FCoE Transit (FIP Snooping Bridge)
- FCoE to FC Forwarding
- Dynamic FCoE to FC Load Balancing

Security options
- 854 Telnet
- 950 FTP
- 1350 TFTP
- 2856 RADIUS
- 3164 Syslog
- 4254 SSHv2
- 775 TACACS+

General IPv4 protocols
- 676 UDP
- 791 IPv4
- 792 ICMP
- 793 TCP
- 826 ARP
- 1042 Ethernet Transmission
- 1305 NTPv3
- 1519 CIDR
- 2131 DHCP client
- 3021 31-bit Prefixes
- 3128 Tiny Fragment Attack Protection

General IPv6 protocols
- 4861 IPv6 Host for management port

Multicast
- 4541 IGMPv1/v2 Snooping

Network management
- 1155 SMIv1
- 1156 Internet MIB
- 1157 SNMPv1
- 1212 Concise MIB Definitions
- 1493 Bridges MIB
- 1901 Community-based SNMPv2
- 2011 IP MIB
- 2012 TCP MIB
- 2013 UDP MIB
- 2571 Management Frameworks
- 2572 Message Processing and Dispatching
- 2576 Coexistence Between SNMPv1/v2
- 2578 SMiv2
- 2579 Textual Conventions for SMiv2
- 2580 Conformance Statements for SMiv2
- 2665 Ethernet-like Interfaces MIB
- 2863 Interfaces MIB
- 3416 SNMPv2
- 3418 SNMP MIB
- 4133 Entity MIB
- ANSI/TIA-1057 LLDP-MED MIB
- IEEE 802.1AB LLDP-MED MIB
- IEEE 802.1AB LLDP DOTI MIB
- IEEE 802.1AB LLDP DOT3 MIB
- FORCE10-IF-EXTENSION-MIB
- FORCE10-LINKAGG-MIB
- FORCE10-COPY-CONFIG-MIB
- FORCE10-PRODUCTS-MIB
- FORCE10-MS-CHASSIS-MIB
- FORCE10-SMI
- FORCE10-FCMIB
- TFTP
- 959 FTP
- 854 Telnet

Chassis
- Single-wide I/O module for M1000e blade enclosure

Environmental
- Power supply: 100 – 240V AC 50/60 Hz
- Max. thermal output: 955.36 BTU/hr
- 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: 59.6 dBA
  at 73°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: ICE-CCC-003, Issue-4, Class A
  - Europe: EN 55022: 2006+AC: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 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