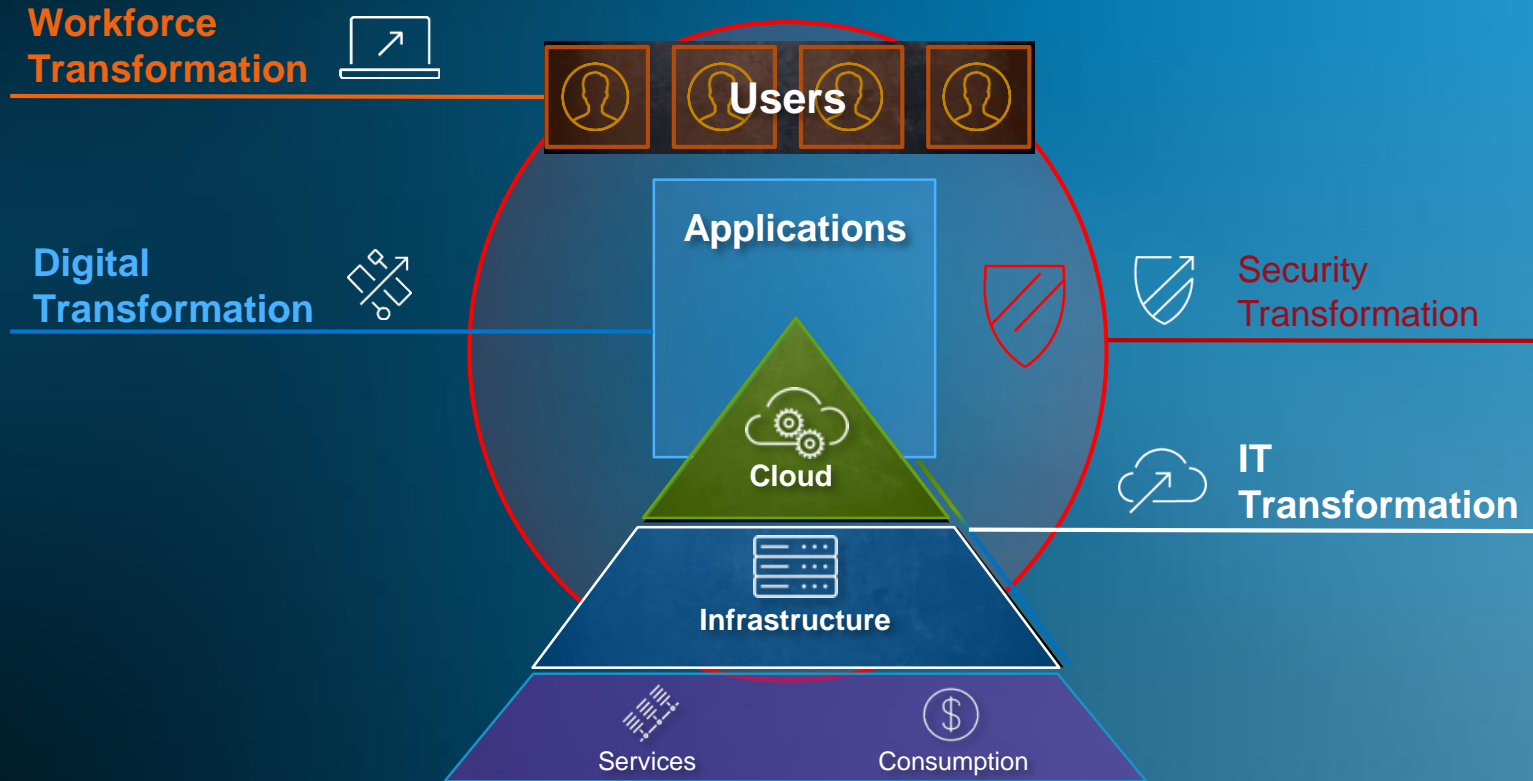


Dell EMC Networking Executive Overview

Winter 2018



Transforming your business



Our vision and strategy - Open Networking



Disrupting the fundamental economics of networking through **open, standards-based technology disaggregation** – addressing the gamut of environments from **hyperconverged to hyperscale**.

Open Networking – the proven path to SDN

**SDN users are 3.5X
more likely to beat
competitors to market**

**97% of transformed
companies are
committed to SDN**

**Deploy applications
2X ahead of schedule
with SDN**

“The resulting operational agility and operational efficiencies have been considerable, abetted further by visibility into the VMware vCenter orchestrator and related infrastructure like vSAN and NSX. The provisioning of the systems is now much easier and a lot faster, and it requires a lot less involvement for me and troubleshooting has become easier.”

Alex Kurgan
Sr. Network Engineer AFEX

“In the past the network team was segregated from the rest of the operations team. Not everyone knew the ins and outs of the various vendor-specific interfaces. This made it difficult and a little bit stressful for the networking team. Now our deployment model is to use Ansible. Everyone on our operations team has access to the Ansible playbook, and anyone can do it. They can deploy the full configuration from nothing to everything in just a few clicks, which is awesome.”

Andrew Martin
Network Engineer LogicMonitor

Dell EMC Open Networking innovation timeline

● **Jan** – announced Open Networking initiative with S4810-ON 10GbE switch and Cumulus Networks

● **Apr** – announced S6000-ON 40GbE switch

● **Apr** – partnership with Big Switch Networks

● **Aug** – partnership with VMware

● **Dec** – partnership with Midokura

● **Jan** – announced OS10

● **Mar** – announced OS10 Open Edition integration into OCP SONiC

● **Apr** – announced S4048T-ON 10GbBaseT switch and S6010-ON 10/40GbE switch

● **Oct** – announced OS10 Open Edition integration into Linux foundation OpenSwitch project

● **Dec** – OS10 Enterprise Edition into Beta

● **Mar** – announced new Virtual Edge Platform (VEP) family for next-gen access/SD-WAN

● **Apr** – announced S4112-ON micro top-of-rack switch

● **Aug** – announced Z9264F-ON 64 x 100GbE switch

● **Aug** – announced MX Fabric ONIE-enabled switching modules

● **Nov** – announced S5248F-ON, S5296F-ON and S5232F-ON switches

2014

2015

2016

2017

2018

● **Mar** – announced joint submission with Microsoft of Switch Abstraction Interface (SAI) to Open Compute Project (OCP)

● **Apr** – announced S3048-ON 1GbE switch, S4048-ON 10GbE switch and Z9100-ON 100GbE switch

● **Apr** – partnership with IP Infusion

● **Jun** – partnership with Pluribus Networks

● **Sep** – announced S6100-ON 40/100GbE switch

● **Jan** – announced campus switches N3132PX-ON and N2128PX-ON 2.5/5GbE POE+ switches

● **May** – announced S5100 25/100GbE & S4100 10/100GbE top-of-rack switches

● **May** – announced N1100 1/10GbE access switch

● **Sep** – announced S4200 deep-buffer/deep-table 10/100GbE switch

● **Sep** – SD-WAN Ready Nodes

MORE TO COME

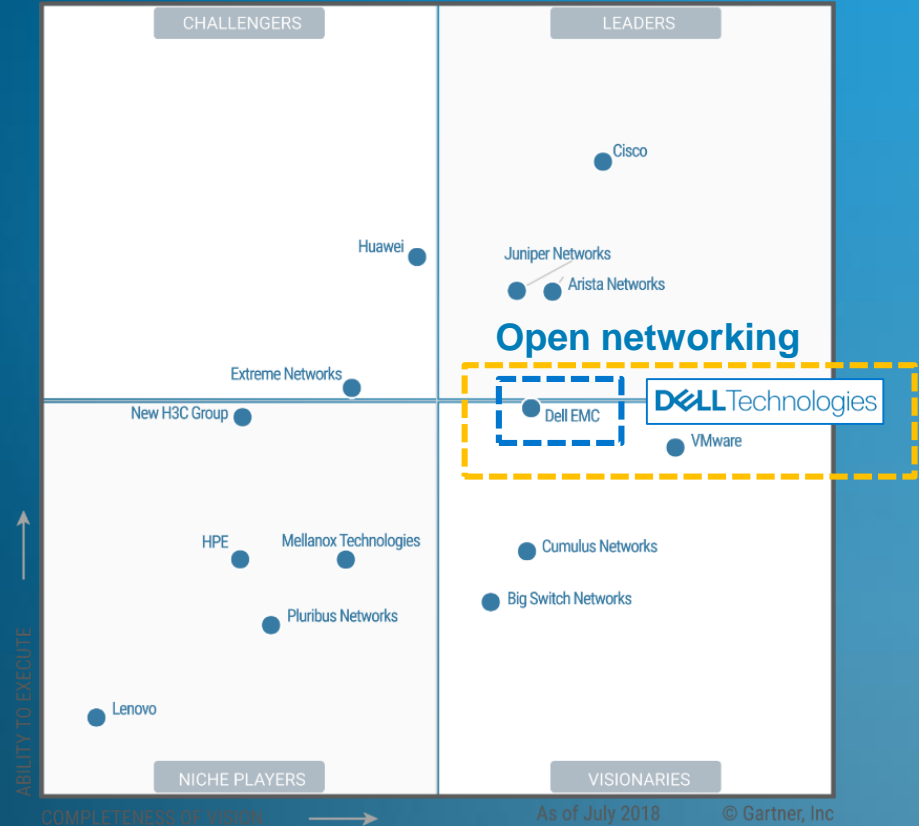
Recognized for our execution and vision

Gartner

Magic Quadrant for Data Center Networking

Dell EMC was an early proponent of, and remains committed to, Open Networking, which has driven and altered the market, and transformed the way many customers (and competitors) think about data center networking.

All organizations should shortlist Dell EMC, particularly those interested in Open Networking.



Dell EMC Networking portfolio

Fabric/Spine switches



Z-series

Top-of-rack/Leaf switches



S-series

Module I/O



MX modules for
MX7000

FN-IOM for
FX2

MXL/IOA
for
M1000e

Next-generation access



Virtual Edge Platform

Campus/Branch switching



N-series

Wireless networking



Aerohive and Ruckus

Networking software



DELL EMC
OS9, OS10

big switch
networks

cumulus networks

ipinfusion™

vmware
NSX

Pluribus
NETWORKS

Ecosystem partners



puppet
labs

ANSIBLE

CHEF

velocloud™

VERSA
NETWORKS

paloalto
networks.

The most complete and open SDN framework

For the Data Center

Open Networking Spectrum

More converged

More disaggregated

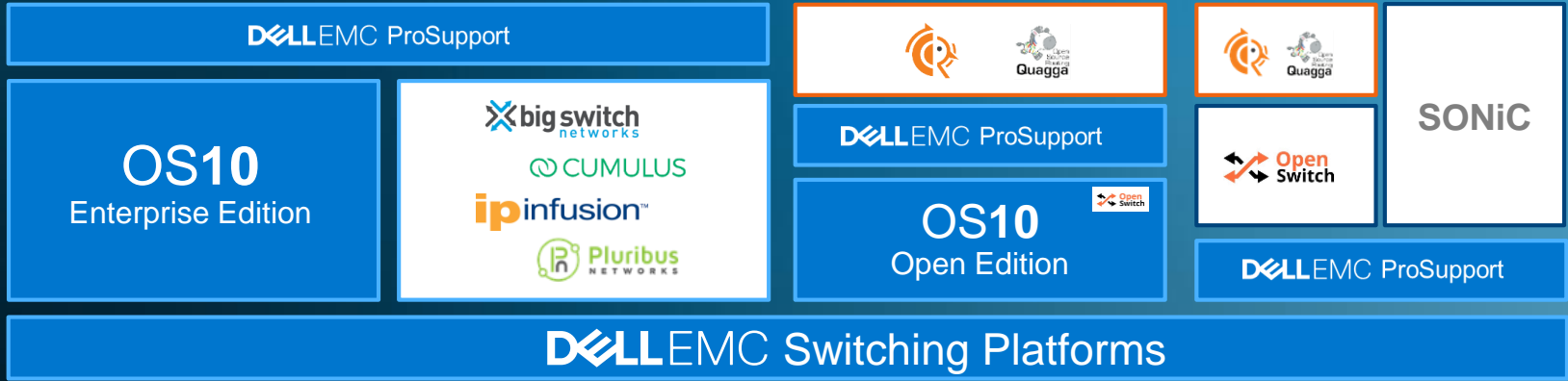


1. Dell EMC networking stack:
Full Dell EMC service and support for hardware and software

2. Open networking stack: Dell EMC service and support with warm hand-over to software partner

3. Disaggregated open source stack: Dell EMC service and support for base OS and hardware

4. Disaggregated open source stack: Dell EMC service and support for hardware elements



OS10 Open Edition = OpenSwitch

The most complete and open SDN framework

For the Campus, Branch and Wide-Area

Open Networking Spectrum



1. Open Networking for campus core, aggregation and access environments

2. Next-generation access/SD-WAN

3. Cloud-managed wireless

DELLEMC ProSupport

DELLEMC ProSupport

DELLEMC ProSupport

airwatch
Unified endpoint security

RSA

impulse safe•connect
Network access control

SONICWALL
Firewalls/intrusion detection

AEROHIVE NETWORKS RUCKUS NETWORKS
Cloud/on-prem secure wireless

OS6
&
OS9

big switch
networks

CUMULUS

velocloud™

VERSA
NETWORKS

AEROHIVE
NETWORKS

RUCKUS
an ARRIS company

DELLEMC N-series

DELLEMC VEP

End-to-end services enables rapid transformations

Storage
Review.com

“Our experience exceeded expectations in every way and the ProSupport team directly impacted the speed at which we rolled out the new network.”

Assistance through the IT Transformation journey

Consulting:

- Know your choices
- Areas to improve
- Understand the ROI
- Validate new technology

Achieve and sustain optimal network performance

ProDeploy: switching, security, Wi-Fi deployment

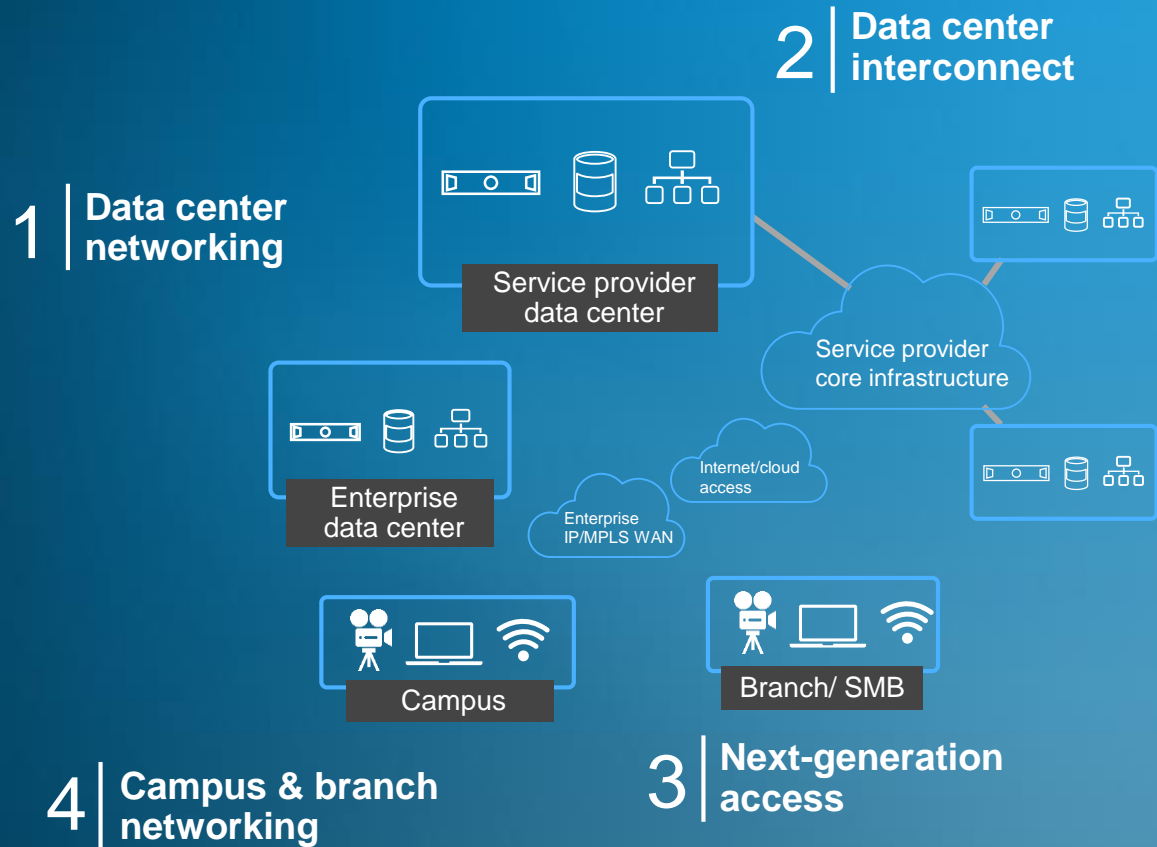
ProSupport: warranties, problem resolution, configuration reviews, collaborative assistance

66% Faster time to deploy¹

95% ProSupport & ProSupport Plus customer satisfaction

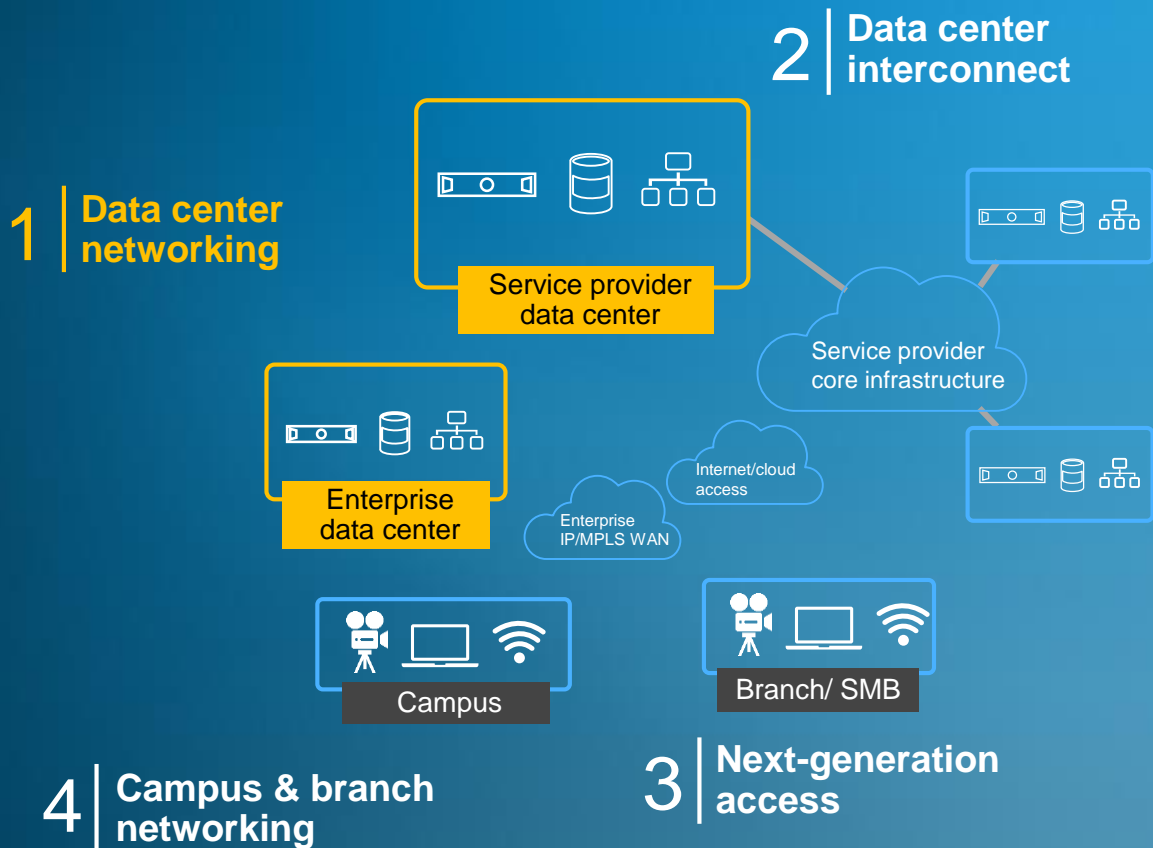
85% Of Networking support cases require more than basic hardware support³

Dell EMC
Networking
maximizes
customer choice,
flexibility, and
innovation at any
scale.



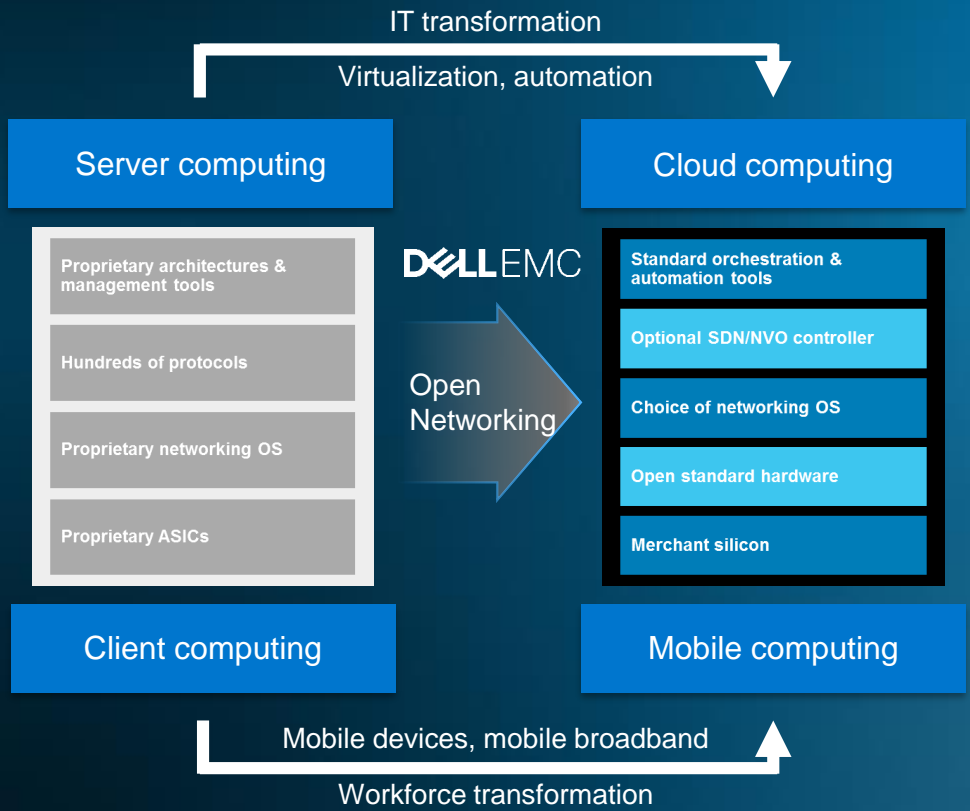
Use Case 1

Data center networking



Our signature in the data center is open

The foundation for IT transformation



Gartner

75%

End users expect an increase in relevance of Open Networking in their purchasing decisions in the next 24 months

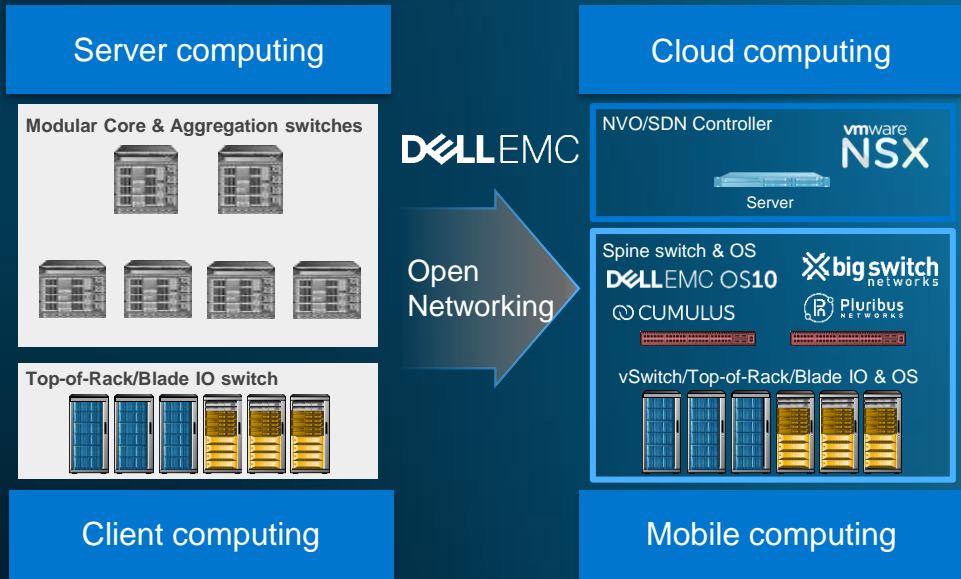
Gartner Magic Quadrant for Data Center Networking, July 2017

Data center architectural evolution

From multilayer and physical to flatter and virtual

IT transformation

Virtualization, automation



Technology disaggregation



Software defined



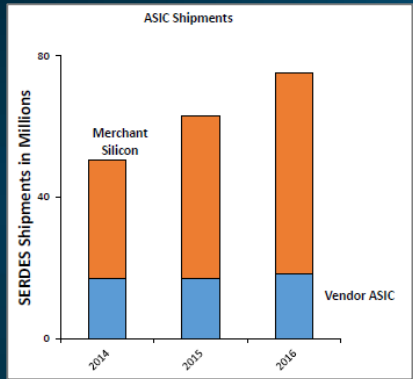
Web scale

Mobile devices, mobile broadband

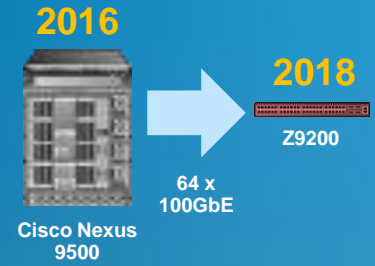
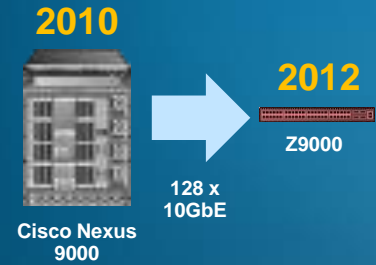
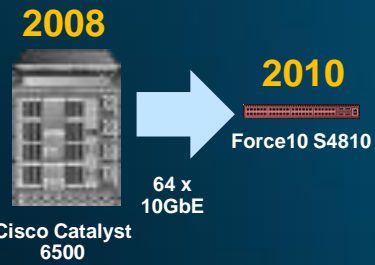
Workforce transformation

Right-sizing the modular switching market with merchant silicon

Port density



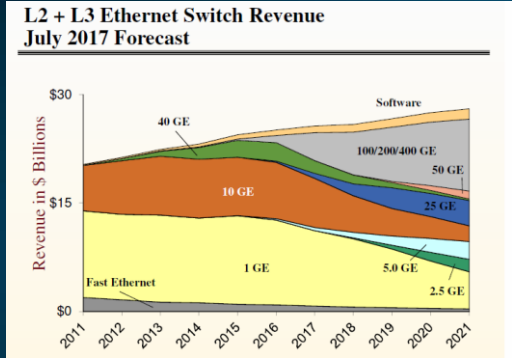
Source: 650 Group



Network scale

Complete top-of-rack connectivity

Port density

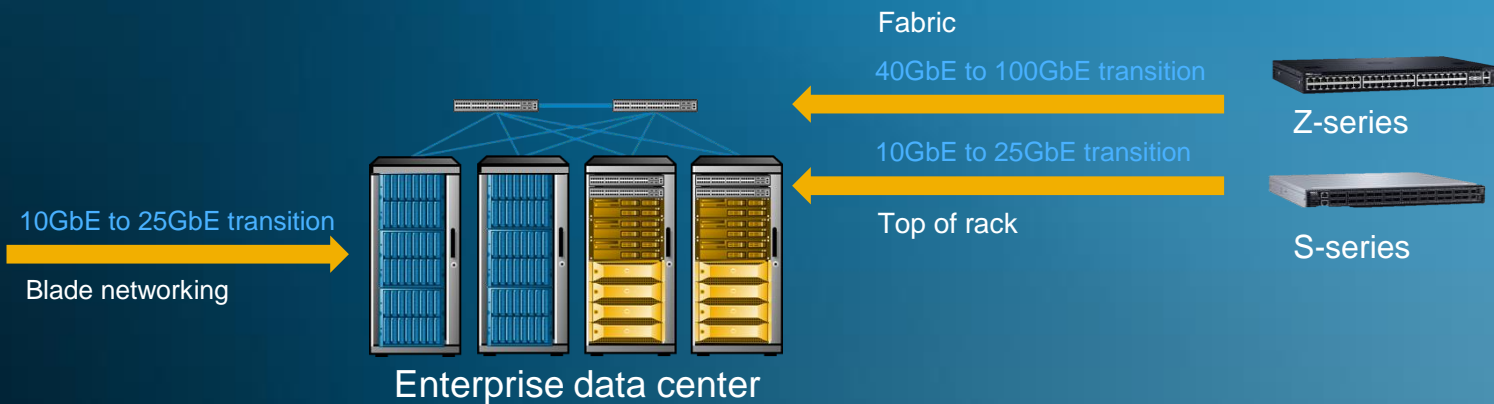
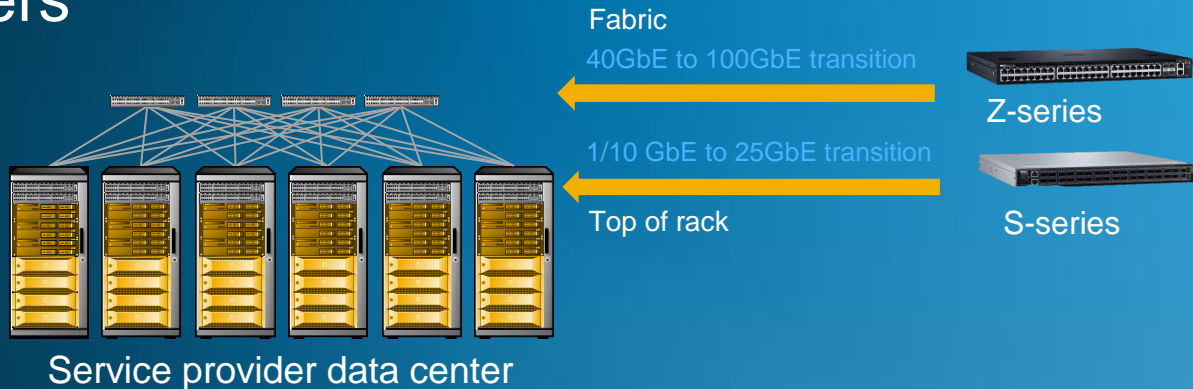


Source: Dell'Oro Group

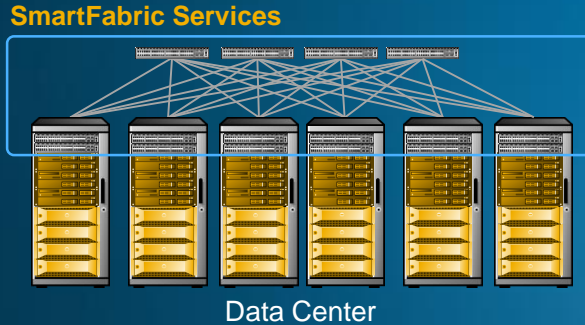


Network scale

Fabric and in-rack switching for enterprise and service providers



Automating Data Center fabrics with intent



Gartner

It is critical to commit to automating the operation of the data center in order to improve availability and agility. Further, this allows you to achieve economies of scale because, as you grow a system, you won't have to linearly grow the resources required to support it.

Integrated software designed to simplify and automate data center fabric creation and management

Autonomous self-building, self-managing, self-healing leaf spine fabrics at any scale

Gartner - Bringing Web-Scale Networking to Your Data Center - Joe Skorupa, Andrew Lerner, November 22, 2016



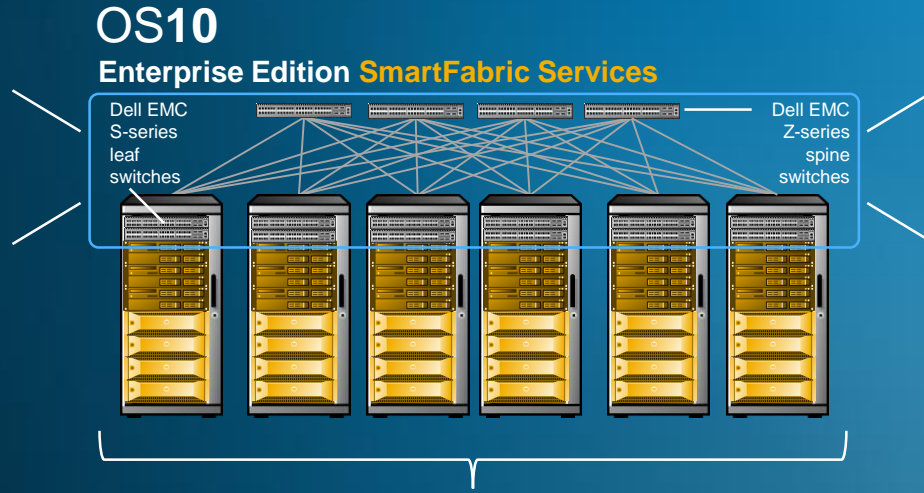
OS10 Enterprise Edition SmartFabric Services

SmartFabric Turnkey Solutions

- Plug-and-play fabric deployment – simply connect switches in fabric mode
- Fabric automation and control through solution nodes

SmartFabric Automation

- Zero-touch expansion – simply add additional leaf switches to the spine
- Automatic topology validation – automatically detect misconfigurations or link-level failures
- Automatically heal fabric upon failure condition removal



Integrated software designed to simplify and automate data center fabric creation and management

Autonomous self-building, self-managing, self-healing leaf spine fabrics at any scale

SmartFabric Vision

- Single pane of glass management – all switches in fabric managed as logical chassis
- Interoperable with 3rd party switches

SmartFabric Lifecycle Management

- Fabric-level firmware upgrades and configuration consistency checks
- Automated or user enforced roll back to last well-known state

Maximize value to your PowerEdge servers


Implement 25GbE networking



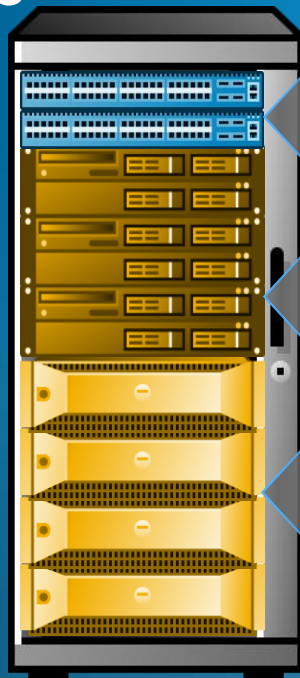
DELL EMC

25GbE for the price of 10GbE.

Networking math that anyone can understand.



Open Networking from Dell EMC
Make the switch.



25GbE top-of-rack switches
Z9200-ON, Z9100-ON, S6100-ON, S5200-ON, S5148F-ON, & S5048F-ON

14G PowerEdge servers with 25GbE I/O

iSCSI & NAS storage with 25GbE I/O*

*Future products currently in development



Fast



Future-proof



Lower cost

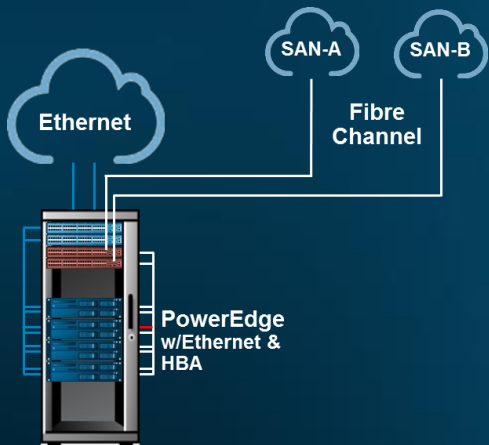


Superior TCO

Optimize your Dell EMC storage

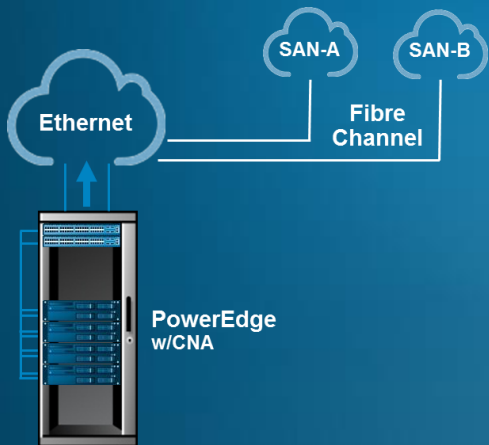
Take advantage of tested storage networking solutions

Traditional storage networking solutions



Separate Ethernet & fibre channel networks

Converged storage networking solutions



Converged LAN/SAN infrastructure

Scale-Out SDS networking solutions



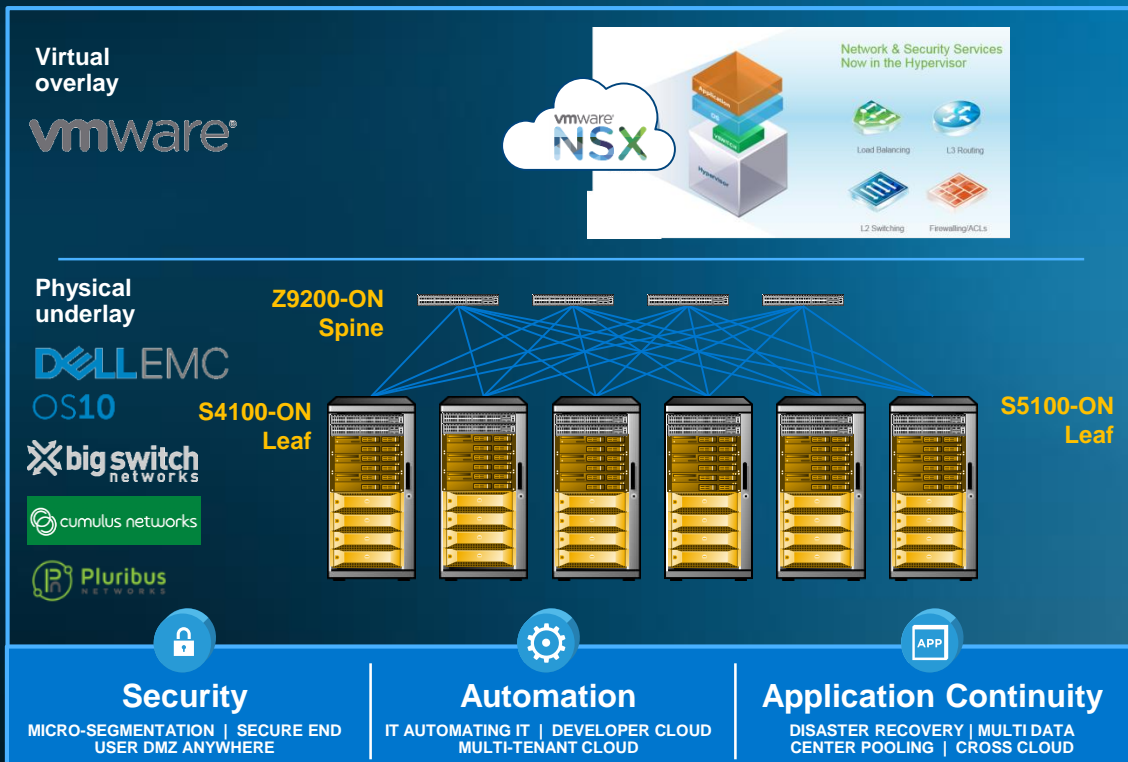
Scale-out Ethernet Fabric



Scale out leaf-spine network infrastructure

Better together: Dell EMC + VMware NSX

Enabling the software-defined data center



- Micro-segmentation and granular security delivered to the individual workload
- Reduced network provisioning time and improved operational efficiency through automation
- Workload mobility independent of physical network topology within and across data centers

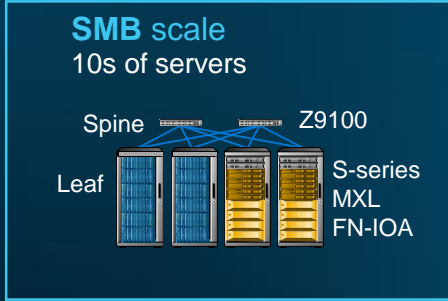
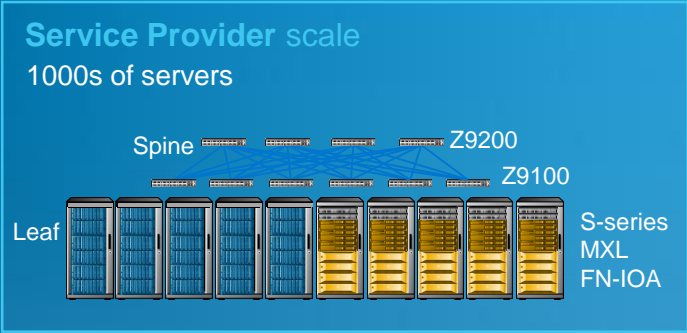
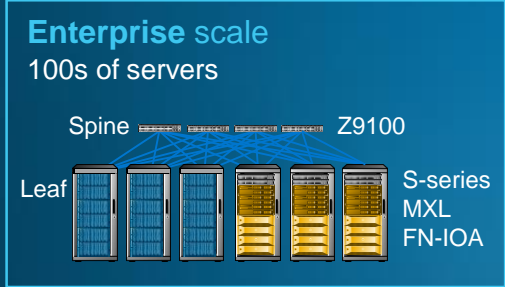
Data center networks at any scale

Fabric scale

Buy-more converged



Lead with OS10 Enterprise Edition



Build-more disaggregated



Lead with OS10 Open Edition, partners

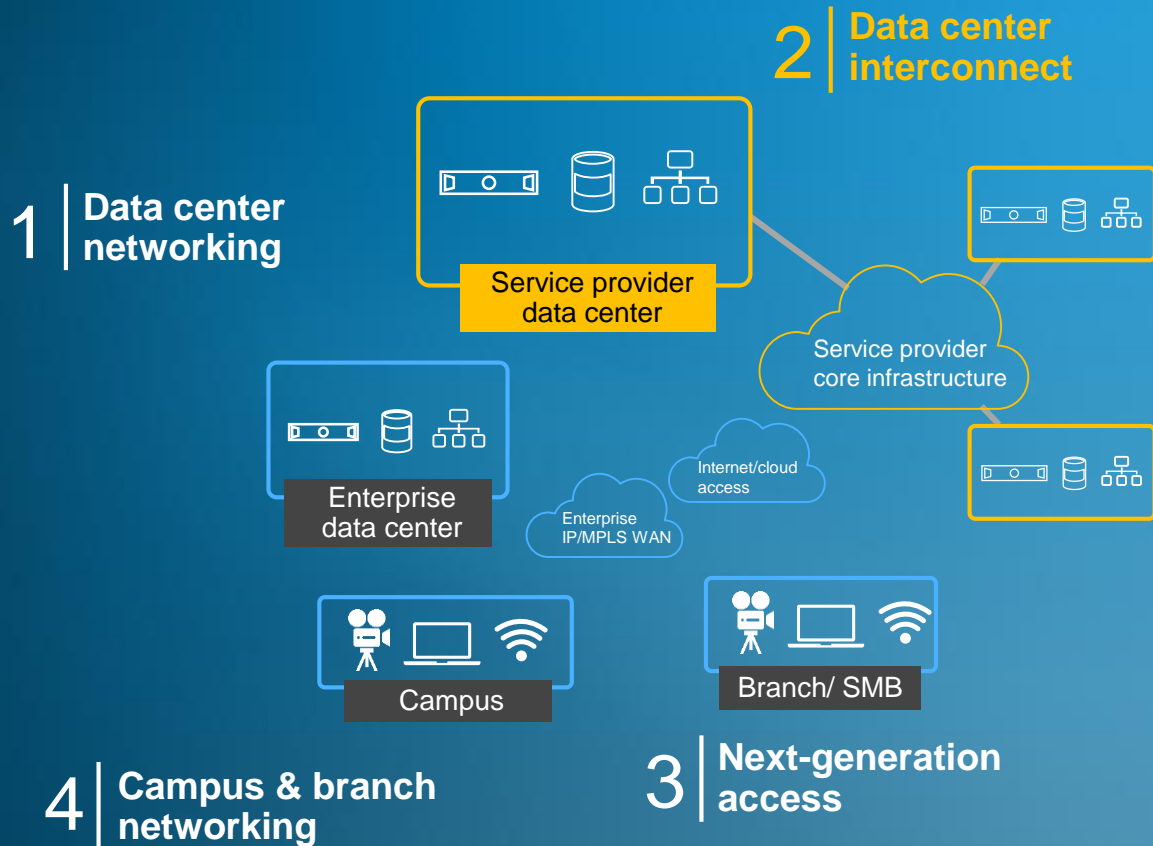
Workload/server/VM density



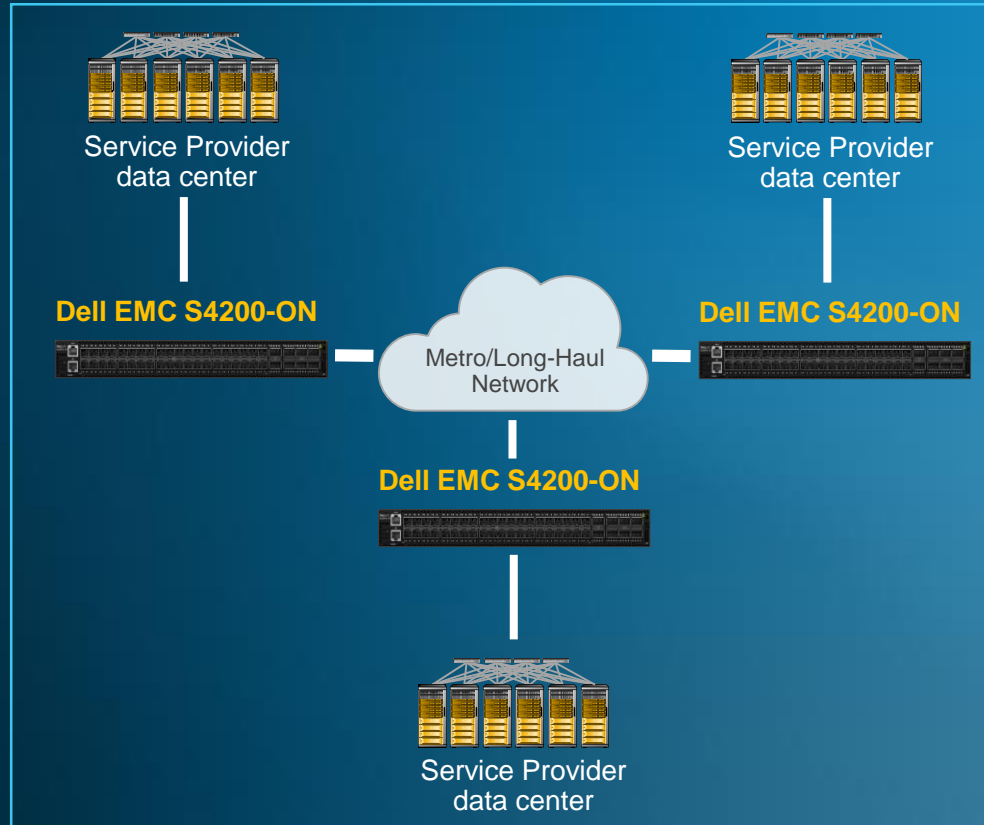
Expert services for every step of the way

Use Case 2

Data center interconnect



Cost-effective data center interconnect platforms for metro and wide area



Del EMC S4200 for data center interconnect

2-3^x

cost-savings for interconnect applications vs. traditional wide-area routing platforms

15^x

larger tables than standard 10/100GbE switch platform. Enables Data Center interconnect & full routing applications

500^x

larger buffers than standard 10/100GbE switch platform Boosts application performance and reliability

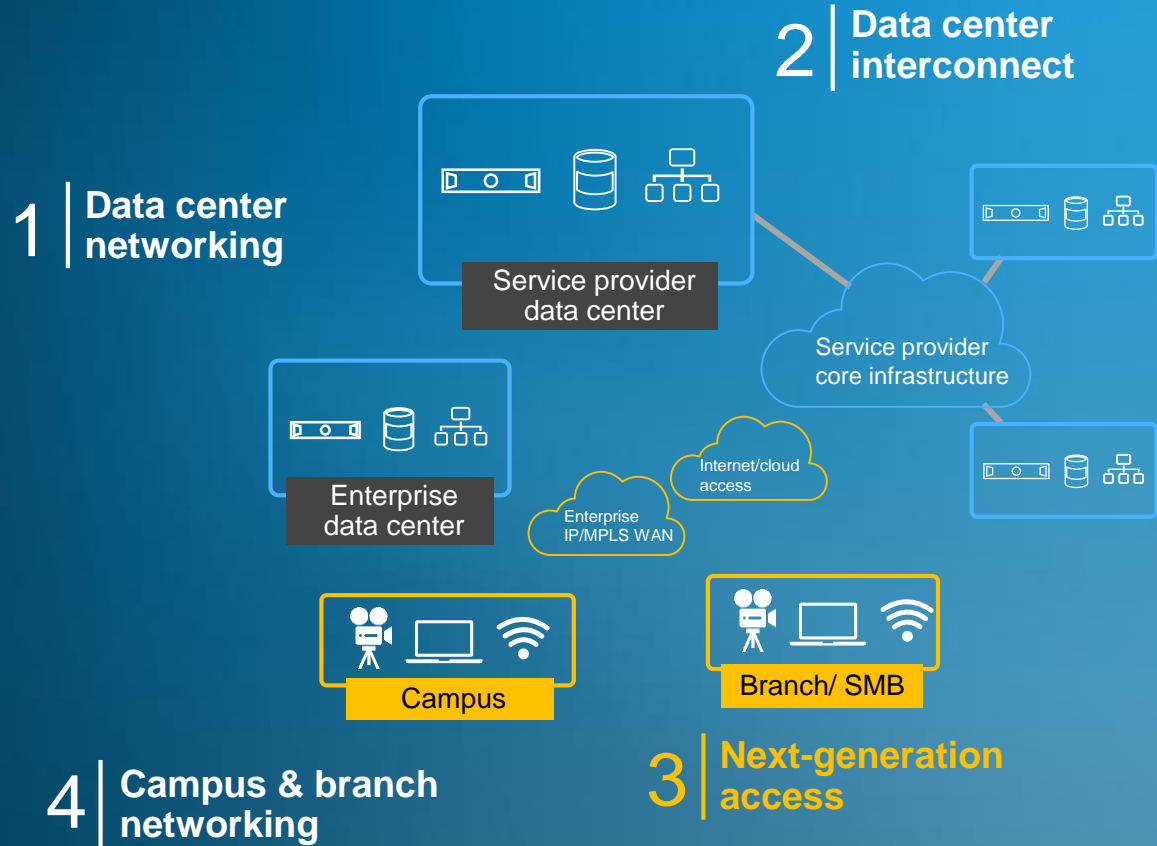
Del EMC S4200-ON



Software options: OS10 / IP infusion

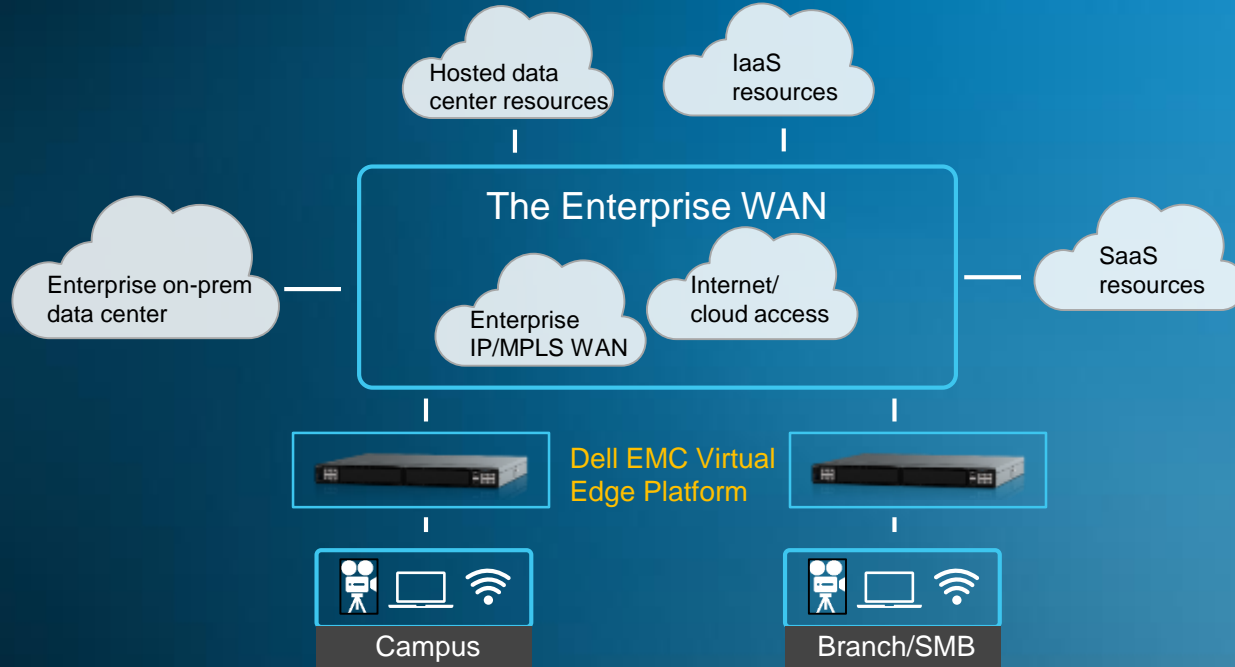
Use Case 3

Next-generation access



Next-generation access

The Enterprise WAN is the new LAN



“Digital transformation will be the most significant driver of SD-WAN growth over the next five years.”

- Rohit Mehra– IDC

Virtual Edge Platform

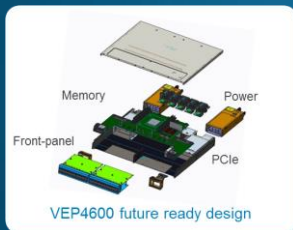
Use Case 3 | Next-generation access

Dell EMC VEP 4600



Intel® Xeon-D

Purpose built



Future ready



Ready Nodes with

velocloud



Validated choice

Virtual Edge Platform 4600

Validated choice

Use Case 3 | Next-generation access



Dell EMC VEP4600

DELL EMC

velocloud



Validated configurations designed to simplify and accelerate deployments

- ✓ Pre-validated offerings integrating Dell EMC Virtual Edge Platform models with industry-leading SD-WAN software packages

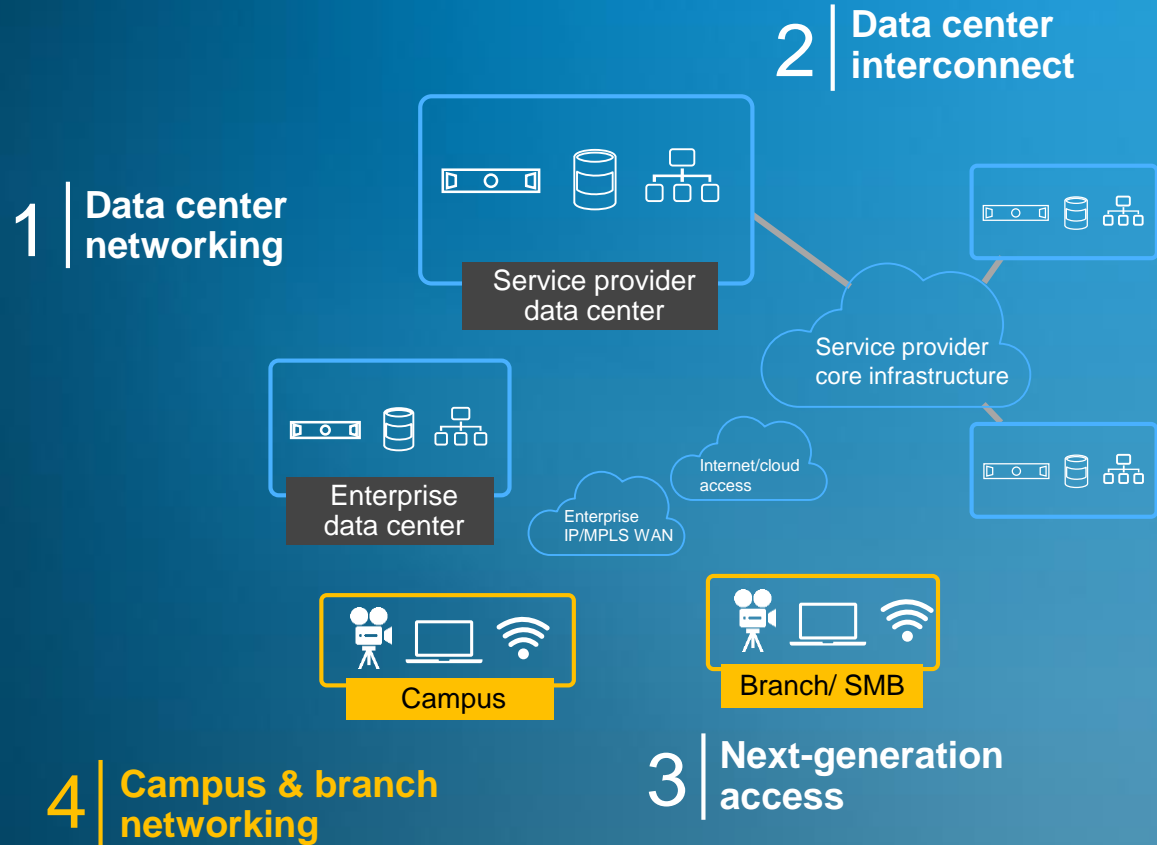
Validated Solutions



- Integrated hardware & software
- Tested & validated
- Deployment & sizing guides
- Accelerated quoting
- Simplified support

Use Case 4

Campus & branch networking

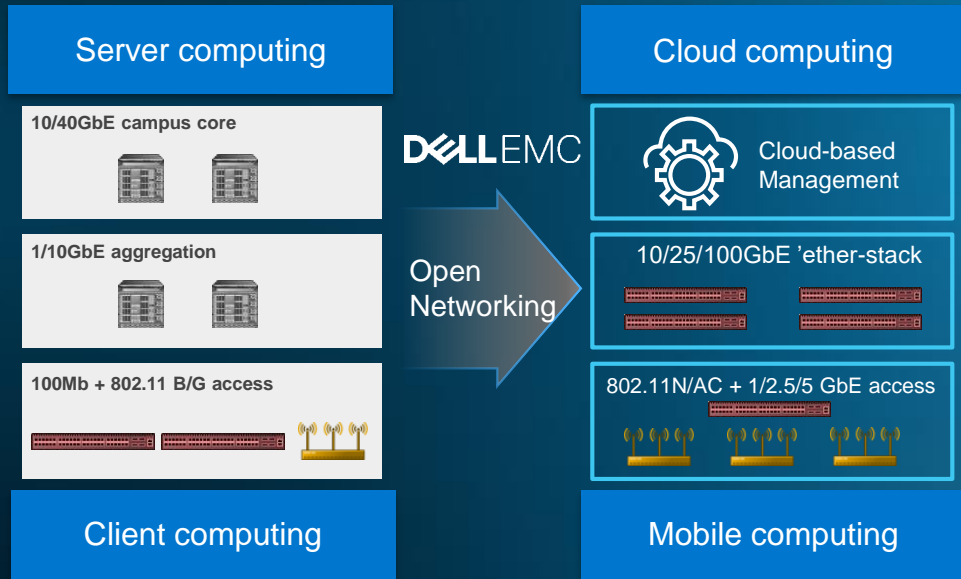


Campus & branch architectural evolution

From fixed and narrowband to mobile and broadband

IT transformation

Virtualization, automation



Mobile devices, mobile broadband

Workforce transformation



Mobile first architectures



Cost effective switching



Cloud-based management

Mobile first architectures

Industry-leading OEM solutions for wireless at any scale



Health care



Higher education



Hospitality



Retail



Large public outdoor venues



Smart cities



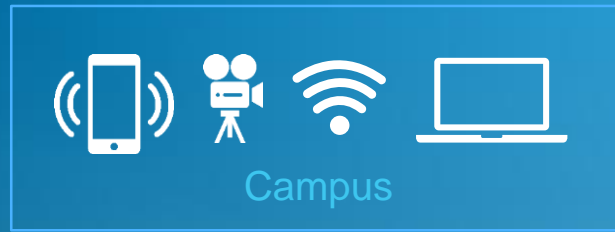
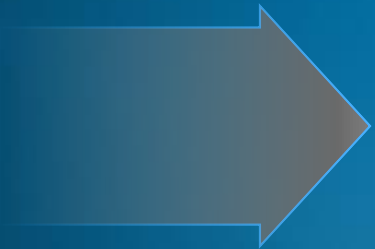
Service providers

Inside /out

Outside/in

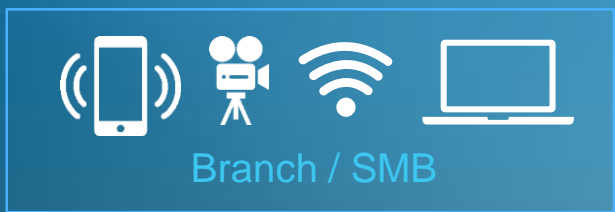
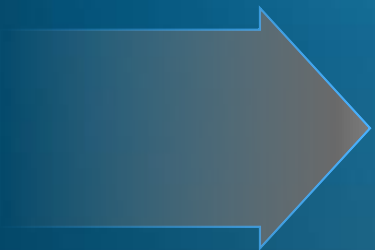
Cost-effective switching

N-series



X-series

Channel only



Cloud-based management

Hardware

Dell EMC N-series switches



Aerohive
NETWORKS

Access points

Software

Two management options:



Cloud



On-
premise

Services



Consulting
and surveys



ProDeploy



ProSupport

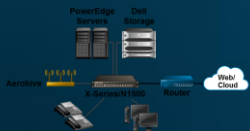
Simplified 'manage from anywhere' solutions for wired and wireless infrastructure

Campus & branch networking at any scale

End-user scale

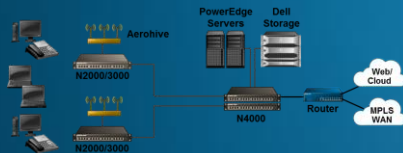
SMB scale

- 10s of users and endpoints
- Minimal to zero IT staff



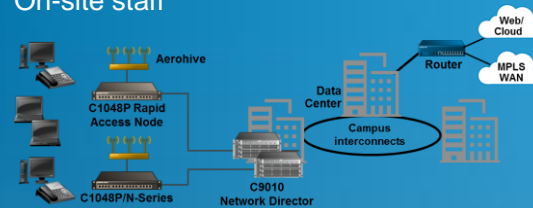
Branch scale

- 100s of users and endpoints
- Satellite and IT staff



Enterprise scale

- 1000s of users and endpoints
- On-site staff



Campus Reference Architectures

Validated solutions for SMB and Enterprise **switching, mobility and security**

Network scale



Expert services for every step of the way

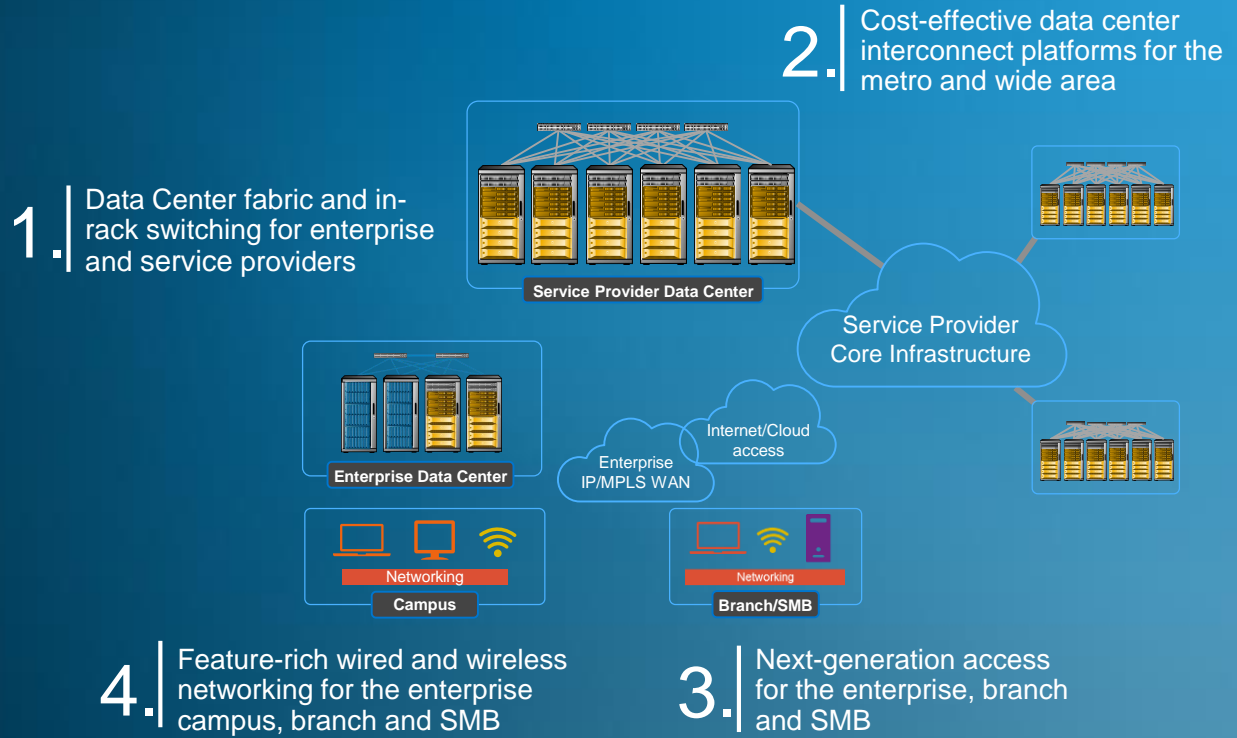
Dell EMC Networking

Executing on our vision of an open network end-to-end

Open Networking

Disrupting the fundamental economics of networking through open, standards-based technology disaggregation

Addressing the gamut of environments from hyperconverged to hyperscale



Learn more:
dell.com/networking

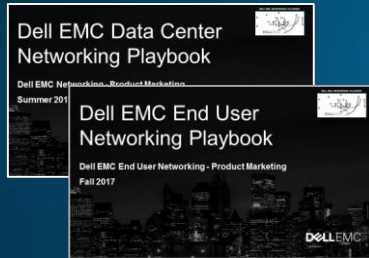
D~~E~~LL EMC

Dell EMC Networking sales & marketing resources

Dell EMC Networking
Overview Materials



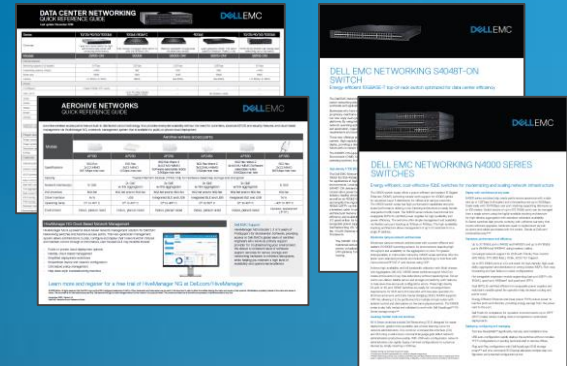
Dell EMC Networking
Playbooks



Dell EMC Networking
Attack Packs



Quick Reference Guides &
Specification Sheets



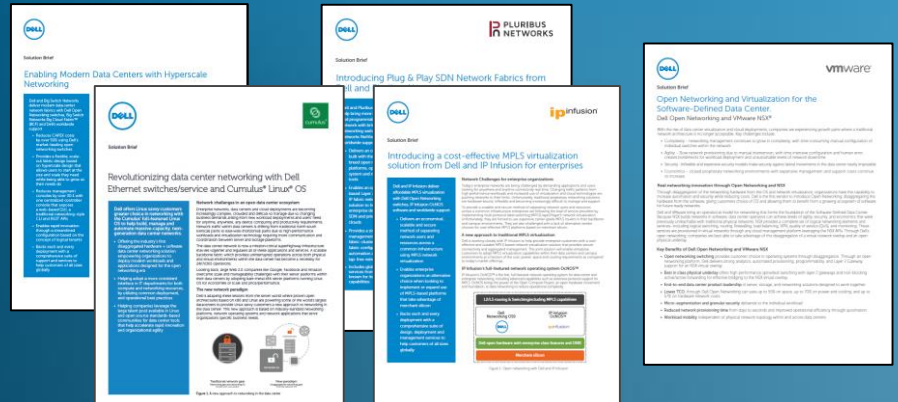
Virtual Rack



Thought Leadership



Open Networking Solutions



www.Dellnetworkingvr.dell.com