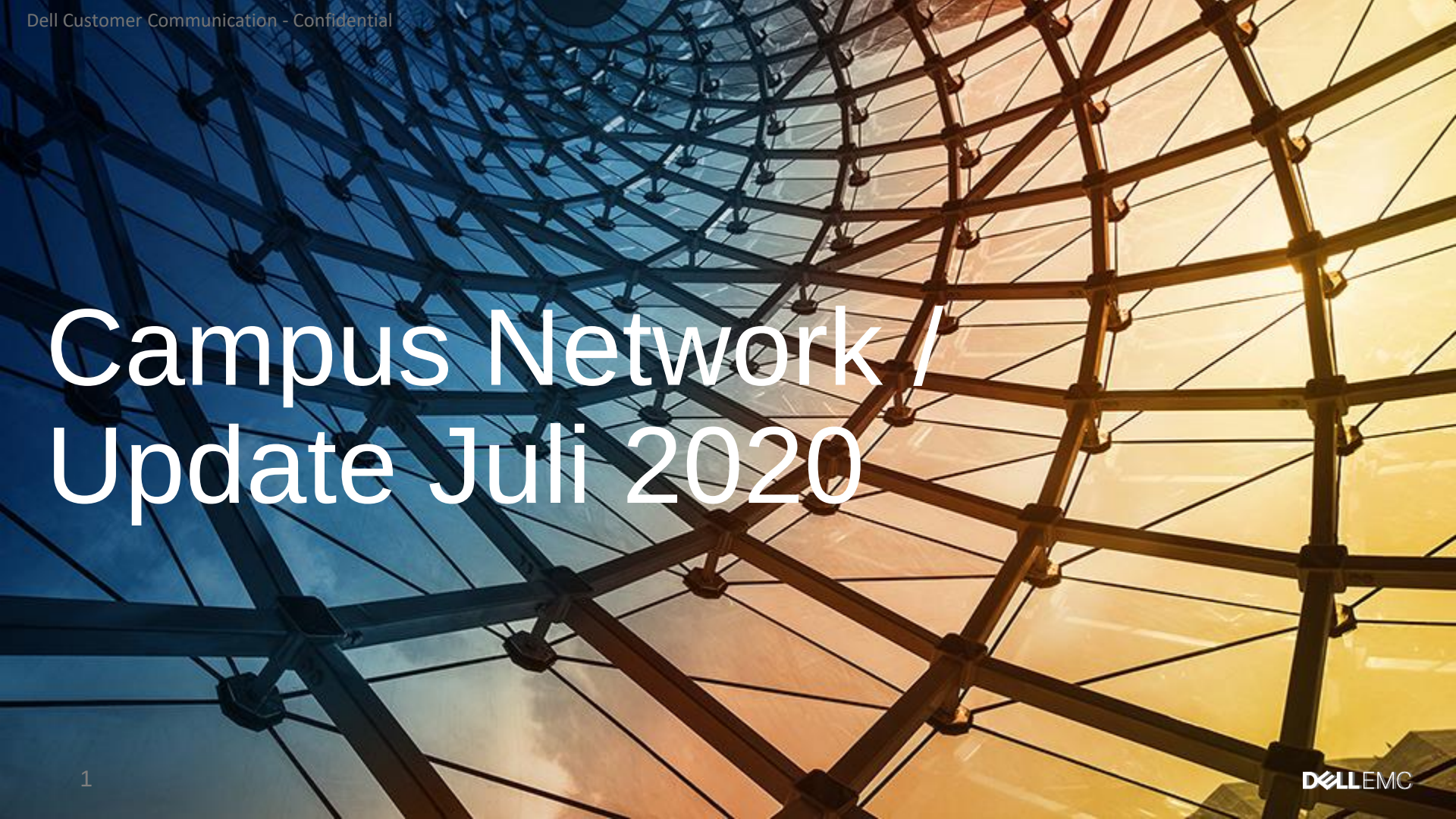

Campus Network / Update Juli 2020


DELL EMC
&
INGRAM MICRO
Mobility Campus Update
connects the Future
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Agenda

DataCenter, Campus, Mobility

- Netzwerk Marked Trends
- DellEMC Campus/DataCenter Switching
- Dell OEM Ruckus
- Ausblick-SD-WAN
- Netzwermanagement & NAC

Das richtige fürs Netztwerk….auch im Campus!

Technology Trends in Campus Networking

Wi-Fi6

Upto 10G to Ethernet network

Efficient in dense environments

Multi-Gig Switching

1G/2.5G/5G/10G

Wireless (802.11ac and 802.11ax)

High performance workstations

SD-WAN

Improving access and economics in the branch

Optimized WAN

Cloud Managed

Network Access-as-a-Service

Simplifying wired/wired management

Increased PoE

IEEE 802.3bt Type 3 (60W) and Type 4 (90W)

LED lighting, PTZ cameras

IoT

Device explosion

Increased network convergence

Security

Network Access Control

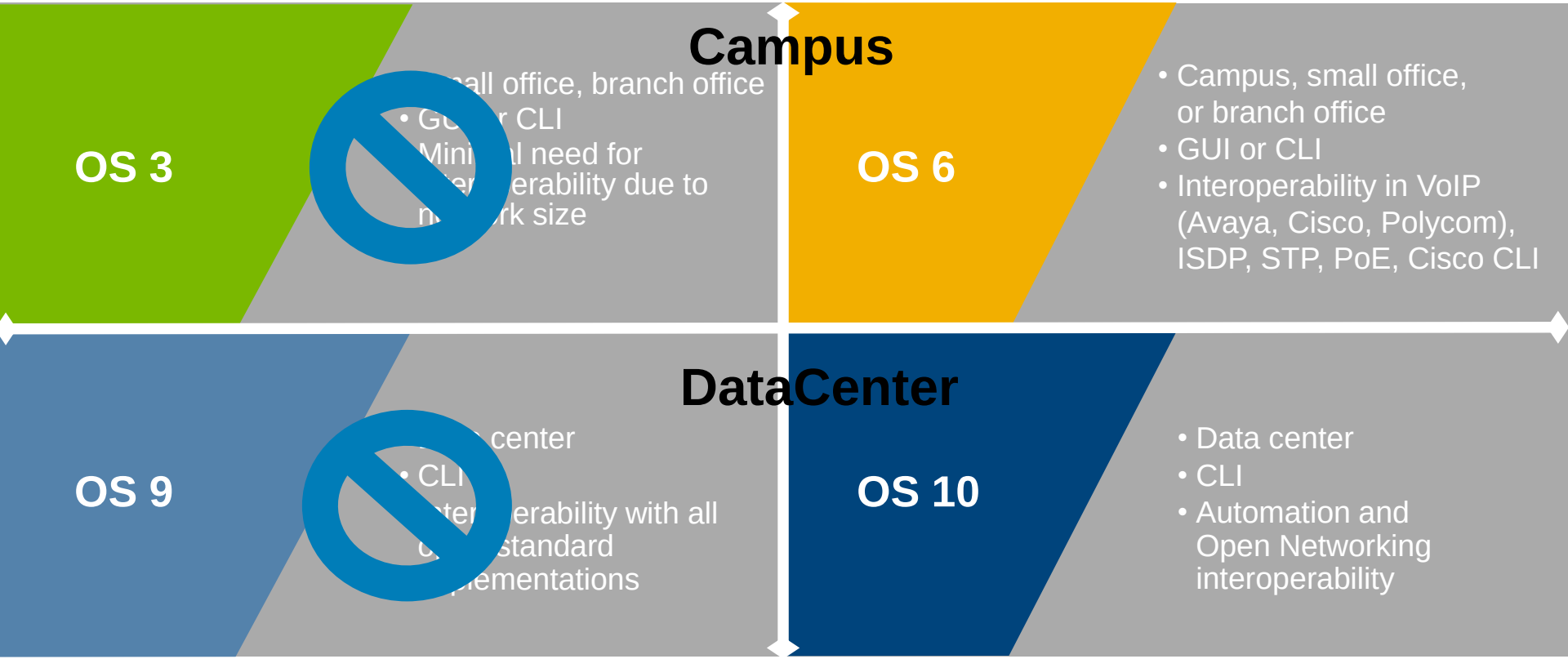
Visibility and Segmentation

Open Networking

Increasing move to fixed form factor core/aggregation

Disaggregated Networking

Network operating system administration



Graphical user interface (GUI)
Command line interface (CLI)


BAD NEWS FOR YOU
I'M AFRAID...
GAME
OVER

Die N-Serie…in voller Bewegung

Campus Switche für den Enterprise Bereich. 1-10Gbit für den Access Bereich im Campus. Kein DC! Fully Managed

N1100

X-Serie

N1500

N2000/2200

N2100

N3000/3200

N3100

N4000


Good News!

N1500 Layer 3 lite 1/10GbE access switch

Cost-effective, energy-efficient 1GbE access switch

- Up to 176Gbps switching capacity
- Up to 48 x 1GbE ports + 4 x 10GbE per switch
- Up to 200 x 1GbE ports in a four-stack configuration managed as a single node

Designed for 1GbE connectivity with Layer 3 lite features

- Cost-effective upgrade solution for aging 10/100Mbps access switches in small to mid-sized business environments

Dell EMC innovation

- Advanced Layer 3 lite functionality (up to 256 static routes; highly configurable ACLs
- USB Rapid Deployment for fast switch configuration
- Dell Fresh Air® compliant for office environments

Dell EMC Networking N1500

Products	
Model	**Port configuration**
N1524	24x RJ45 10/100/1000 Mb ports, 4x SFP+ ports for uplinks & stacking
N1524P	24x RJ45 10/100/1000 Mb PoE+ ports, 4x SFP+ ports for uplinks & stacking
N1548	48x RJ45 10/100/1000 Mb ports, 4x SFP+ ports for uplinks & stacking
N1548P	48x RJ45 10/100/1000 Mb PoE+ ports, 4x SFP+ ports for uplinks & stacking

N1100 1/10GbE campus access switch

Cost-effective Open Networking switches for campus access

- **N1108T-ON/N1108P-ON** – Half-width, 8 x 10/100/1000Mbps RJ45 ports and 2 x GbE RJ45 and 2 x GbE SFP interfaces, 4 x PoE/PoE+ ports
- **N1124T-ON/N1124P-ON** – Full-width, 24 x 10/100/1000Mbps RJ45 ports and 4 x SFP/SFP+ 1/10GbE ports, 12 x PoE/PoE+ ports
- **N1148T-ON/N1148P-ON** – Full-width, 48 x 10/100/1000Mbps RJ45 ports and 4 x SFP/SFP+ 1/10GbE ports, 12 x PoE/PoE+ ports

Applications

- Cost effective migration for aging 10/100 Mbps access switches with full-featured N-series functionality

Dell EMC innovation

- **Open Networking** with support for ONIE
- **USB rapid deployment** to expedite switch configuration
- **Fanless design** for ultra-quiet operation
- **Energy-efficient Ethernet** plus lower power PHYs to reduce power to inactive ports and idle links

ONIE

Dell EMC Networking N1100-ON

Full & half width
form factors

PoE and non-PoE
in a range of port configurations

DELL EMC

N1108EP-ON: Layer 2 1GbE Switch

Key features and innovations

- Fanless 8 port POE switch
- Each port capable up to POE+ power
- Adapter less: Power the switch via uplinks or via standard AC
- Compact half RU width

Key use cases

- Office or meeting rooms
- Class rooms with PoE power
- Wireless LAN AP connectivity
- Video Surveillance

SKUs	Port configuration
N1108EP-ON	8x 10/100/1000Mbps half/full duplex RJ45 ports, 2x GbE RJ45 and 2x GbE SFP interfaces, 8xPOE/POE+, compact half width form factor, fanless operation

Ganz Neu ☺

Roadmap: Q4 FY20

N2200-ON: L3 Standard 2.5GbE MultiGig Access

Latest generation 2.5GbE Campus Access Switches

NEW!

ONIE OS6

- Cost optimized fixed form factor switches, with full scale 2.5G MultiGig on all ports and 802.3bt Type-3 (60W) PoE on subset of ports
- x86 platform based on Broadcom Hurricane 3 MG chipset
- **N2224X-ON** - 1RU, 24x1/2.5GbE RJ-45 ports
- **N2224PX-ON** - 1RU, 24x1/2.5GbE RJ-45 with 802.3bt Type-3 (60W) PoE on 12 ports and 802.3at (30W) PoE on 12 ports
- **N2248X-ON** - 1RU, 48x1/2.5GbE RJ-45 ports
- **N2248PX-ON** - 1RU, 48x1/2.5GbE RJ-45 with 802.3bt Type-3 (60W) PoE on 24 ports and 802.3at (30W) PoE on 12 ports

Purpose-built for

- 802.11ac Wave 2 WLAN deployments and 802.3bt Type-3 high power PoE applications requiring upto 60W per port.
- Ideal for Mid to Large Enterprise Campus networks, Retail deployments requiring a range of PoE devices

Dell EMC innovation

- 160G Stacking with upto 12 members
- 25G Uplinks to aggregation

Dell EMC Networking N2200-ON

2.5G Multi-Gig

25G Uplinks

DELL EMC

N2200-ON Series Platform Definitions

	24 Ports	48 Ports
Managed, Layer 3 Standard	N2224X-ON N2224PX-ON	N2248X-ON N2248PX-ON
Silicon	Broadcom Hurricane 3 MG	Broadcom Hurricane 3 MG
Downlinks	24 x 1/2.5G Cu	48 x 1/2.5G Cu
Uplinks	4 x 25G SFP28	4 x 25G SFP28
PoE Variant	12 x 802.3at(30W) + 12x 802.3bt Type-3 (60W)	24 x 802.3at (30W) + 24 x 802.3bt Type-3 (60W)
Maximum PoE Budget	1080W*	2160W*
Stacking	12 members, 160G, 2x40G QSFP+ ports	12 members, 160G, 2x40G QSFP+ ports
PSU	Dual internal redundant PSUs (FRUs), AC/DC options	Dual internal redundant PSUs (FRUs), AC/DC options
Cooling	N+1 redundant fans (FRUs), I/O to PS and Reverse airflow options	N+1 redundant fans (FRUs), I/O to PS and Reverse airflow options
NPU	Hurricane3 MG	Hurricane3 MG
CPU	Denverton C3338 2 core	Denverton C3338 2 core
Flash	8 GB SSD	8 GB SSD
Memory	4 GB DDR4	4 GB DDR4

*Supporting Maximum PoE budget will require additional PSUs or power adapters to be purchased by the customer. Switches are by default supplied with single PSU only.

N3200-ON: L3 Advanced 1GbE &10GbE MultiGig Access

NEW!

Latest generation 1GbE and 10G MultiGig Campus Access Switches

- Cost optimized fixed form factor switches, with wide range of port density options for 1G and 10G MultiGig speeds and 802.3bt Type-4 (90W) and 802.3at (30W) PoE ports
- x86 platform based on Broadcom Trident3 chipset (except N3208PX-ON based on H3MG)
- **1G Platforms:**
  - **N3224T-ON** - 1RU, 24x1GbE RJ-45 ports
  - **N3224P-ON** - 1RU, 24x1GbE 802.3at (30W) PoE ports
  - **N3224F-ON** - 1RU, 24x1GbE SFP ports
  - **N3248TE-ON** - 1RU, 48x1GbE RJ-45 ports
  - **N3248P-ON** - 1RU, 48x1GbE 802.3at (30W) PoE ports
- **10G MultiGig Platforms:**
  - **N3208PX-ON** - Compact fanless*, 4x5GbE 90W PoE and 4x1GbE 90W PoE ports
  - **N3224PX-ON** - 1RU, 24x1/2.5/5/10GbE 802.3bt Type-4 (90W) PoE ports
  - **N3248X-ON** - 1RU, 48x1/2.5/5/10GbE RJ-45 ports
  - **N3248PXE-ON** - 1RU, 48x1/2.5/5/10GbE 802.3bt Type-4 (90W) PoE ports

ONIE OS6

Dell EMC Networking N3200-ON

48 x 10G MultiGig

48 x 90W PoE

Purpose-built for

- 802.11ax WLAN deployments and 802.3bt Type-4 (90W) high power PoE applications
- Ideal for Large Enterprise Campus networks and large retail deployments

Dell EMC innovation

- **Open Networking**
- High Density (48-ports) 10G Multigig and 802.3bt Type-4 (90W) PoE
- 400G Stacking with upto 12 members
- 25G Uplinks to aggregation

*Fanless until 25C ambient, fan kickstarts beyond that ambient temperature range

N3200-ON Series MultiGig Platform Definitions

	8 Ports	24 Ports	48 Ports
Managed, Layer 3 Advanced	N3208PX-ON	N3224PX-ON	N3248X-ON N3248PXE-ON (with MACSec)
Downlinks	4 x 1G Cu + 4 x 1/2.5/5G Cu	24 x 1/2.5/5G/10G Cu	48 x 1/2.5/5G/10G Cu
Uplinks	2 x 10G SFP+ Ports	4 x 25G SFP28	4 x 25G SFP28
PoE Variant	8 x 802.3bt Type-4 (90W)	24 x 802.3bt Type-4 (90W)	48 x 802.3bt Type-4 (90W)
Maximum PoE Budget	720W*	2160W*	4320W*
Stacking	No	12 members, 400G, 2x100G QSFP28 ports	12 members, 400G, 2x100G QSFP28 ports
PSU	One internal open frame AC PSU and external adapter(s)	Dual internal redundant PSUs (FRUs), AC/DC options	Dual internal redundant PSUs (FRUs), AC/DC options
Cooling	Fan turn-on after 25C ambient	N+1 redundant fans (FRUs), I/O to PS airflow	N+1 redundant fans (FRUs), I/O to PS and Reverse airflow options on N3248X-ON
NPU	Broadcom Hurricane 3 MG	Broadcom Trident 3 X3	Broadcom Trident 3.X5
CPU	Denverton C3338 2 core	Denverton C3338 2 core	Denverton C3338 2 core
Flash	8 GB SSD	8 GB SSD	8 GB SSD
Memory	4 GB DDR4	4 GB DDR4	4 GB DDR4

*Supporting Maximum PoE budget will require additional PSUs or power adapters to be purchased by the customer. Switches are by default supplied with single PSU only.

N3200-ON Series GiGE Platform Definitions

	24 Ports	48 Ports
Managed, Layer 3 Advanced	N3224T-ON N3224F-ON N3224P-ON	N3248TE-ON N3248P-ON
Downlinks	N3224T/P: 24 x 1G Cu N3224F: 24 x 1G SFP	48 x 1G Cu
Uplinks	4 x 10G SFP+	4 x 10G SFP+
PoE Variant	24 x 802.3at (30W)	48 x 802.3at (30W)
Maximum PoE Budget	720W*	1440W*
Stacking	12 members, 400G, 2x100G QSFP28 ports	12 members, 400G, 2x100G QSFP28 ports
PSU	Dual internal redundant PSUs (FRUs), AC/DC options	Dual internal redundant PSUs (FRUs), AC/DC options
Cooling	N+1 redundant fans, I/O to PS and Reverse airflow options on N3224T-ON	N+1 redundant fans, I/O to PS and Reverse airflow options on N3248TE-ON
NPU	Broadcom Trident 3 X3	Broadcom Trident 3 X3
CPU	Denverton C3338 2 core	Denverton C3338 2 core
Flash	8 GB SSD	32 GB SSD on N3248TE-ON, 8 GB SSD on N3248P-ON
Memory	4 GB DDR4	4 GB DDR4

*Supporting Maximum PoE budget will require additional PSUs or power adapters to be purchased by the customer. Switches are by default supplied with single PSU only.

Stacking – What's new

Key new benefits	N2200 (24/48 port switches only)	N3200 (24/48 port switches only)
Dedicated Rear Stacking Ports for all families	Yes	Yes
Standard ports instead of proprietary HiGig	2xQSFP+ ports (40G per port) replaces HiGig21 ports **NEW**	2xQSFP28 ports (100G per port) replaces HiGig42 ports **NEW**
Stacking without specialized cables No more short reach stacking limitation	Short reach and long reach stacking using standard QSFP+ Optics/DAC/AOCs	Short reach and long reach stacking using standard QSFP28 Optics/DAC/AOCs
2x or greater stacking bandwidth compared to previous generation	160 Gbps (vs 80Gbps) , 12 members	400 Gbps (vs 160 Gbps), 12 members

- **Stacking support within each family continues – N2200, N3200 families**
- **Stacking not backward compatible with old N-series**

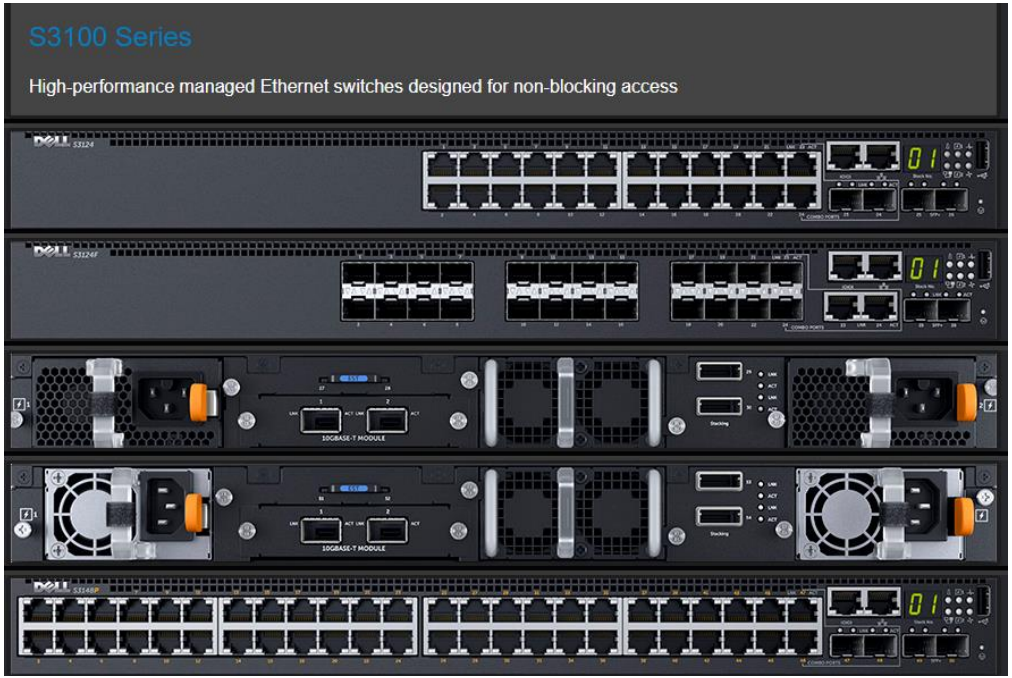
Extending PoE Budgets

	External Power Adapters	MPS-1S Shelf	MPS-3S Shelf
Supported Models	N3208PX-ON	N2224PX-ON N2248PX-ON N3248P-ON N3224PX-ON N3248PXE-ON	N2224PX-ON N2248PX-ON N3248P-ON N3224PX-ON N3248PXE-ON
Power wattage supported	Upto 2x320W on N3208PX-ON	Can support one of: 1050W AC PSU 1600W AC PSU 2000W AC PSU 1300W DC PSU	Can support upto three: • Any of the 1050W AC PSU, 1600W AC PSU, 2000W AC PSU • Or 1300W DC PSUs
Function	Can support PoE budget extension or redundancy for one switch	Can support PoE budget extension or redundancy for one switch	Can support PoE budget extension or redundancy for upto 3 switches
Mounting Options	Wall/Ceiling (Plenum rated) Rack mounting	Wall/Ceiling (Plenum rated) Rack mounting	Rack mounting
Other key features	-	-	Power sharing possible. Eg: 3x2000W PSUs can deliver 3000W to Switch 1, 1500W to Switch 2 and 1500W to Switch 3 2x1600W PSUs can deliver 1200W to Switch 1, 1000W to Switch 2 and 1000W to Switch 3 Maximum of 6000W Power that can be shared across 3 switches.

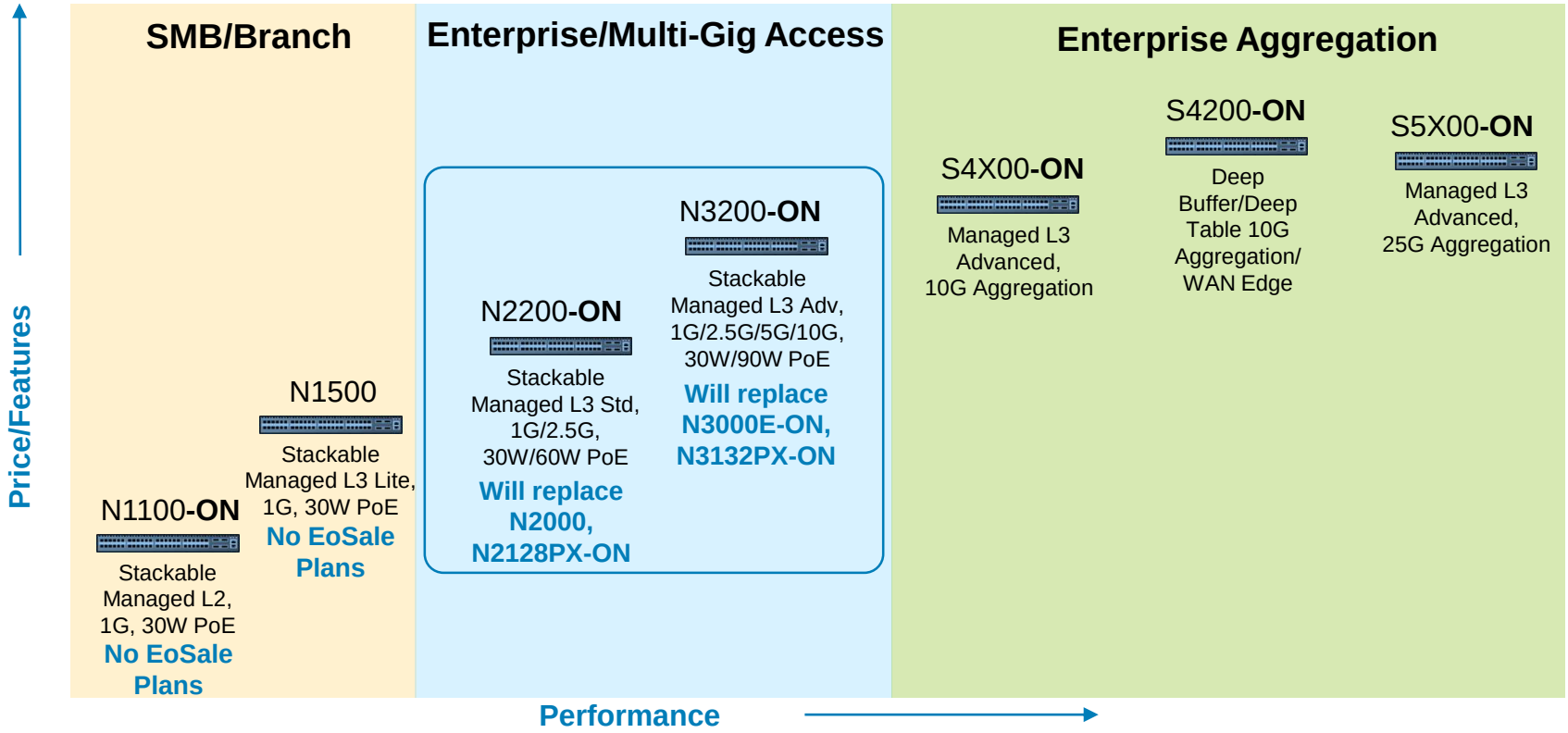
S-3100 Series

Dell Networking OS9

- 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



Campus Switching **Positioning**



Key Use Cases

Use case for PoE cameras for video surveillance

Solving real world challenges

Dell EMC Surveillance technology is helping to make the world safer in a variety of public environments.

Campus Safety
Leveraging IoT technologies to improve campus security and ensure safer learning

Hospital and patient safety
Improving patient monitoring, safety and quality of care

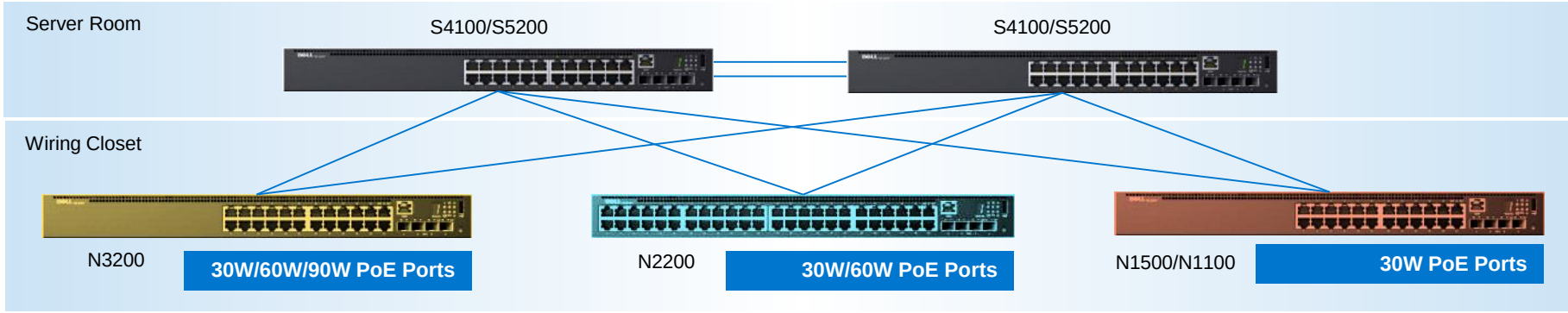
Safe Cities
Making cities in India safer and more secure by transforming its video management technology

Stadium safety
Dell EMC and the National Center for Spectator Sports Safety and Security is partnering to enhance the fan experience, improve venue safety and increase profitability

Airport safety
Protecting travelers moving in and around airports and country entry points

Public safety
Transforming police departments for better detect, detour and documentation with body worn cameras

High powered PoE devices, Perpetual & Fast PoE




Signage
>60W


Kiosks
30W-60W

Thin Clients
30W-60W


IP Turrets
30W-60W


Outdoor/PTZ
30W-60W

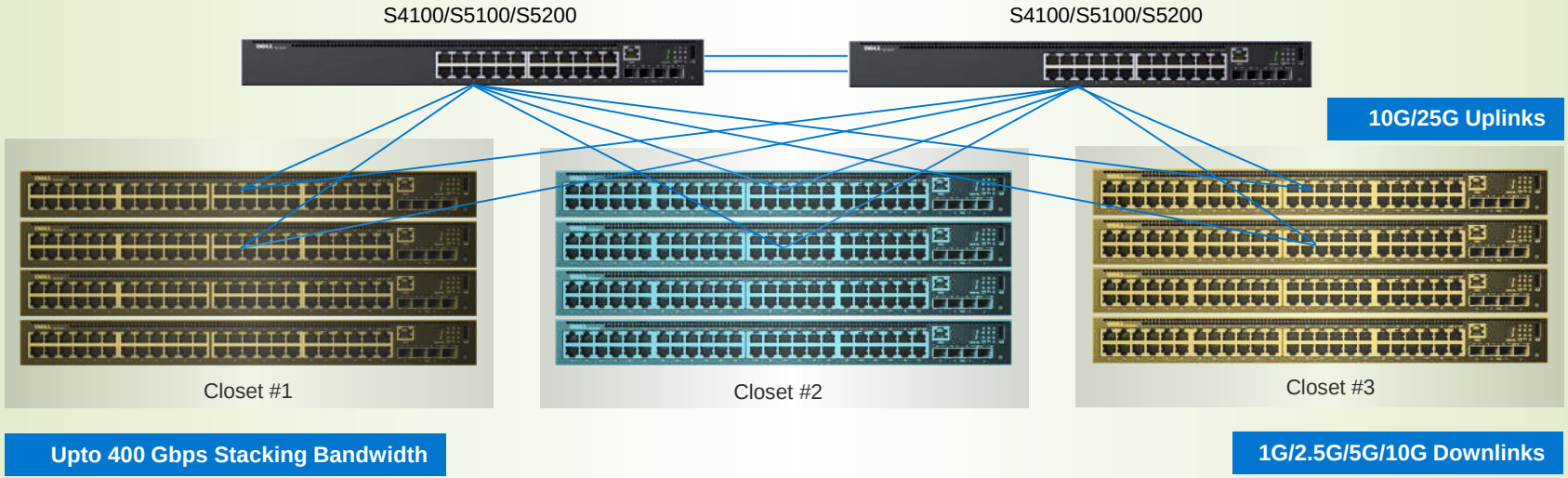

LED Troffers
30W-60W


802.11ax APs
30W-60W

PoE Type	IEEE	Max Power to PD	Max Power at PSE	Pairs Used	Cable
PoE	802.3af	12.95W	15.4W	2	Cat 3,5
PoE+	802.3at	25.5W	30W	2	Cat 5
PoE 60W	802.3bt Type-3	51W	60W	4	Cat 5
4PPoE	802.3bt Type-4	74.55W	90W	4	Cat 5e*

*Cat 6a recommended for better thermal performance

Scalable Campus with Multi-Gig Access & Multi-rate Aggregation



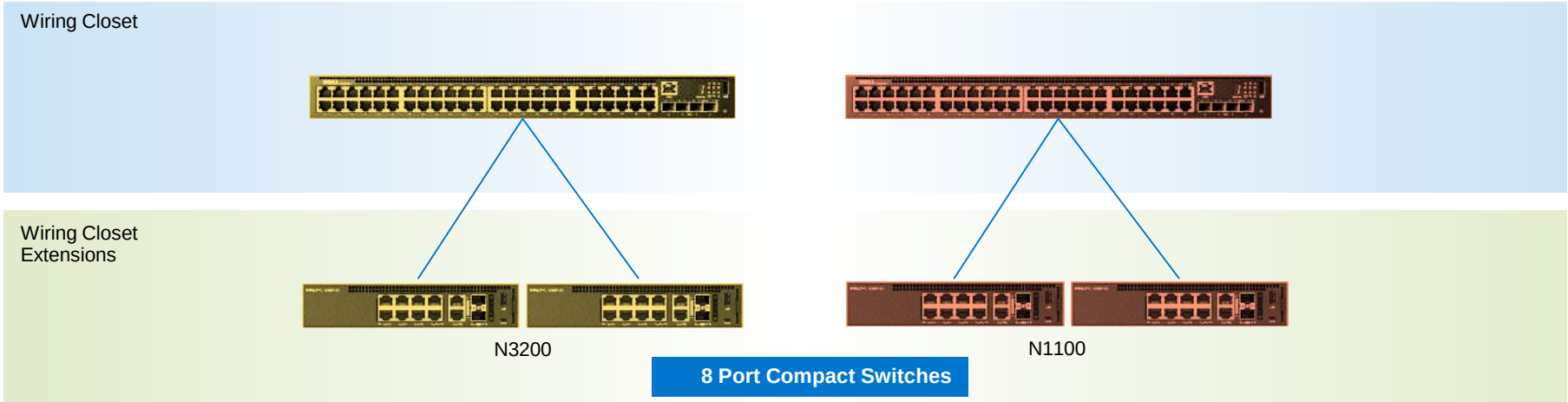
N3200

Downlinks : 1G/2.5G/5G/10G
Uplinks : 25G
Stacking : 400Gbps

N2200

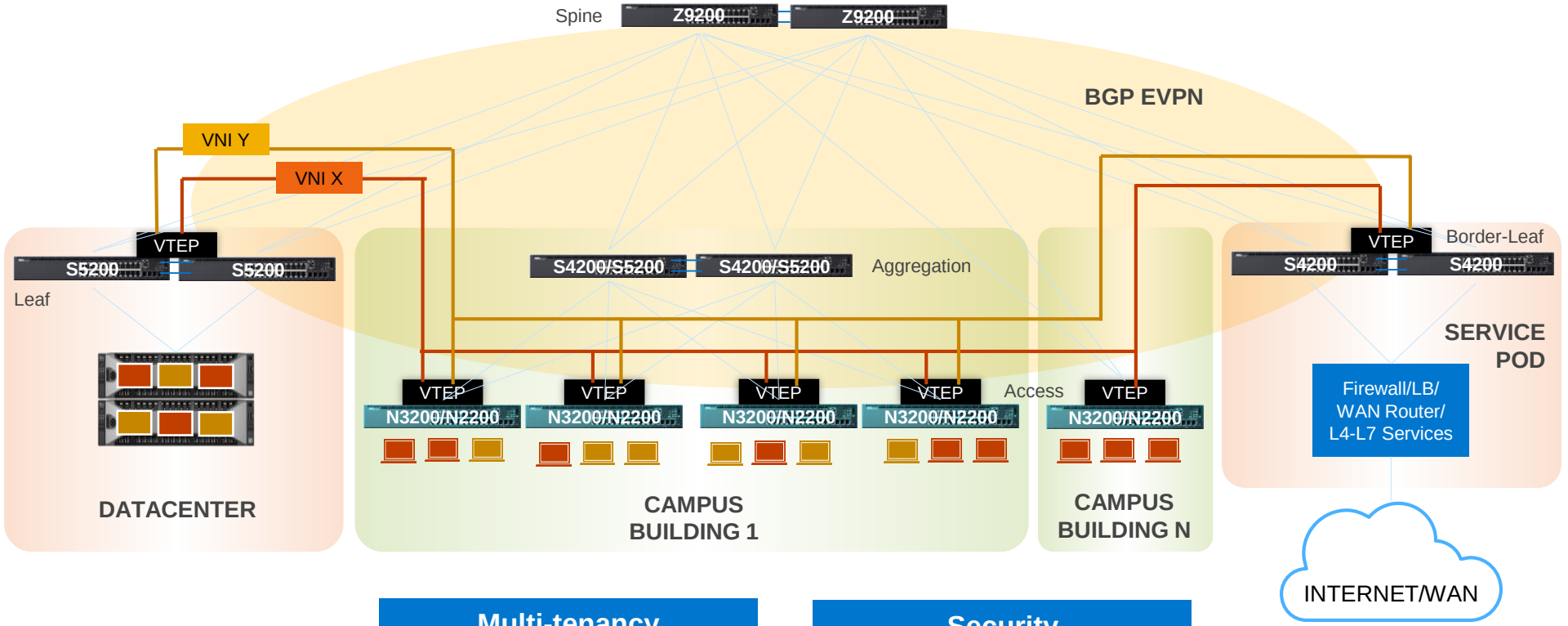
Downlinks : 1G/2.5G
Uplinks : 25G
Stacking : 160Gbps

Simplified cabling using carpet areas switches (Compact switches)



Optimize Cabling CAPEX with distributed fanless compact switches closer to end users and IoT devices

BGP-EVPN VXLAN Fabric*



Multi-tenancy **Security**

*Silicon capable, use case expected to be enabled by 3rd Party ON partners such as Cumulus (supported today), Pica8 (in roadmap)

N-Series advantage—Lifetime warranty

Lifetime Limited Warranty (LLW) covers software upgrades, hardware repair or replacement, and optics and cables when purchased with the switch.	Lifetime Warranty	ProSupport	ProSupport Plus
Technical support access		24x7	24x7
Parts and labor response	NBD Parts only	NBD or Mission Critical parts &	NBD or Mission Critical parts & labor
Software and firmware updates	✓	✓	✓
TechDirect online cases and dispatch	✓	✓	✓
SupportAssist remote monitoring	✓	✓	✓
Dispatch monitoring and crisis management		✓	✓
Escalation management		✓	✓
Hypervisor and OS support		✓	✓
Collaborative 3rd party assistance		✓	✓
SupportAssist automated support		✓	✓
Direct access to elite ProSupport Plus engineers			✓
Dedicated Technical Account Manager			✓
Monthly health check and performance recommendations			✓
Monthly contract renewal and support history reporting			✓
System maintenance			✓
Cost	**included**	**$**	**$$**

Platform Specifications Key Features

DELL EMC

Other Key Features

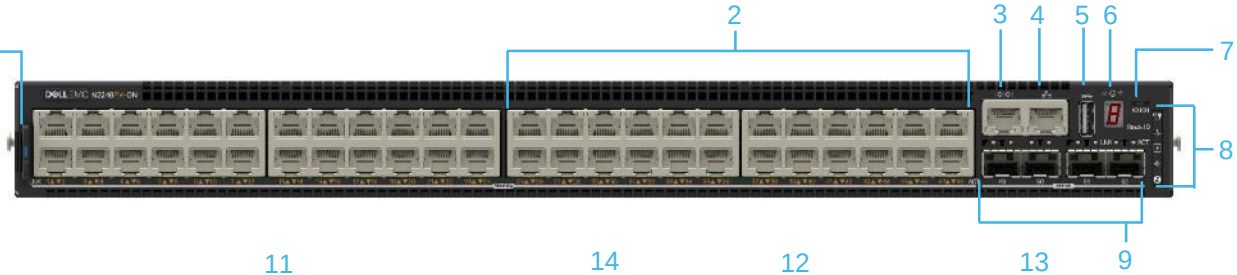
	N2200	N3200
OMNM	Y	Y
Perpetual PoE	Y	Y
Fast PoE	Y	Y
80 Plus Rating	Platinum	Platinum
Energy Star	Y	Y
802.3Bz EEE	Y	Y
USB Port	USB 3.0	USB 3.0
RJ-45 Management Port	Y	Y
Micro-USB Console	Y	Y
RJ-45 Console	Y	Y

SW Feature Snapshot for next-gen N-Series

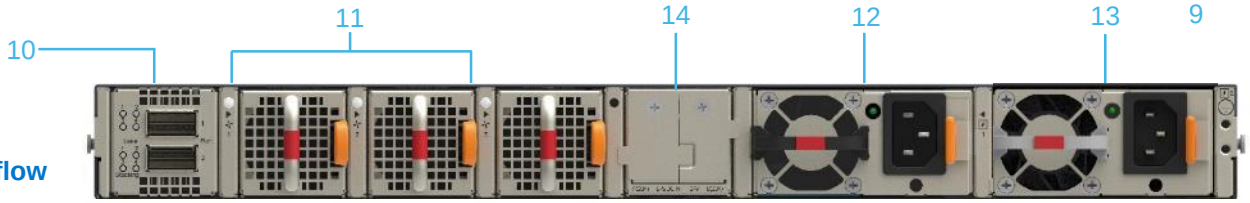
Feature	Layer 2 N1100-ON	Layer 3 Lite N1500	Layer 3 Standard N2000, N2128PX-ON, N2200-ON	Layer 3 Advanced N3000E-ON N3132PX-ON, N3200-ON
Basic Layer 2	Y	N	N	N
Static Routing	N	Y	Y	Y
RIPv1, v2	N	Y	Y	Y
VRRP	N	Y	Y	Y
MLAG/VLT	N	N	Y	Y
OSPFv2	N	N	Y	Y
OSPFv3	N	N	N	Y
IGMP/MLD	N	N	N	Y
PIM-SM/DM/SSM	N	N	N	Y
VRF	N	N	N	Y
BFD	N	N	N	Y
BGP	N	N	N	Y

N2248PX-ON Views

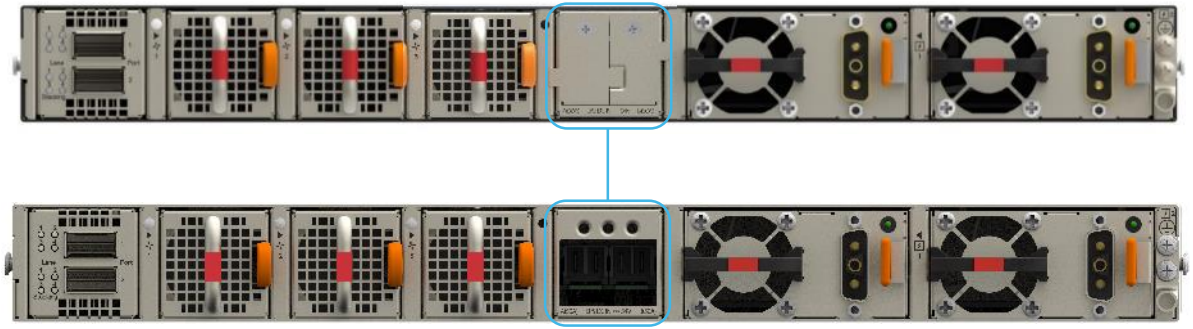
Front



Rear
AC PSU
IO/PS Airflow



Rear –
DC* PSU
IO/PS Airflow



1. Luggage tag
2. 2.5GBASE-T Multigig RJ45 ports
3. RJ45 Ethernet Console port
4. RJ45 Serial Management port
5. USB Type-A port
6. StackID
7. MicroUSB Type-B port
8. Status LEDs
9. 25G SFP28 ports
10. QSFP+ Stacking ports
11. Fans
12. PSU1 (Ships default with switch)
13. PSU2 (Cust kit)
14. Slot for EPS Connector

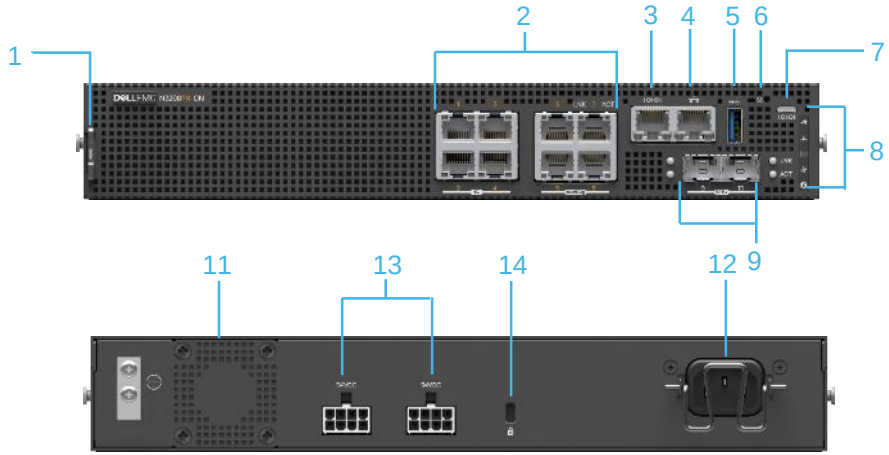
DC PSUs don't ship default with the switch. Customer has to buy one or two DC PSUs as cust kits

*(DC PSUs in Roadmap)

N3208PX-ON Views

Front

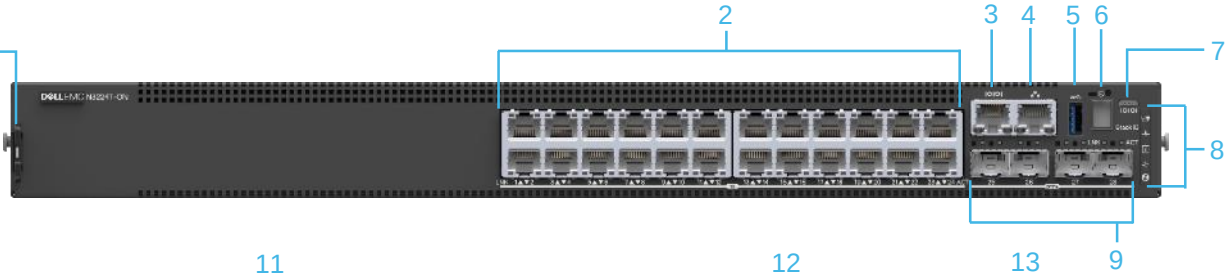
Rear
AC PSU
IO/PS Airflow



1. Luggage tag
2. 2.5GBASE-T Multigig RJ45 ports
3. RJ45 Ethernet Console port
4. RJ45 Serial Management port
5. USB Type-A port
6. StackID
7. MicroUSB Type-B port
8. Status LEDs
9. 25G SFP28 ports
10. QSFP+ Stacking ports
11. Fan (fixed)
12. PSU connector (Fixed)
13. Connectors for external power adapters
14. Kensington lock slot

N3224T-ON Views

Front



1. Luggage tag
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11. Fans
12. PSU1 (Ships default with switch)
13. PSU2 (Cust kit)

Rear
AC PSU
IO/PS Airflow

Rear –
DC* PSU
IO/PS Airflow

DC PSUs don't ship default with the switch. Customer has to buy one or two DC PSUs as cust kits

Rear –
AC PSU
PS/IO Airflow

Reverse airflow PSUs and fans are marked with BLUE indicator on the handle

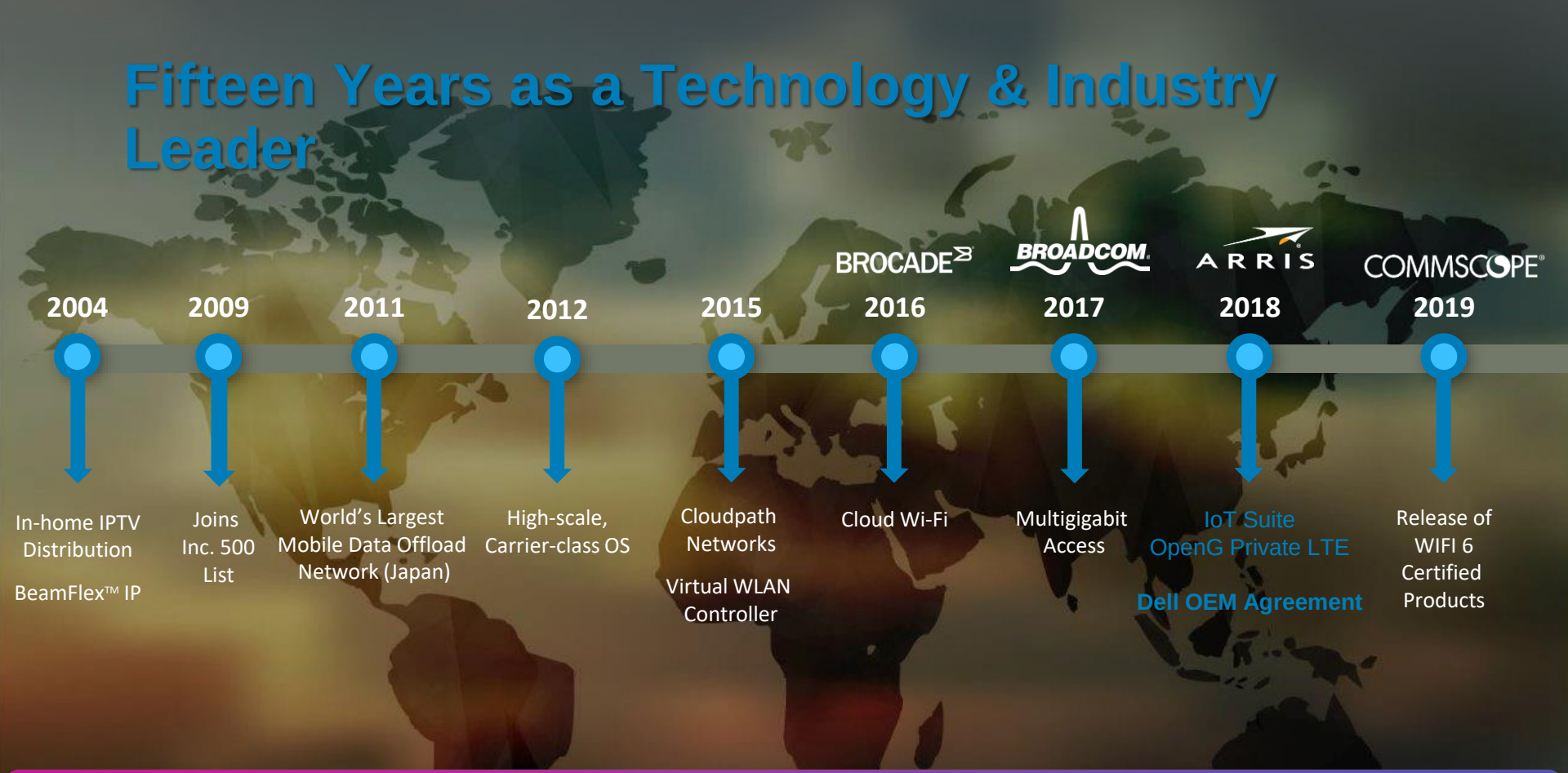
Rear –
DC* PSU
PS/IO Airflow

DC PSUs don't ship default with the switch. Customer has to buy one or two DC PSUs as cust kits

*(DC PSUs in Roadmap)

WLAN-Ruckus OEM

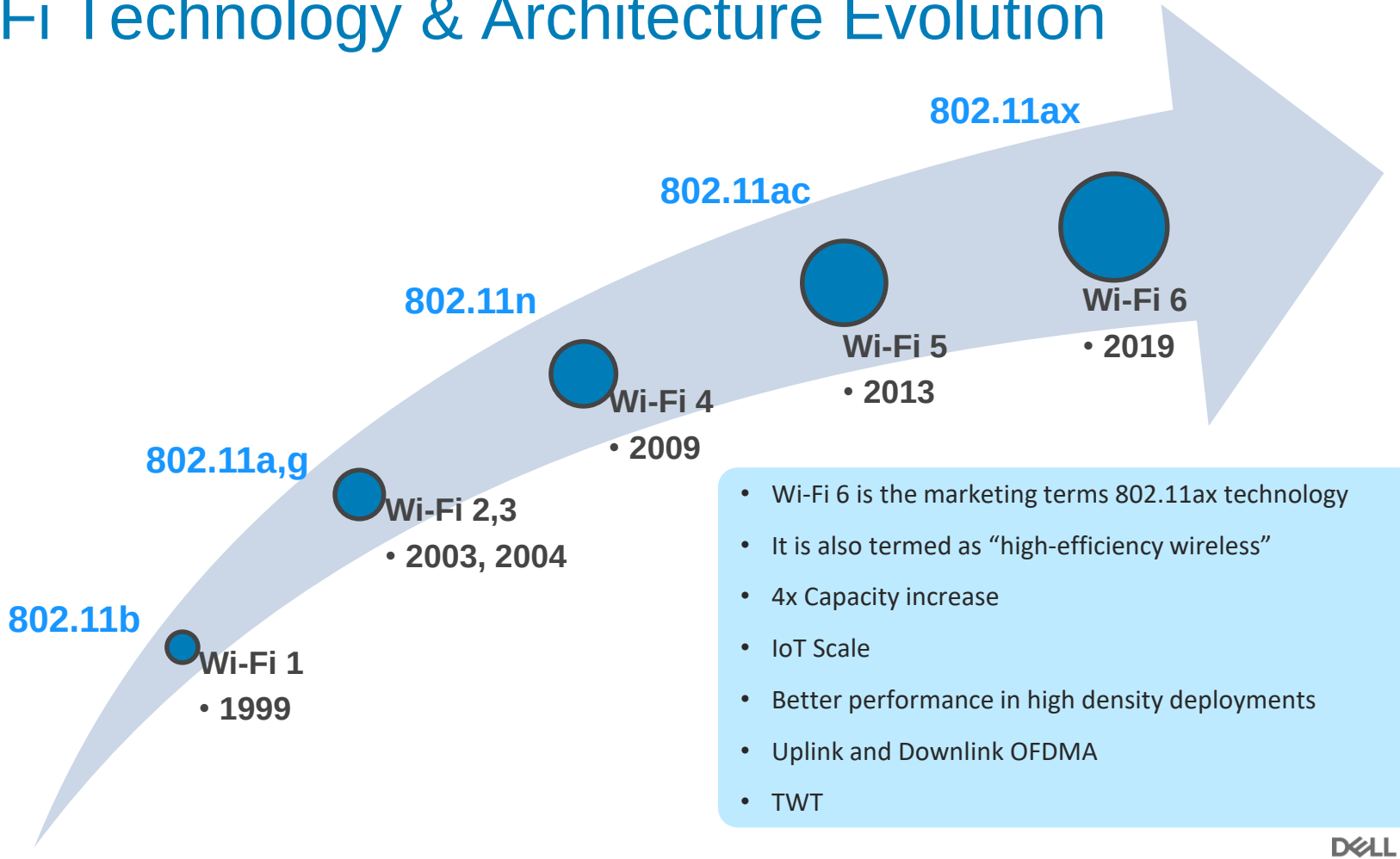
Fifteen Years as a Technology & Industry Leader



Even with four acquisitions in the last three years, there has been no impact to the Dell OEM Agreement

Mobilität der Menschen / User nimmt dramatisch zu

Wi-Fi Technology & Architecture Evolution



- Wi-Fi 6 is the marketing terms 802.11ax technology
- It is also termed as “high-efficiency wireless”
- 4x Capacity increase
- IoT Scale
- Better performance in high density deployments
- Uplink and Downlink OFDMA
- TWT

Dell EMC Ruckus OEM Products

Access Points
Indoor & Outdoor

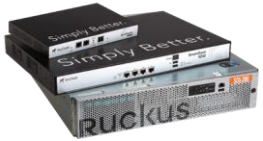
Indoor
- R730
- R710/R720
- R610
- R510
- R320
- R310
- H510
- H320
- M510
- Midrange .11ac W2 Unleashed
- Low-end .11ac W2 Unleashed
- Mid-Range .11ax AP
- High-End .11ax AP

Outdoor
- T710/T710s
- T610/T610s
- T310d,c,s,n
- E510
- P300
- Low-end .11ac W2 Unleashed AP
- High-end 802.11ax Outdoor AP

Controllers
Virtual & Physical

vSZ
Up to 10,000 APs
(30K AP Cluster)

vSZ-D
1Gbps, 10 Gbps



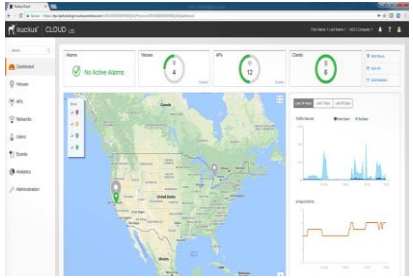
ZD1200, up to 150 APs
SZ100 (1GbE & 10GbE), up to 1024 APs
SZ300 (AC), up to 10K APs (30K AP Cluster)

- Virtual SmartZone
- Virtual Data Plane
- SmartZone 100 (2 Models)
- SmartZone 300 (1 Model)
- ZoneDirector 1200

Software

- Smart Cell Insight
- Cloudpath
- Cloudpath EDU
- URL Filtering
- Geo-Redundancy
- Split-Tunnel

Network Management



- Cloud Based Wireless Management Solution
- Ruckus Analytics

- Cloud based Integrated wired and wireless management*
- Federal Certified APs and Switches*

Roadmap Items 1HFY21 | Roadmap Items 2HFY21 | Roadmap Items 1HFY22

DELL EMC

* In Planning

Dell OEM On-Premise Platform Positioning

Small

ZD 1200

Max APs:	150
Clients:	4000
Data Plane:	200 Mbps
Size:	Mini Desktop

Medium-Large

	SZ 100	vSZ-E
Max APs:	1,024	1,024
Clients:	25,000	25,000
Data Plane:	10 Gbps	vSZ-D
Size:	1RU	Virtual

4 Node Cluster

Max APs:	3,000	3,000
Clients:	60,000	60,000
Data Plane:	40 Gbps	vSZ-D

Very Large

	SZ300	vSZ-H
Max APs:	10,000	10,000
Clients:	150,000	100,000
Data Plane:	20 Gbps	vSZ-D
Size:	2RU	Virtual

4 Node Cluster

Max APs:	30,000	30,000
Clients:	450,000*	300,000
Data Plane:	80 Gbps	vSZ-D

Deployment Type	**1 or more smaller sites**	**SMB Campus** **SMB Multi-site**	**Medium to Large Campus** **Enterprise Distributed Sites**	**SP Internal Network** **Managed Services**

***** SZ300 client scale increased in 3.6

Roadmap: 1HFY21

Upcoming Ruckus OEM Access Points

NEW!

R750

- Midrange 802.11ax (WiFi 6)
- 4x4:4 MIMO; BeamFlex+
- 2.4 Gbps on 5Ghz, 1.1 Gbps on 2.4 GHz
- Support for BLE & Zigbee
- Multi-Gig (2.5 GbE) uplink

R650

- Entry level 802.11ax (WiFi 6)
- 4x4:4; BeamFlex+; USB 2.0
- 2.4 Gbps on 5Ghz, 574 Mbps on 2.4 GHz
- Support for BLE & Zigbee
- Multi-Gig (2.5 GbE) uplink

T750 omni

- **FIRST Outdoor 802.11ax (WiFi 6)**
- 4x4:4 MIMO; BeamFlex+, IP67
- 2.4 Gbps on 5Ghz, 1.1 Gbps on 2.4 GHz
- Support for BLE & Zigbee
- Multi-Gig (2.5GbE) uplink

UNLEASHED

R750

- Upto 50 APs support

R650

- Upto 50 APs support

T750 omni

- Upto 50 APs support

R510

- Midrange 802.11ac Wave 2 AP
- 2x2:2 MIMO; BeamFlex+
- 867 Mbps on 5Ghz, 300 Mbps on 2.4G

R320

- Entry level 802.11ac Wave 2 AP
- 2x2:2 MIMO; BeamFlex
- 867 Mbps on 5Ghz, 300 Mbps on 2.4G

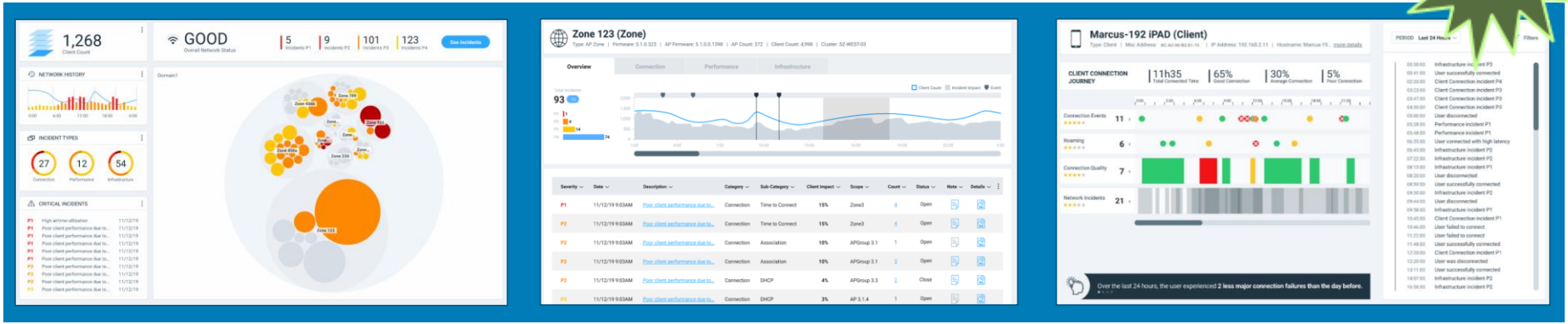
T310c

- Entry level Outdoor 802.11ac AP
- 2x2:2 MIMO; BeamFlex+
- 866 Mbps on 5Ghz, 400 Mbps on 2.4G

Roadmap: 1HFY21

Dell EMC Ruckus Advanced Analytics

NEW!



Network Health Summary

- Network health at a glance
- Highlight issues by severity, scope, and impact

ML-Driven Incidents

- Machine-assisted proactive network oversight
- Auto-detect and classify problems by severity

Client Troubleshooting

- Holistic client experience with connection lifecycle
- Simplified troubleshooting

DELL EMC

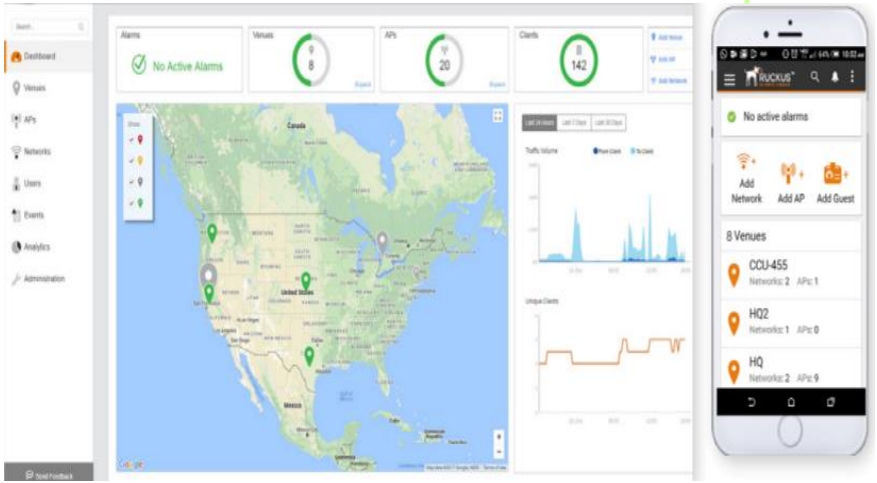
Roadmap: 1HFY21

Dell EMC Ruckus Cloud Wi-Fi

Cloud Management for Ruckus Wired/Wireless Access

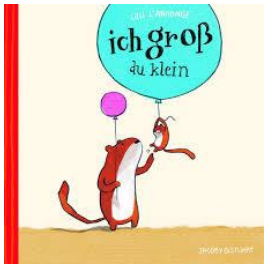
- Single-pane-of-glass view of WLANs, connected APs and clients across multiple sites
- Visibility on real-time and historical data on applications, traffic, clients etc
- Provision, monitor, optimize, and troubleshoot an enterprise-grade Wi-Fi and wired network
- Manage a geographically distributed multisite wireless network while minimizing the IT overhead needed

NEW!



DELL EMC

Die Technik unterscheidet,……..!



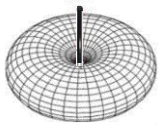
Light and RF Propagation

Radio Frequency propagation has similar characteristics to light propagation

If you take an unfocused light bulb of a given power, it spreads it energy in all directions & the energy quickly diminishes over distance

- Traditional omni-directional AP antenna work like an unfocused light bulb

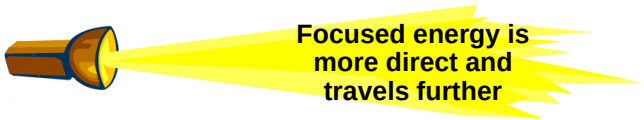
Unfocused energy quickly diminishes…

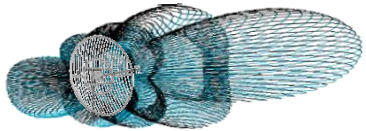


So does RF…

If you focus (optimise) the same light bulbs energy the light will be brighter & travel further in the direction of focus

- If you focus the RF energy as a beam towards the receiver you produce a stronger signal at the receiver and so improve coverage, performance and reliability





So does RF…

für jede Situation die “Richtige”

Ungerichtete Antennen

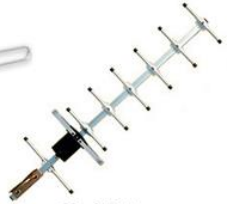
Stab-antenne

Rundstrahl-antenne

WLAN-Antenne

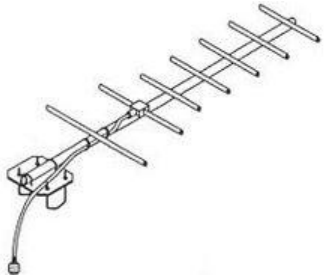
Richtantennen

Dipolantenne



Yagi-Antenne

Parabolantenne



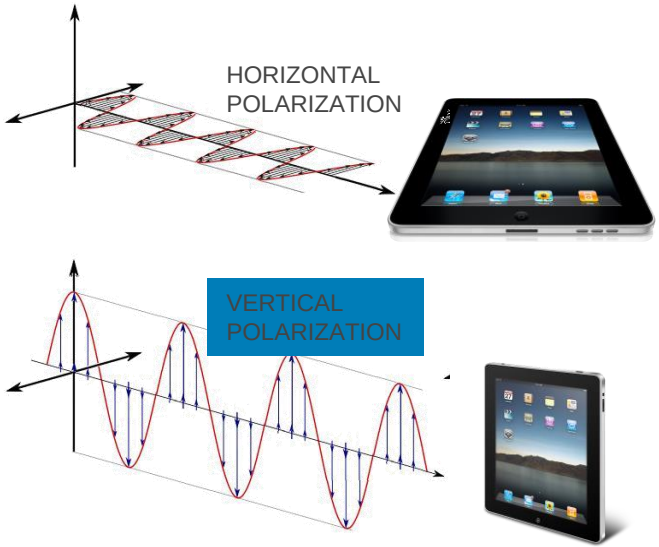
Ruckus APs

Standard APs

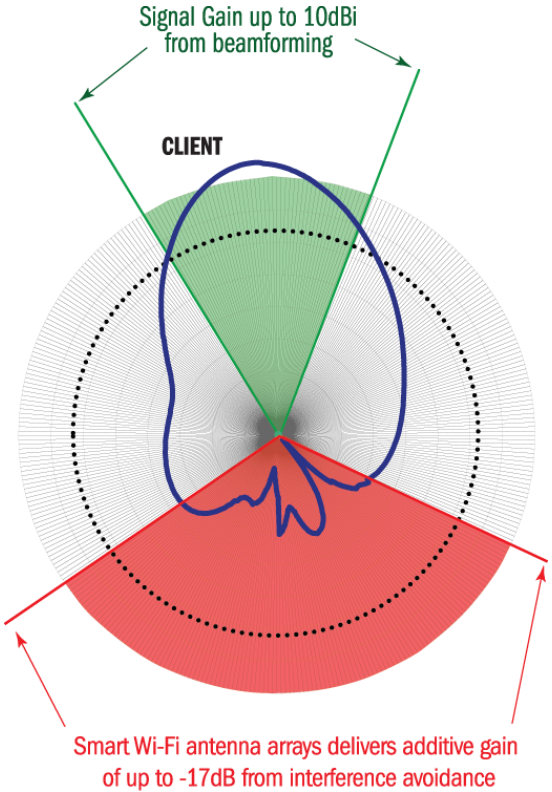
BeamFlex+

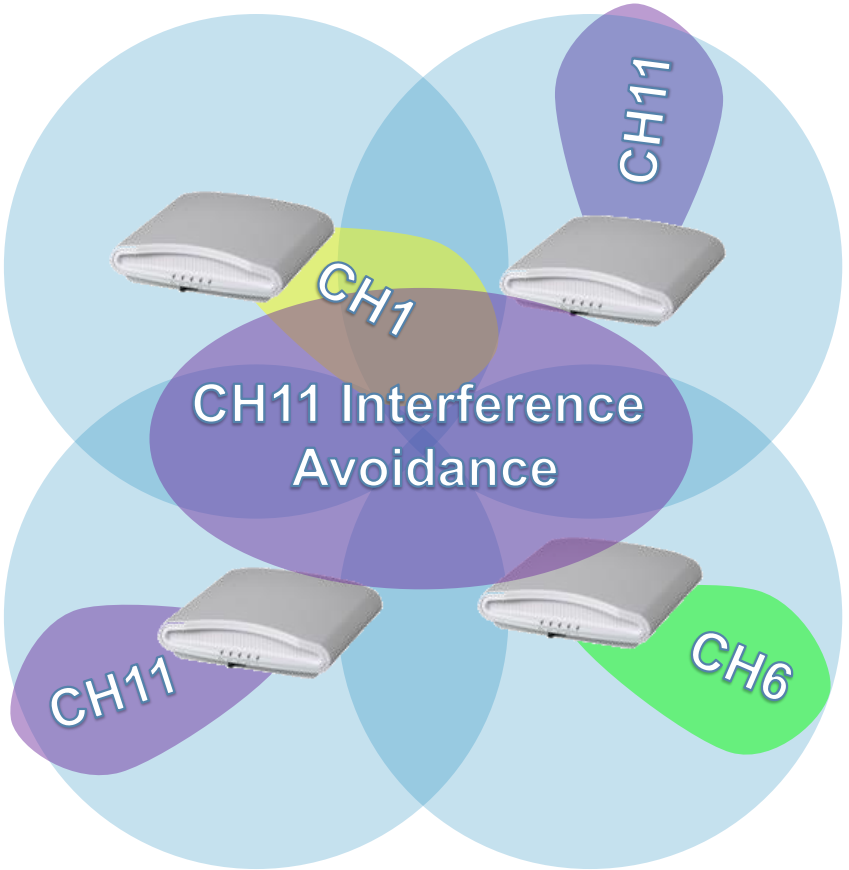
5x Device orientation accounts for up to 5x performance differential among products

- Better reception (PD-MRC) for weak and hard to “hear” devices
- Better transmission to devices constantly changing their orientation

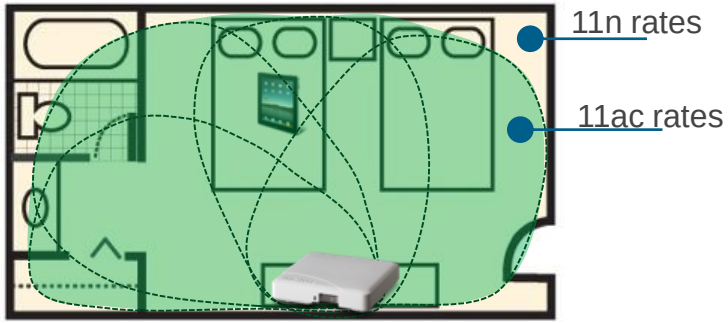


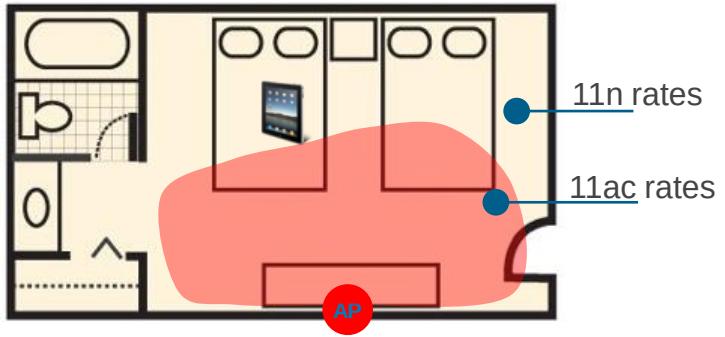
Beamflex reduces Self Interference



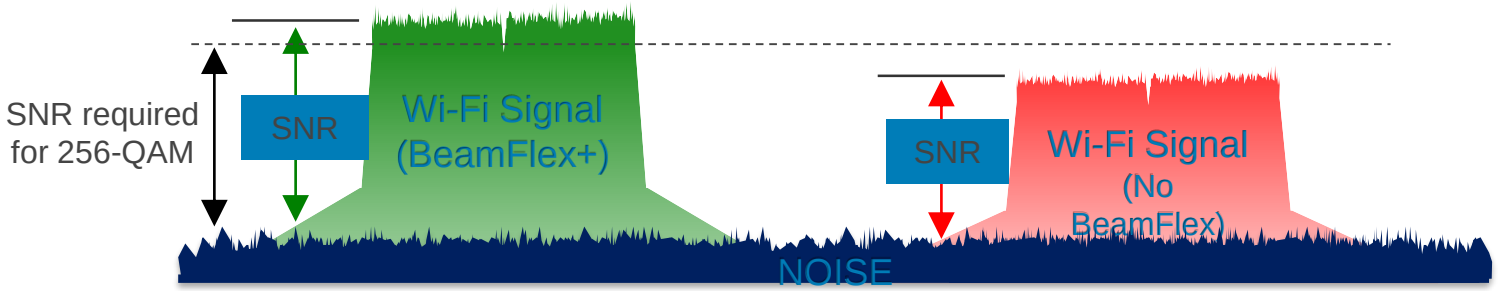


Extended 11ac Coverage with BeamFlex+





Static antenna 11ac coverage



52

Ruckus Technologies

BeamFlex +

Adaptive antenna technology

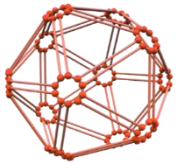
ChannelFly

Adaptive channel management increasing WLAN capacity

SmartCast

Precision QoS per-user per-traffic class

SmartMesh



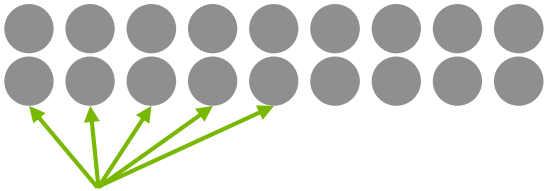
Self-provisioning, self-optimizing high-speed wireless backbone

SmartSec

Advanced per-user security

SmartSec – Dynamic PSK

Traditional PSK



- **PSK shared by all devices**
- **Several security problems**
- **High admin overhead for changes**

Dynamic PSK

- **Unique PSK per device**
- **Simple and secure**
- **Great for non-1X devices**
- **Easy to control each device**

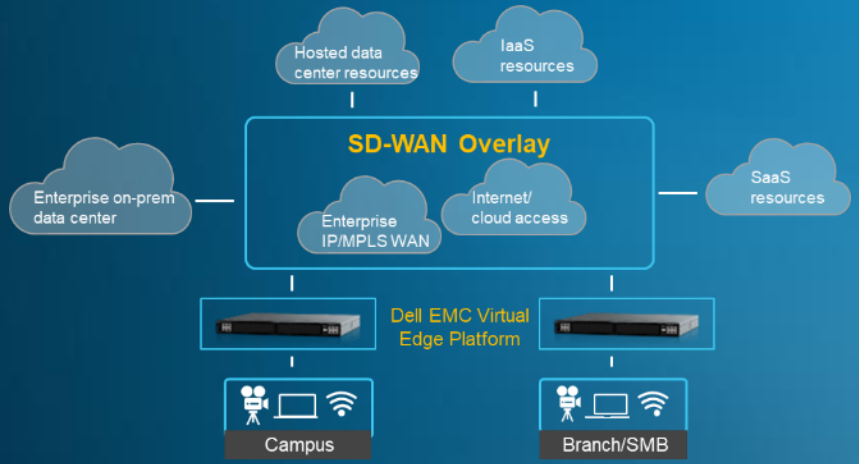
SD-WAN

The Enterprise WAN is the new LAN

velocloud

VERSA NETWORKS

Pre-validated industry leading SD-WAN Software

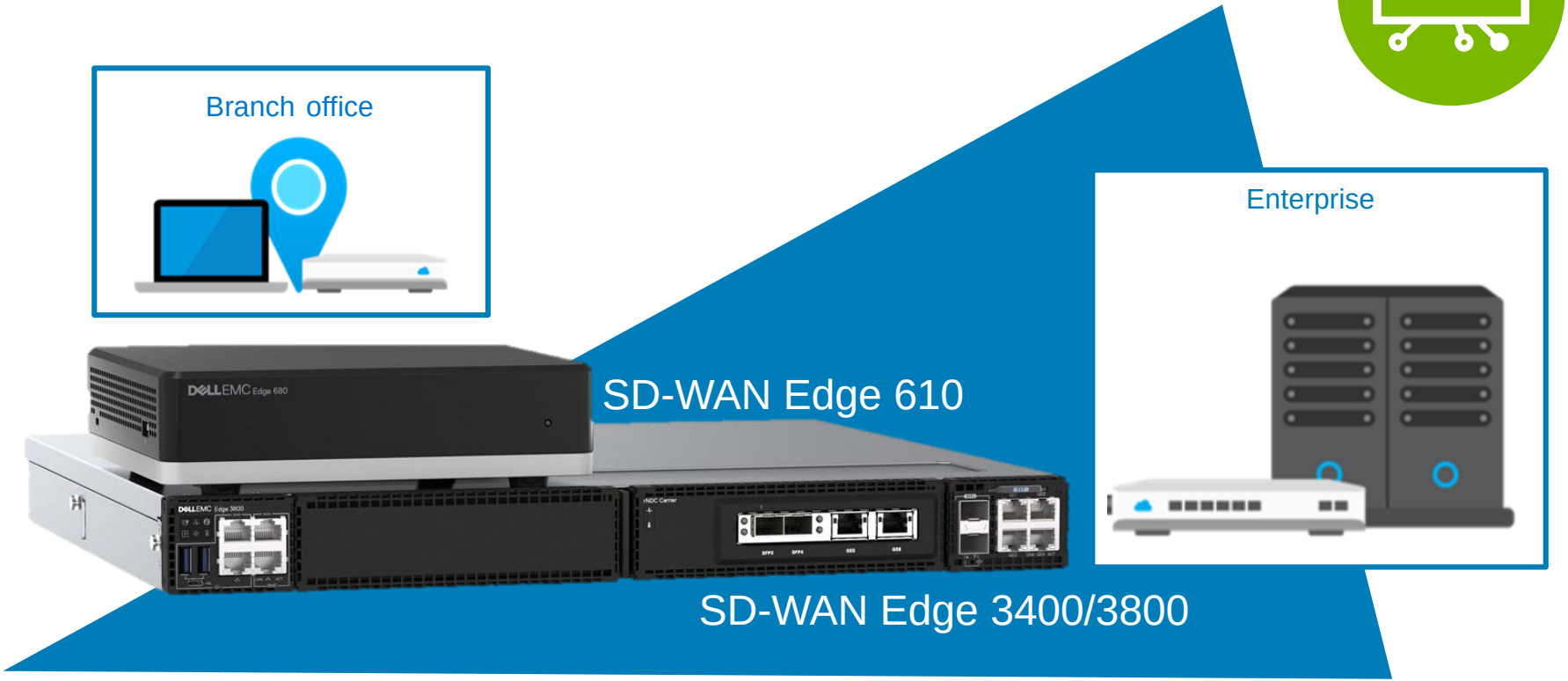


DELL EMC

Virtual Edge Platforms for next-generation enterprise access

Purpose built WAN optimization solutions for today and tomorrow

Dell EMC SD-WAN Edge solutions

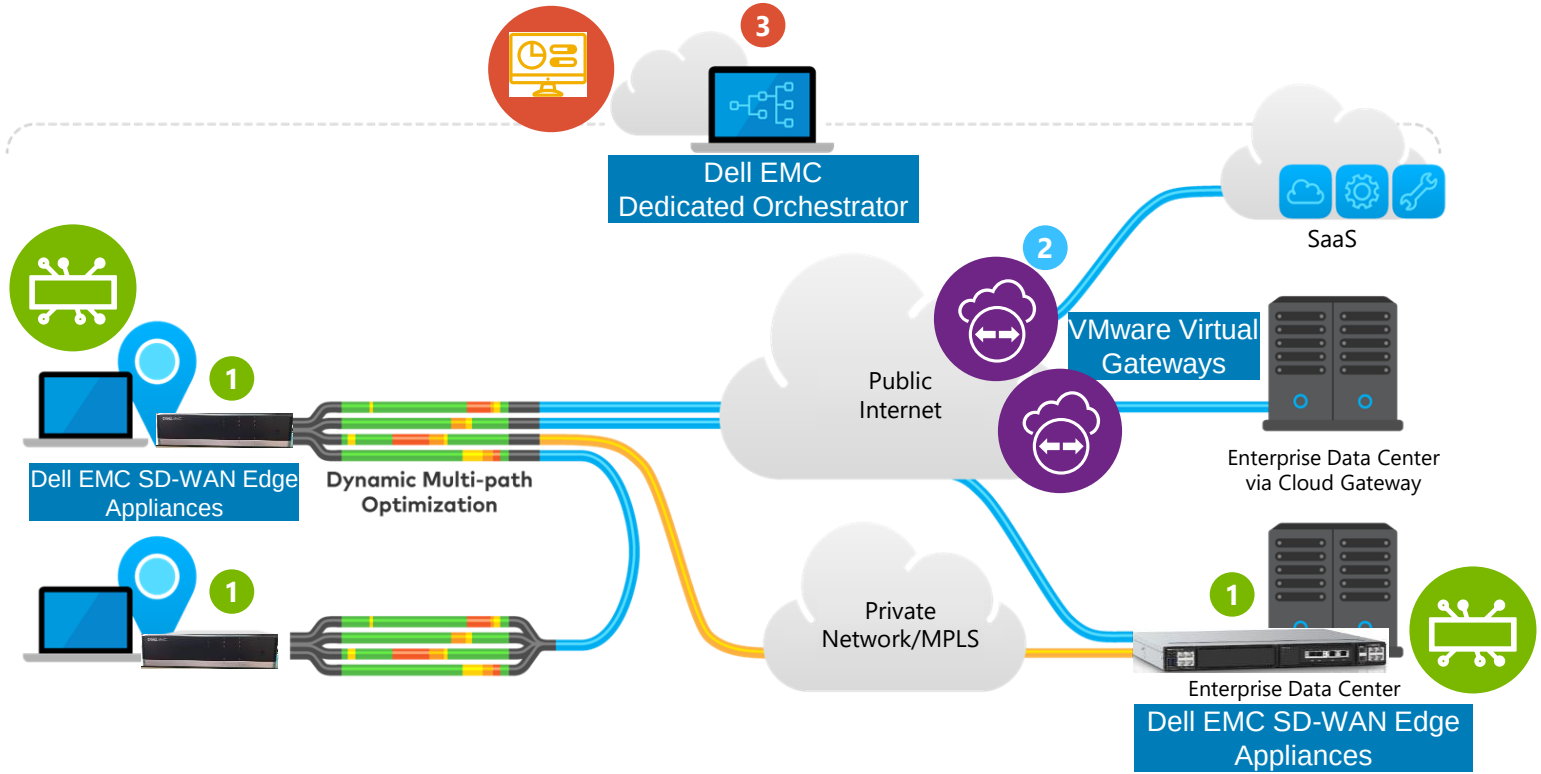


Volume of SD-WAN traffic

Complete SD-WAN Transformation

All-in-one SD-WAN simplicity from Dell EMC and VMware

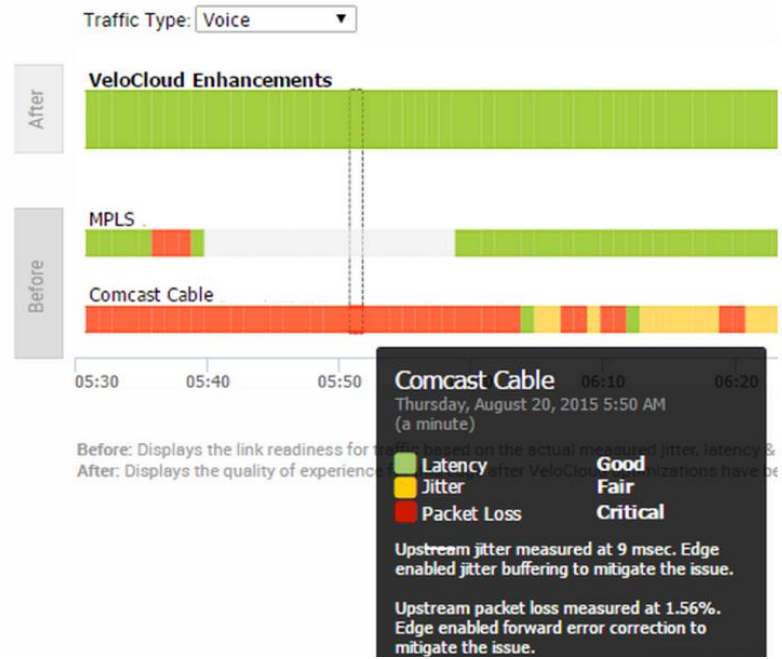
1. Dell EMC SD-WAN Edge Appliances
2. VMware Virtual Gateways
3. Dell EMC Dedicated Orchestrator



DELL EMC

Dynamic Multi-Path Optimization (DMPO)

Assured Application Performance over Any Type of Link



Continuous Link Monitoring

- Drives automation and optimization

Dynamic Per Packet Steering

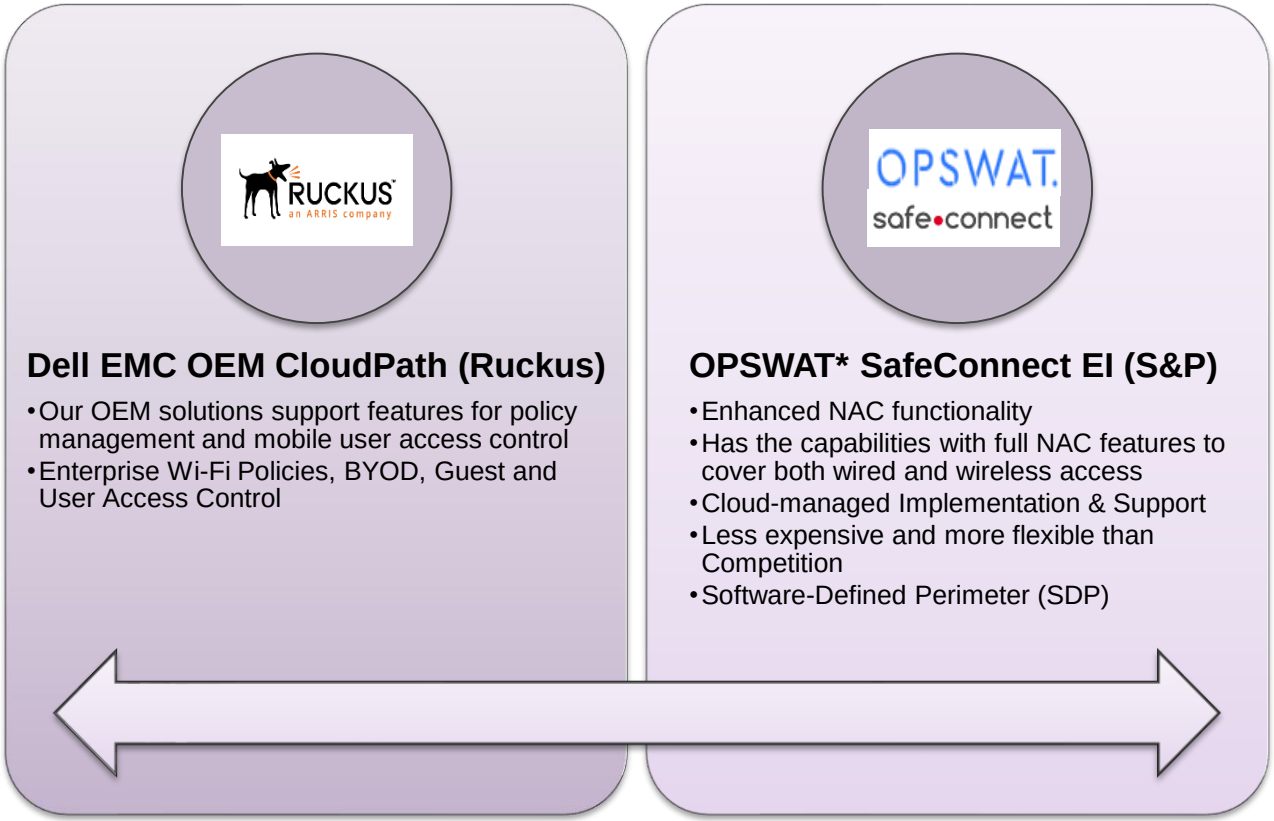
- Sub-second steering without session drops
- Aggregated bandwidth for single flows

On Demand Remediation

- Protects against concurrent degradation
- Enables single link performance

Network Access Control

Dell EMC Network Access Control (NAC) Solutions



Dell EMC OEM CloudPath (Ruckus)

- Our OEM solutions support features for policy management and mobile user access control
- Enterprise Wi-Fi Policies, BYOD, Guest and User Access Control

OPSWAT* SafeConnect EI (S&P)

- Enhanced NAC functionality
- Has the capabilities with full NAC features to cover both wired and wireless access
- Cloud-managed Implementation & Support
- Less expensive and more flexible than Competition
- Software-Defined Perimeter (SDP)

* Impulse Acquired by OPSWAT on 12 Dec 2019

Network Management

Keine Angst vor unserem CLI,…..!

N-Series:
Basic Configuration Using CLI - Create VLANs

This example shows how to create a VLAN where an NMS is configured

N3xxx_1#**configure t**
N3xxx_1(config)#**vlan 99 → Adds the VLAN to the VLAN Database (Layer2)**
N3xxx_1(config-vlan99)#**name Management**
N3xxx_1(config-vlan99)#**exit**

Add an IP address to the VLAN

N3xxx_1(config)#**interface vlan 99 → VLAN Interface (Layer3)**
N3xxx_1(config-if-vlan99)#**ip address 192.168.99.1 255.255.255.0**
N3xxx_1(config-if-vlan99)#**exit**
N3xxx_1(config)#**exit**

Attach the VLAN to an uplink port (trunk) and also to the NMS which is on an access port

N3xxx_1#**configure t**
N3xxx_1(config)#**interface range tengigabitethernet 1/0/1-2**
N3xxx_1(config-if)#**switchport mode trunk → accept tagged VLANs on the interface**
N3xxx_1(config-if)#**switchport trunk allowed vlan 99 → Only accept VLAN 99**
N3xxx_1(config-if)#**exit**

N-Series: Systems Management

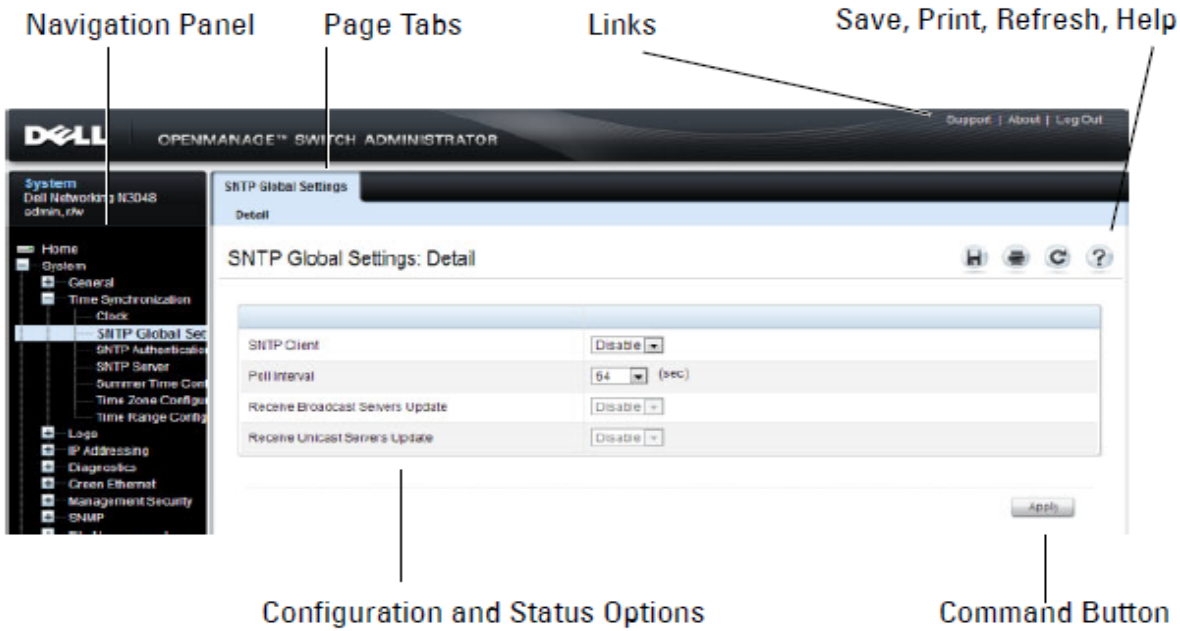
Web GUI / Open Manage Switch Administrator

- Access the via a browser using the IP address (IP address must be previously assigned using IP Wizard or CLI)

N-Series: Systems Management

Web GUI / Open Manage Switch Administrator

Figure 4-2. Switch Administrator Components



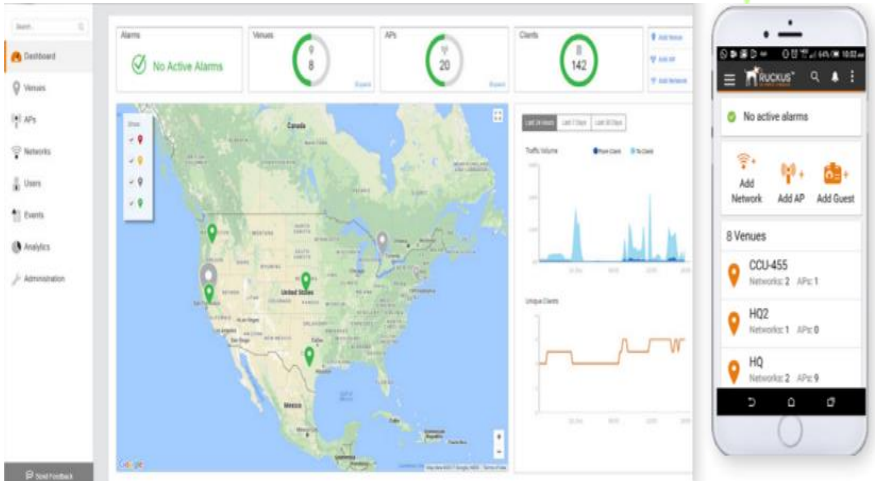
Roadmap: 1HFY21

Dell EMC Ruckus Cloud Wi-Fi

Cloud Management for Ruckus Wired/Wireless Access

- Single-pane-of-glass view of WLANs, connected APs and clients across multiple sites
- Visibility on real-time and historical data on applications, traffic, clients etc
- Provision, monitor, optimize, and troubleshoot an enterprise-grade Wi-Fi and wired network
- Manage a geographically distributed multisite wireless network while minimizing the IT overhead needed

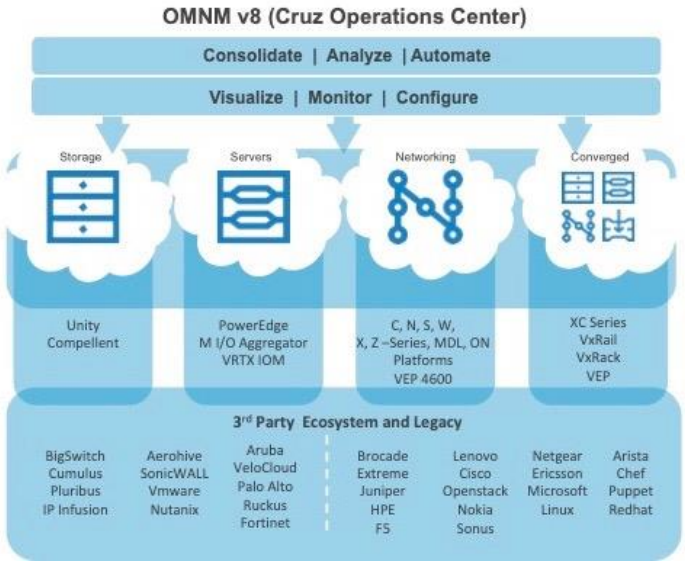
NEW!



DELL EMC

Open Manage Network Manager

Powerfully simple and scalable solution to ***discover***, ***configure***, ***monitor,*** and ***automate*** your hybrid cloud and network infrastructures including: compute, storage, network, virtual, mobile, CPE, IOT and environmental elements.



KEY FEATURES

- Deep Discovery, Inventory, CMDB
- Fault Management/Event Service and Automation
- Configuration File Management
- Change/Compliance Management
- Automated and User Configurable Actions
- Script Management
- Automated Network Topology
- Firmware/OS Management & Deployment
- Group (one-to-many) Operations
- Customer Self-Care (multi-tenancy)
- User Security Management
- Comprehensive Solution Auditing & Logging
- Inventory Maintenance
- Multi-Technology/Vendor Support
- 3rd-Party Integration
- Network Operations Collaboration

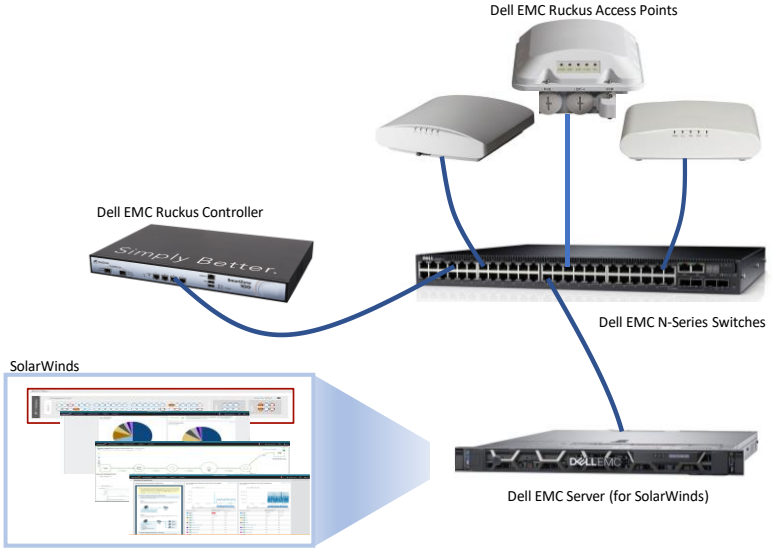
Roadmap: 1HFY21

SolarWinds Network Management Solution

Single Pane-of-Glass Management for Dell EMC Network

Solarwinds Network Management Solution key Network Management and Configuration capabilities for Dell EMC Ruckus access points, controllers and Dell EMC N-series switches via SNMP. Main capabilities are:

- Network Performance Monitoring
- Network Configuration Management
- Security Event Management
- Analysis of NetFlow Traffic
- Automatic Network Topology Mapping
- Unified administrative dashboard to locate, map and monitor wired and wireless devices



Benefits

- Single Pane of Glass View for wired and wireless network
- Quick and correct configurations on a large network
- Simple yet comprehensive unified dashboard

DELL EMC

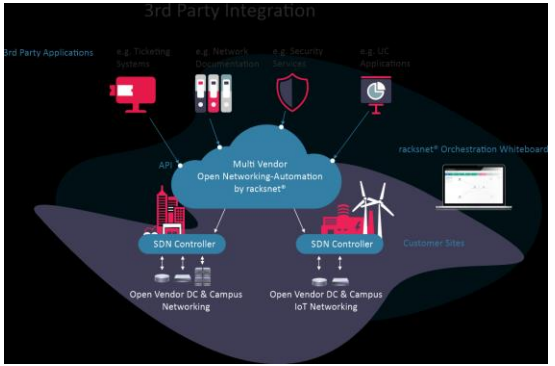
racksnet®

WAN, Campus, Datacenter und IoT-Netzwerke - alles über ein unified GUI

Cloud-Entry

Multi-Vendor

3rd-Party Integration



GUI

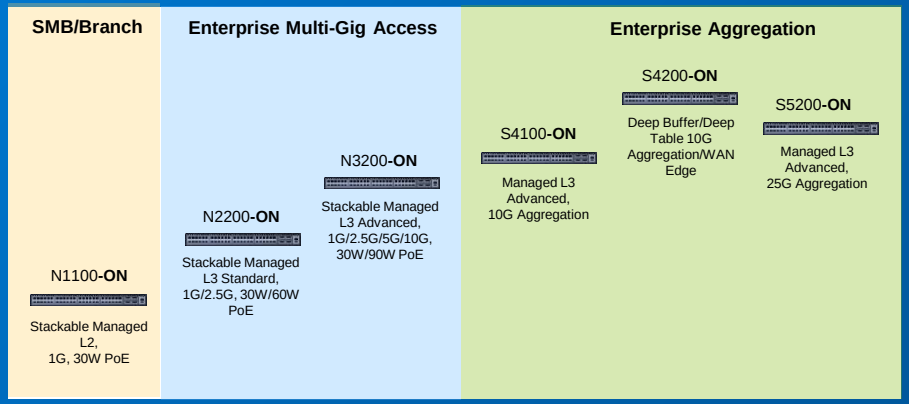
DELL EMC

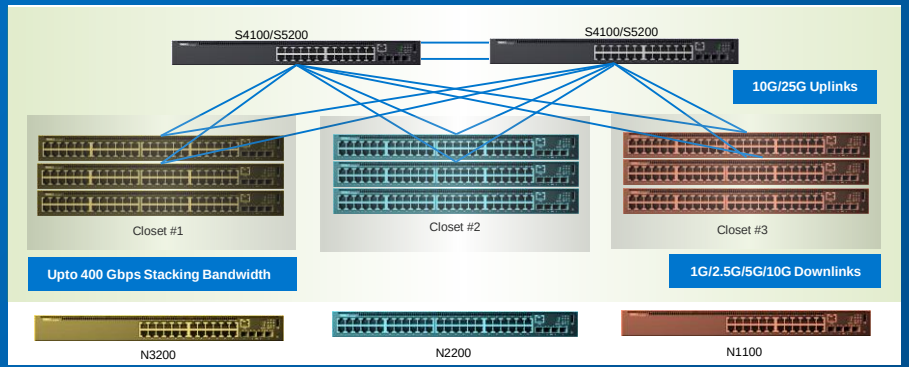
Summery

Trusted. Proven. Cutting-Edge

Open Networking Edge-to-Core

- Complete portfolio of **Open Networking** switches from Mid-market to Enterprise, Access to Core
- 802.1ax Ready **2.5G/5G/10G MultiGig**
- Full PoE budget **8/24/48x802.3bt 90W PoE** Switches
- **25G uplinks** for next-gen campuses
- **400Gbps Stacking**
- **MACSec Ready**
- High power **compact switches** for IoT applications





DELL EMC
OS6 (Edge)
OS10 (Agg/Core)

PICA8

CUMULUS

vmware NSX

DELL Technologies

Dell EMC Open Campus Fabric (OCF) Framework

DELL EMC ProSupport

Management and Automation

vmware vRealize | RUCKUS SmartZone, Cloud Wi-Fi | solarwinds | DELL EMC OpenManage Network Manager | DELL EMC DevOps | vmware Workspace™ ONE™

SECURE CAMPUS OVERLAY

Micro-Segmentation	Network Access Control	FireWall	Endpoint Protection	Threat Detection & Response	Encryption
vmware NSX	impulse, RUCKUS**	paloalto	RSA SECURID ACCESS	RSA NETWITNESS	DELL EMC MACsec

SD-WAN

velocloud vmware

VERSA NETWORKS

SD-LAN

Embedded NOS*: DELL EMC OS6 & OS10

Open Networking: PICA8, CUMULUS

RUCKUS

DELL EMC

VEP4600
VEP1400
Universal CPE

S4200-ON
Campus Internet Edge

DELL EMC
N3200-ON
N2200-ON
N1100-ON
Wired Access

S5200-ON
S4100-ON
Wired Aggregation

Wireless Access

CAMPUS UNDERLAY

THINGS | USERS

*OS6 on N-Series and OS10 on S-Series
**BYOD

DELL EMC

Collateral

Customer Ready

https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell_emc_campus_networking_n3200_n2200_series_customer_ready.pptx

Launch Messaging

https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell_emc_campus_networking_n3200_n2200_series_launch_messaging.pptx

Executive Overview

https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell_emc_campus_networking_n3200_n2200_series_executive.pptx

Networking Overview
https://www.dellemc.com/resources/en-us/asset/sourcebooks/products/networking/dell_emc_networking_overview_winter.pptx

Dell EMC Campus Overview
https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell_emc_campus_networking_executive_overview.pptx

Dell Technologies Product Portfolio - Campus
https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell-technologies-portfolio-poster-networking-campus.pdf

Dell Campus Networking Follow a Wire and Pitch a Switch
https://www.dellemc.com/resources/en-us/auth/asset/sales-documents/products/networking/dell_emc_campus_networking_pitch_a_switch.pptx


TWENTY QUESTIONS
DICK
HERB
VAN
FLORENCE
ALDO RAY

Thank you