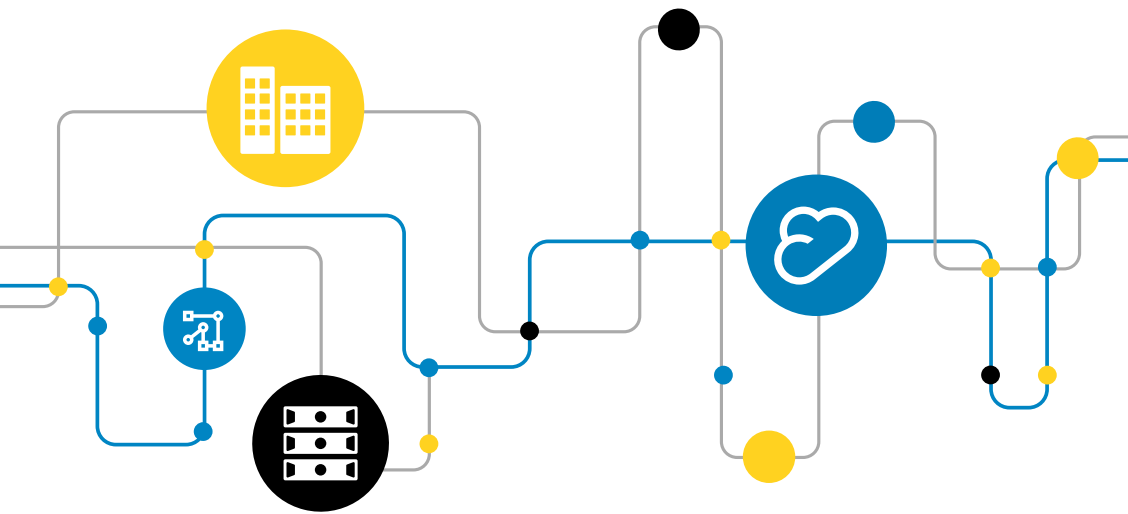




Bringing open networking to the enterprise with Dell EMC Networking solutions

In today's data center, rapid increases in virtualization, cloud deployments and big data analysis have created new challenges as organizations look to build IT infrastructures that meet today's and tomorrow's business demands.

The Dell EMC vision of the new data center networking model is an open ecosystem in which organizations can take their pick from innovative, industry-standard network applications, network operating systems and network hardware.

Open networking solutions enable IT managers to build an application-agnostic infrastructure and simplify data center management with standard automation tools and standards-based open platforms. Organizations can leverage open-source tools and expertise to minimize costly engineering overhead and help reduce the time and effort required to design, provision and manage networks.

Why Dell EMC Networking?

Industry Leader

First vendor to offer the disaggregated networking model, continuing to disrupt the industry with software-defined storage, computing and networking

Innovative Products

Rapid execution model with a rich product pipeline that leads the industry in delivering networking systems with state-of-the-art technology

End-to-End Solutions

Exceptional solutions encompassing best-in-class servers, storage and networking products with global services and reach

Dell EMC Networking Product Portfolio Guide

- 2 | Active fabric solutions and data center switches
- 4 | Campus chassis switches, campus LAN aggregation and access switches
- 5 | Wireless networking
- 6 | Data center open networking
- 7 | Get started with Dell EMC Networking

Leaf/Spine Fabric

Cost-effective fabrics for cloud and virtualized data centers of any size

Dell EMC offers a family of high-performance, cost-effective networking solutions to interconnect server, storage and software elements in cloud and virtualized data centers. Leaf/spine fabric solutions comprise low-power, high-throughput 1-100GbE switching platforms equipped with fully-featured Layer 2/3 multi-path fabric technology, DCB options for SAN/LAN convergence and software-defined networking.

Leaf/Spine Fabric Solutions

(Two or four node configurations combined with top-of-rack and blade I/O elements)

- 10G leaf/spine (modular): LAN and SAN (FC, FCoE, RoCE, iSCSI) using the S5000
- 1-100GbE leaf/spine : Using Z9100-ON, S6100-ON, S6010-ON, S5248F-ON, S5048F-ON, S4200-ON, S4100-ON, S4048-ON, S4048T and S3048 systems

Redefining fabric economics

Internal analysis demonstrated that Dell EMC leaf/spine architectures are more cost effective and space saving compared to the traditional modular Cisco Nexus chassis. The leaf/spine fabric design delivers the same throughput density, saving up to 77% less power, up to 68% less space and up to 59% less costs overall.¹

Data Center Top-of-Rack and Fabric Switches

Speed	Model	Overview	Capacity and ports	Data Center Core	Aggregation / Layer 3	Top-of-Rack	Features	PoE / PoE+	Stacking (maximum stack)	Open Automation ¹	iSCSI optimization ²	Hot-swap power	Redundant power	Airflow option ^{3, 4, 5 or 6}	Warranty ⁷
25, 40, 50, 100 GbE	Z9100-ON	10/25/40/50/100GbE fixed open networking fabric switch for high performance environments.	6.4 Tbps 32 ports 100GbE (QSFP28), 32 ports 40GbE, 64 ports 50GbE, 128 ports 10GbE (w/breakout) or 128 ports 25GbE. Two additional 10GbE SFP+ ports.	●	●	●			–	✓	✓	✓	✓	*3	1 yr
	S6100-ON	10/25/40/50/100GbE fully modular open networking top-of-rack switch.	6.4 Tbps Choice of up to 32 ports of 100GbE (QSFP28), 32 ports of 100GbE (QSFP28 and CXP), 64 ports of 50GbE (QSFP28), 64 ports of 40GbE (QSFP+), 128 ports of 25GbE (SFP28) or 128 ports of 10GbE (w/ breakout) and two fixed SFP+ ports of 10GbE/1GbE/100MbE.		●	●			–	✓	✓	✓	✓	✓	1 yr
	S6010-ON	High-performance 10/40GbE top-of-rack open networking switch	2.56 Tbps 32 ports 40GbE QSFP+ or 96 ports 10GbE (w/breakout). Eight additional 40GbE QSFP+ ports.		●	●			–	✓	✓	✓	✓	✓	1 yr
	S5148F-ON	Programmable high-performance switch with native 25G ports and 100G fabric ports	3.6 Tbps 48 ports of 25GbE (SFP28) and 6 ports of 100GbE (QFSP28)		●	●			6	✓	✓	✓	✓	*3	1 yr
	S5048F-ON	High-performance switch with native 25G ports and 100G fabric ports	3.6 Tbps 48 ports of 25GbE (SFP28) and 6 ports of 100GbE (QFSP28)		●	●			6	✓	✓	✓	✓	*3	1 yr
	S4248FB-ON	Full function high-performance switch with 10/40GbE ports and multi-rate 100GbE ports	1.6 Tbps 48 ports of 10GbE (SFP+), 2 ports of 40GbE (QFSP+) and 6 ports of 100GbE QSFP28		●	●				✓	✓	✓	✓	*3	1 yr
	S4248FBL-ON	High-performance switch with 10/40GbE ports, multi-rate 100GbE ports and deep buffers and tables	1.6 Tbps 48 ports of 10GbE (SFP+), 2 ports of 40GbE (QFSP+) and 6 ports of 100GbE QSFP28	●	●					✓	✓	✓	✓	*3	1 yr

● Recommended deployment

¹ Analysis consisted of one Cisco Nexus 7010 chassis with five F248XP line cards combined with eight Nexus 5596 switches for a total of 384 ports of 10GbE compared to eight Dell S4810 switches and two Dell Z9000 switches providing the same exact throughput capacity.

⁽¹⁾ Open Automation is an integrated software suite of advanced network management tools to automate data center processes and hypervisor switch communications. See page 5 for details. ⁽²⁾ iSCSI optimization automatically configures QoS policies for Dell storage arrays. ⁽³⁾ Air flow direction (front to rear or rear to front) must be selected upon ordering. ⁽⁴⁾ Side-to-side airflow. ⁽⁵⁾ Air flow moves from front ports and side towards back. ⁽⁶⁾ Fan less models available. Power-over-Ethernet (PoE/PoE+) available on select models. ⁽⁷⁾ Details pertaining to other Limited Hardware Warranties, visit Dell.com/Warranty. Life = Lifetime Warranty (hardware repair or replacement) for as long as you own the product. Info at Dell.com/LifetimeWarranty.

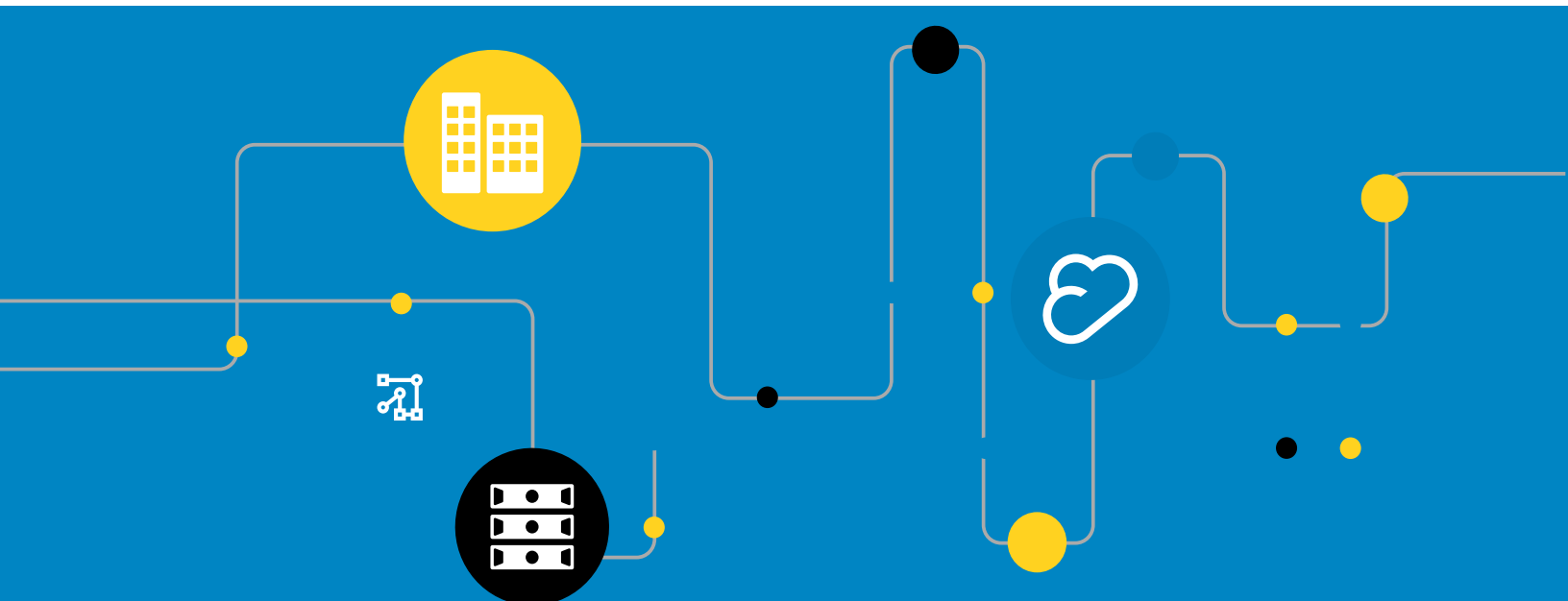
Data Center Top-of-Rack and Fabric Switches

Speed	Model	Overview	Capacity and ports	Data Center Core	Aggregation / Layer 3	Top-of-Rack Features	PoE / PoE+	Stacking (maximum stack)	Open Automation ¹	iSCSI optimization ²	Hot-swap power	Redundant power	Airflow option ^{3, 4, 5 or 6}	Warranty ⁷
10GbE and 8/16/32 GbFC	S5000	Modular LAN/SAN fabric switch for Ethernet, FC and FCoE at ToR for true flexibility.	1.28 Tbps Up to 48 ports inserted as 12 port modules and four fixed 40GbE ports.		●	●		6	✓	✓	✓	✓	*3	1 yr
	S4128F-ON S4128T-ON	High-performance switch with 10GbE fiber or copper ports and multi-rate 100G fabric ports	960 Gbps 28 ports of 10GbE (SFP+) or 10GBaseT and 2 ports of 100GbE (QFSP28)		●	●			✓	✓	✓	✓	*3	1 yr
	S4148F-ON S4148T-ON	High-performance switch with 10GbE fiber or copper ports and multi-rate 100G fabric ports	1.76 Tbps 48 ports of 10GbE (SFP+) or 10GBaseT, 2 ports of 40GbE (QFSP+) and 2 ports of 100GbE (QFSP28)		●	●			✓	✓	✓	✓	*3	1 yr
	S4148U-ON	High-performance, multi-functional switch with Ethernet and Fibre Channel ports	1.76 Tbps 24 ports of 10GbE (SFP+), 24 ports of 40GbE (QFSP+) and 4 unified ports of QSFP28 or FC8/16/32)		●	●			✓	✓	✓	✓	*3	1 yr
	S4148FE-ON	High-performance switch with 10GbE fiber ports, multi-rate 100G fabric ports and support for LRM optics	1.76 Tbps 48 ports of 10G (SFP+), 2 ports of 40GbE (QFSP+) and 4 ports of 100G (QSFP28)		●	●			✓	✓	✓	✓	*3	1 yr
	S4048-ON	High-density 10GbE open networking switch.	1.44 Tbps 72 ports 10GbE (w/breakout) and 6 ports of 40GbE (QSFP+)			●		6	✓	✓	✓	✓	*3	1 yr
	S4048T-ON	High-density, energy-efficient 10GBASE-T top-of-rack switch for high performance data center and computing environments.	1.44 Tbps 48 dual-speed 1/10GBASE-T ports and 6 ports of 40GbE (QSFP+)			●		6	✓	✓	✓	✓	*3	1 yr
1GbE	S3100	Power-efficient and resilient GbE switching solution with integrated 10GbE uplinks for advanced L3 switching for office and campus networks	260 Gbps Up to 48 line-rate 1GbE ports of copper or 24 line-rate ports of fibre. Two combo ports for fibre/copper flexibility and two integrated 10GbE SFP+ ports. Up to 48 ports of POE+		●	●	P+	12	✓	✓	✓	✓	*5	Life
	S3048-ON	High-density 1GbE open networking switch.	260 Gbps 48 ports of 1GbE and 4 ports of 10GbE (w/SFP+ module)			●		6	✓	✓	✓	✓	*3	1 yr

● Recommended deployment

¹ Analysis consisted of one Cisco Nexus 7010 chassis with five F248XP line cards combined with eight Nexus 5596 switches for a total of 384 ports of 10GbE compared to eight Dell S4810 switches and two Dell Z9000 switches providing the same exact throughput capacity.

⁽¹⁾ Open Automation is an integrated software suite of advanced network management tools to automate data center processes and hypervisor switch communications. See page 5 for details. ⁽²⁾ iSCSI optimization automatically configures QoS policies for Dell storage arrays. ⁽³⁾ Air flow direction (front to rear or rear to front) must be selected upon ordering. ⁽⁴⁾ Side-to-side airflow. ⁽⁵⁾ Air flow moves from front ports and side towards back. ⁽⁶⁾ Fan less models available. Power-over-Ethernet (PoE/PoE+) available on select models. ⁽⁷⁾ Details pertaining to other Limited Hardware Warranties, visit Dell.com/Warranty. Life = Lifetime Warranty (hardware repair or replacement) for as long as you own the product. Info at Dell.com/LifetimeWarranty.





Campus Chassis Switches

The Dell EMC Networking C9010 network director is a next-generation, multi-rate capable modular switching platform designed for medium to large campus and mid-market data center networks. Based on an innovative architecture that merges core, aggregation and access layers into a single network infrastructure, the C9010 acts as a single point of control for the C1048P rapid access node, resulting in a streamlined, centrally managed foundation for mission-critical applications.

Model	Deployment	Capacity and ports
C9010	Medium to large enterprise campus and small to mid-sized data center networks	Choice of 24-port SFP+ line card, 24-port 10GBASE-T line card or 6-port QSFP+ line card
C1048		48 10/100/1000BASE-T PoE+ ports for user/server access, and two SFP+ uplinks for connectivity back to the C9010

One Network

The Dell EMC campus networking portfolio of enterprise-class wired and wireless, next-generation management and industry-leading support combines into **One Network** designed to meet the needs of your business. Our cost-effective, future-ready solutions reduce complexity and integrate seamlessly into existing networks for flexible growth and investment protection.

Campus LAN Aggregation and Access Switches

Speed	Model	Overview	Capacity and ports		Data Center	Aggregation / Layer 3	Edge / Layer 2	Branch office	Small office	Features	PoE / PoE+	Stacking (maximum stack)	Open Automation ¹	iSCSI optimization ²	Hot-swap power	Redundant power	Airflow option ^{3, 4, 5 or 6}	Warranty ⁷
10GbE	N4000	Scalable 10GbE Layer 3 Advanced switch with 40GbE port capabilities.	1.2 Tbps	Up to 64 line-rate 10GbE ports per switch and up to 672 10GbE ports in a 12-unit stack with user port stacking at up to 320 Gbps. Hot swap expansion module supporting dual QSFP+ (8 x 10GbE), Quad 10GBaseT and Quad SFP+.								12					*5	Life
1GbE	N3000	Scalable GbE Layer 3 Advanced switch with energy-efficient design and PoE+capabilities. ONIE (Open Networking) support available on N3132PX-ON.	260 Gbps	Up to 48 line-rate 1GbE ports per switch and up to 624 1GbE ports in a 12-unit stack. Hot swap expansion module supporting dual SFP+ and dual 10GBaseT. Up to 48 ports of PoE+ and 32 ports of 60W PoE (N3132PX-ON).							P+	12					*5	Life
	N2000	Scalable GbE Layer 3 Standard switch with energy-efficient design and PoE+ capabilities. ONIE (Open Networking) support available on N2128PX-ON.	220 Gbps	Up to 48 line-rate 1GbE ports per switch and up to 600 1GbE ports in a twelve-unit stack. Two integrated 10GbE SFP+ ports. Up to 48 ports of PoE+. 4 60W PoE ports on N2128PX-ON.							P+	12				E	*5	Life
	N1500	Energy-efficient Layer 3 Lite switch with PoE+ capabilities for smaller fully managed networks	176 Gbps	Up to 48 line-rate 1GbE ports per switch and up to 200 1GbE ports in a 4-unit stack. Four integrated 10GbE SFP+ ports. Up to 48 ports of PoE+.							P+	4				E	*5	Life
	N1100	Energy-efficient L2 switch with PoE+ capabilities for smaller fully managed networks	176 Gbps	8, 24, 48 line-rate 1GbE ports and up to 192 1GbE ports in a 4-unit stack. Up to four integrated 10GbE SFP+ ports. Up to 24 ports of PoE/PoE+							P+	4						Life
10GbE	X4012 +	Smart managed Layer 2+ switch designed for small and medium businesses.	240 Gbps	10GbE 12-port fibre for aggregation and high speed server/storage attach.													*5 or *6	ELW
1GbE	X1000 +	Smart managed Layer 2+ switch designed for small and medium businesses.	176 Gbps	Compact 1GbE 8-port model w/PoE option. Half RU width 1GbE models with 26- and 18-port options.							P/ P+						*5	ELW

+ Smart web managed ● Recommended deployment

* (1) Open Automation is an integrated software suite of advanced network management tools to automate data center processes and hypervisor switch communications. See page 5 for details. (2) iSCSI optimization automatically configures QoS policies for Dell storage arrays. (3) Air flow direction (front to rear or rear to front) must be selected upon ordering. (4) Side-to-side airflow. (5) Air flow moves from front ports and side towards back. (6) Fan less models available. Power-over-Ethernet (PoE/PoE+) available on select models. (7) Details pertaining to other Limited Hardware Warranties, visit Dell.com/Warranty. Life = Lifetime Warranty (hardware repair or replacement) for as long as you own the product. Info at Dell.com/LifetimeWarranty.

Wireless Networking

Aerohive wireless solutions are designed for the next-generation campus network. Aerohive access points feature built-in distributed control technology that provides enterprise scalability, advanced BYOD and security features without the need for controllers. Manage your network of Aerohive APs and Dell EMC Networking switches via HiveManager NG, a network management system that is available for public or private cloud deployment.

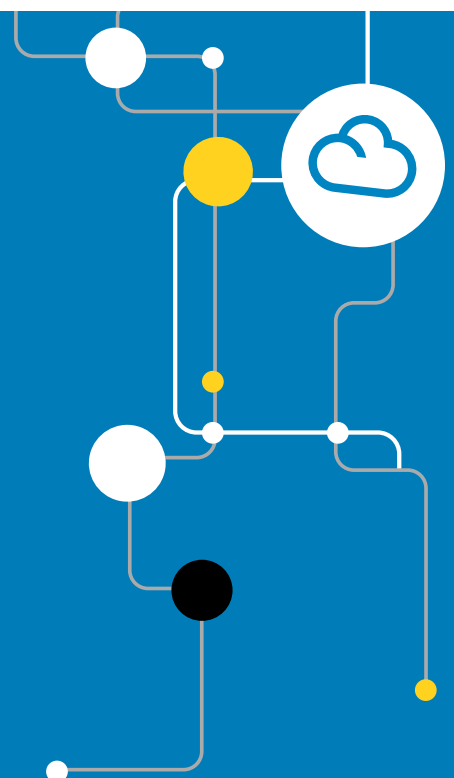
Aerohive wireless access points

Model	AP122	AP130	AP230	AP250	AP245X	AP1130	AP550
Specifications	802.11ac 2x2:2 MIMO 867Mbps max rate	802.11ac 2x2:2 MIMO 867Mbps max rate	802.11ac 3x3:3 MIMO 1.3Gbps max rate	802.11ac Wave 2 3x3:3 MU- MIMO Software selectable radios 2.6Gbps max rate	802.11ac Wave 2 3x3:3 MU- MIMO 1.3Gbps max rate	802.11ac 2x2:2 MIMO 867Mbps max rate	802.11ac Wave 2 4x4:4 MU-MIMO Software selectable radios 3.64Gbps max rate
Security	Trusted Platform Module (TPM) Chip for hardware-based key storage and encryption						
Network interface(s)	1x GbE	1x GbE	2x GbE w/link aggregation	2x GbE w/link aggregation	2x GbE w/link aggregation	1x GbE	2x GbE w/link aggregation
PoE interface	802.3af	802.3af	802.3af and/ or 802.3at	802.3af and/ or 802.3at	802.3af and/ or 802.3at	802.3at	802.3af and/ or 802.3at
Other interface	N/A	N/A	USB	Integrated BLE and USB	Integrated BLE and USB	N/A	Integrated BLE and USB
Operating temp	0° to 40° C	0° to 40° C	0° to 40° C	0° to 40° C	0° to 50° C	-40° to 55° C	0° to 40° C
Environment	Indoor, plenum rated	Indoor, plenum rated	Indoor, plenum rated	Indoor, plenum rated	Indoor, plenum rated	Outdoor, waterproof (IP 67)	Indoor, plenum rated

HiveManager NG Cloud-Based Network Management

HiveManager NG is a powerful cloud-based network management solution for Dell EMC Networking switches and Aerohive access points. This next-generation management system allows administrators to plan, configure and deploy their network within minutes and maintain control through an informative, user focused GUI. Key benefits include:

- Public or private cloud deployment options
- Flexible, cloud-based management
- Simplified deployment workflows
- Streamlined device and network configuration
- Centralized policy management
- Help desk-style troubleshooting interface



Open Networking

Dell EMC Open Networking switch solutions are cost-effective and easy to deploy, providing a clear path to software-defined networking (SDN). Based on our dependable, award winning Z-Series and S-Series switch hardware and featuring a choice of third-party OS and software options, these solutions give you the power to transform your network and accelerate data-center innovation with simplified, high-capacity network fabrics.

All Dell EMC Open Networking switches support the open source Open Network Install Environment (ONIE) for zero-touch installation of alternate network operating systems including feature-rich Dell EMC Networking OS:

- **Dell EMC Networking OS9** – our scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features, including OSPF, BGP and PBR (Policy Based Routing) support
- **Dell EMC Networking OS10** – a Linux-based infrastructure operating system with initial enablement on open networking data center platforms. OS10 is designed for modern and transitioning IT organizations moving towards a DevOps operational model where agility and infrastructure automation are critical.
- **Big Switch Networks** – Big Switch Networks Big Cloud Fabric and Big Monitoring Fabric products package technology components into fabric solutions, bringing Software-Defined Networks advanced feature sets at competitive price points.
- **Cumulus Networks** – Cumulus Networks simplifies data center operations by delivering operating system products that run on industry standard Ethernet switches, converging networking into the architectural and supply chain model of compute and leveraging hundreds of existing management, automation and monitoring tools.
- **IP Infusion** – the de facto standard for software-defined networking. For more than a decade, tier one and two network equipment manufacturers (NEMs) have relied on IP Infusion's OCNos® network software platform to bring products to market faster, improve ROI, and differentiate from competitors.
- **Pluribus Networks** – A leader in performance-oriented network virtualization for private and public cloud datacenters, Pluribus Networks transforms how IT administrators deploy applications to realize productivity gains and enable new business models.

Modular Infrastructure

Transforming your Dell EMC M1000e blade server enclosure

Blade interconnects capacity and ports	Model
1/10/40 GbE with four FlexIO modules (Layer 2/3)	MXL
1/10/40 GbE with four FlexIO modules (Layer 2)	PowerEdge M I/O aggregator
1/10 GbE with two FlexIO modules	M8024-k
10/100/1000Base-T Gbps ports plus 10 Gbps SFP+ (2 ports)	M6348
10/100/1000Base-T (4 fixed ports) and two FlexIO modules	M6220
8/16 Gbps FC (8 ports)	M6505

For the Dell PowerEdge FX2 modular-infrastructure platform

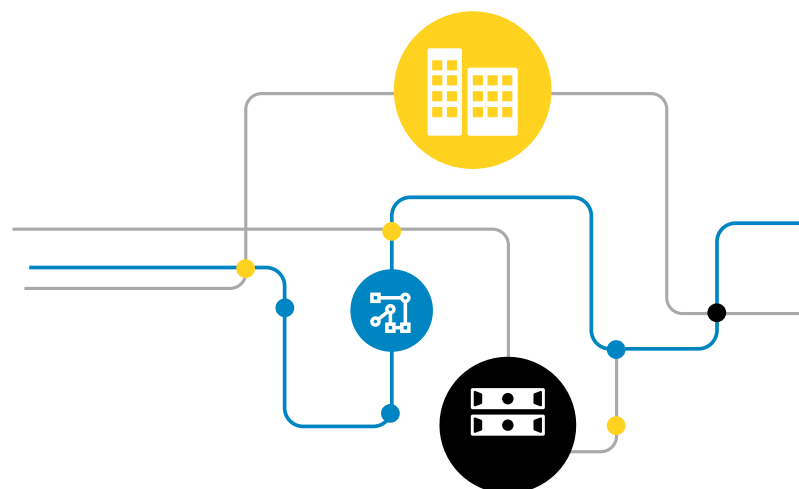
FN IO Modules capacity and ports*	Model
1/10GbE SFP+ (4 ports)	410s
1/10GbE 1/10GBase-T (4 ports)	410t
10GbE SFP+ (4 ports), or default 10GbE SFP+ (2 ports) and 2/4/8 Gbps Fibre Channel NPG mode and F_port (2 ports)	2210s

Brocade Fibre Channel

Leading connectivity options for your SAN

Capacity and ports*	Model
8/16 Gbps, (48, 72 or 96 ports)	Brocade 6520
8/16 Gbps, (24, 36 or 48 ports)	Brocade 6510
8/16 Gbps, (12 or 24 ports)	Brocade 6505
4/8 Gbps, (8, 16, or 24 ports)	Brocade 300

*All switches support multi-speeds.



Dell EMC IT Lifecycle Services for Networking

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



Consult

When you're ready to strengthen an existing network or build a new open architecture, Dell EMC Network Consulting can help you make informed and confident decisions. Our consultants can analyze your multivendor environment using specialized diagnostic tools and deliver a comprehensive report and action plan to improve network performance.

Application Performance Assessment

Look beyond the network. Our most comprehensive traffic analysis monitors end-users, apps, servers and devices to uncover the cause of performance degradation.

Network Optimization Assessment

Monitor the health of your multi-vendor network with an in depth analysis and design review that can help you improve stability and performance of all connected devices.

Network Topology Assessment

Gain better visibility of your network with an audit of all connected devices, configurations and device relationships to improve functionality and interoperability.

Voice-over-IP Assessment

VoIP requires healthy network infrastructure and proper design. We can troubleshoot your existing platform or help guide the process of building a new one.

Security Assessment

The network is under constant attack. Let our experts examine and uncover potential vulnerabilities in the firewall to enhance posture, reduce risk and facilitate compliance.

Wi-Fi Surveys and Assessments

Great wireless connectivity requires security, performance and compliance. Dell EMC can guide you with a new Wi-Fi design or troubleshoot issues with Wi-Fi coverage.



Deploy

Reduce costs, save time, and get new network technology up and running fast.

- Implementation planning and site readiness
- Installation and configuration of wired and wireless devices
- Multi-vendor integration and testing for networking



Train

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
- Choose instructor-led or self-paced online training programs.



Manage & Support

Spend less time resolving network issues and more time innovating.

- Access to technical experts 24x7x365
- Prevent downtime with automated remote monitoring enabled by Dell EMC Support Assist.
- Resolve multivendor networking challenges with collaborative third-party assistance.



Transform & Retire

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



Make the switch.
Learn more at
Dell.com/Networking