



Cisco DC Fabric

Designing next generation DC with Cisco Nexus family switches

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Goal

- How to build Balkans size data center networks based on Cisco products, technologies and solutions.

Agenda

- Cisco ONE
- Brief Nexus portfolio overview
- Step by step product positioning

Cisco ONE Software

Included Licenses and Applications by Suite

	Cisco ONE for Data Center		Cisco ONE for WAN	Cisco ONE for Access		Suites
Advanced Security	Threat Defense for Data Center Firepower Services for ASA/FP, ASA Security Context, ASA Security Plus, ASA Botnet Traffic Filter, CSM, FSMC ASA		Threat Defense for WAN Firepower Services for ASA, Security Context, Security Plus, Botnet Traffic Filter, CSM, FSMC Cloud Web Security Essentials ASA, Cloud	Identity Services for Access ISE Plus ISE		
Advanced Applications	Data Center Fabric Prime DCNM-SAN VDC MPLS FCoE Nexus Data Broker Intelligent Traffic Director	Enterprise Cloud Suite PSC UCSD UCS Perf Mgmt VACS (w/ N1KV Adv)	WAN Collaboration UC License TDM Gateway / CUBE UC Apps CME/SRST	Campus Fabric IP Services Full L3 Routing, Virtualization (VRF, EVN) IS-IS, WCCP, Multicast	Advanced Mobility Services CMX WIPS	
Foundation	Foundation for Networking FabricPath VXLAN VDC OTV/LISP FCoE Prime Infrastructure Prime DCNM-LAN Cisco Energy Mgmt ACI Fabric RISE Intelligent Traffic Director	Foundation for Compute PSC Foundation UCSD Foundation Intercloud Fabric N1KV Essentials UCS Perf Mgmt Foundation UCS Central Energy Mgmt	Foundation for WAN SEC License TrustSec, MACSec, IOS VPN, IOS IPS, IOS ZBFW, CWS Connector, SSL VPN APP License AVC, MPLS, WAAS, FNF, etc Prime vNAM PI Lifecycle PI Assurance Energy Mgmt	Foundation for Switching IP Base TrustSec, MediaNet, StubRouting, Converged Access, FNF, WireShark, VSS, ISSU PI Lifecycle PI Assurance ISE Base Energy Mgmt	Foundation for Wireless WLC AP MSE Base PI Lifecycle PI Assurance ISE Base	
Infrastructure and Base OS	Networking Cisco Nexus® 3K, 5K, 6K, 7K, 9K	Compute X86, UCS	WAN ISR, ASR	Switching Cisco Catalyst® 2K, 3K, 4K, 6K	Wireless WLC, MSE, AP	Products

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N1K – N9K Switching Portfolio

Cisco Unified Fabric Switching Innovations

SAN



Cisco MDS 9700 Series



Cisco MDS 9250i



Cisco MDS 9336



Cisco MDS 9148S

LAN/SAN



Cisco Nexus 9000



Cisco Nexus 7000/7700



Cisco Nexus 5000

Cisco Nexus 3500 and 3000



Cisco Nexus 2000



Cisco Nexus® 1010

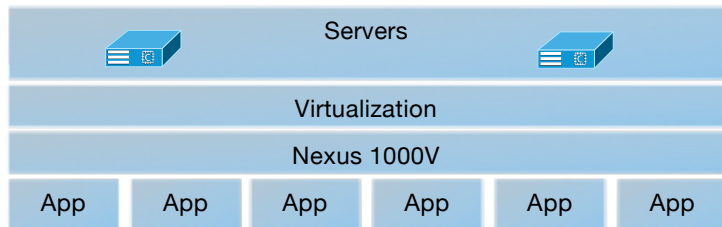


Cisco Nexus 1000V

Connectivity and Storage Access

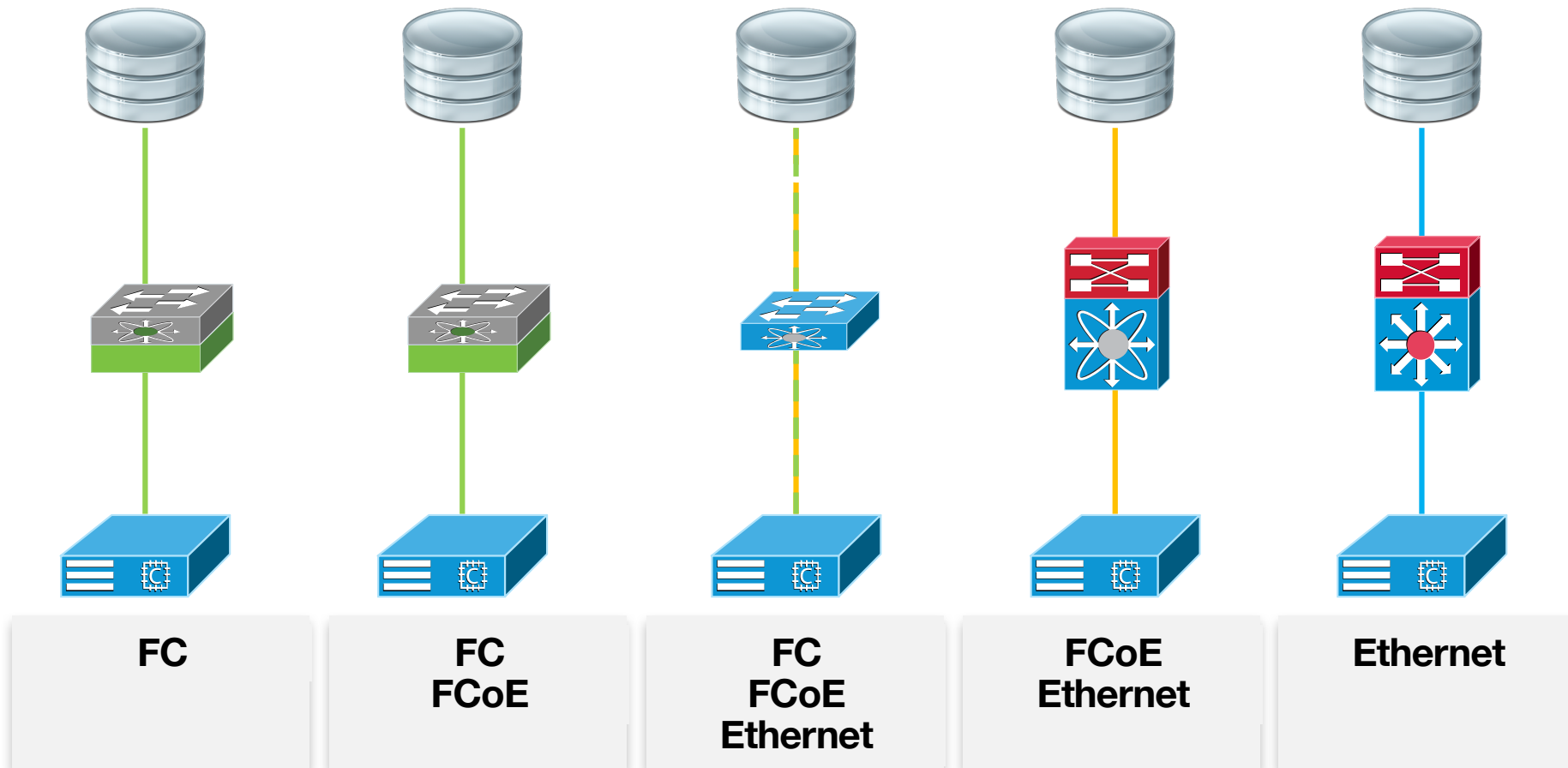


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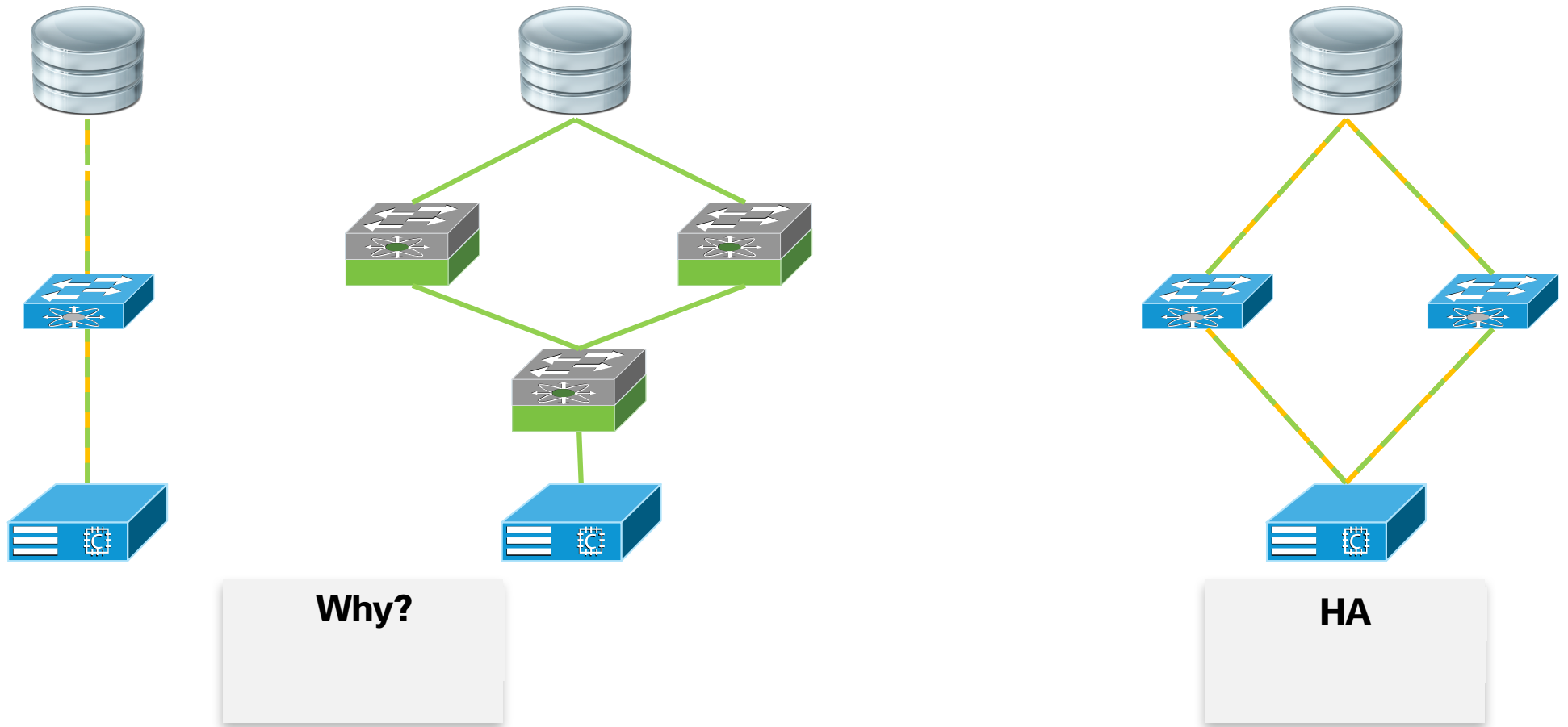


- FC
- FCoE
- IP/Ethernet

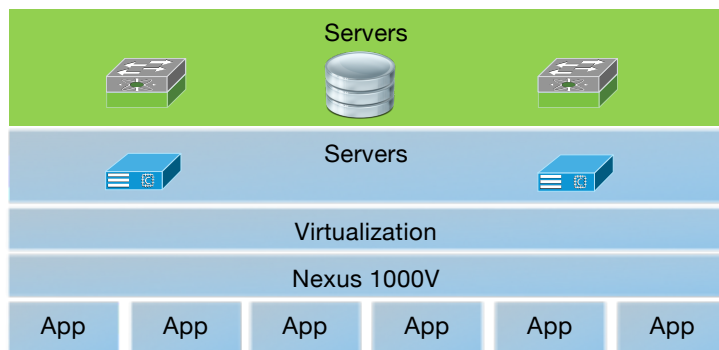
FC/FCoE/Ethernet



Redundancy



FC SAN



- Classic
- We are use to it
- Dedicated bandwidth
- Network&App team separation
- Lack of knowledge
- Hard to change
- ...

Cisco MDS



Cisco MDS 9148S

- 48x16Gbit/s FC
- 1RU
- 12 port licensing model



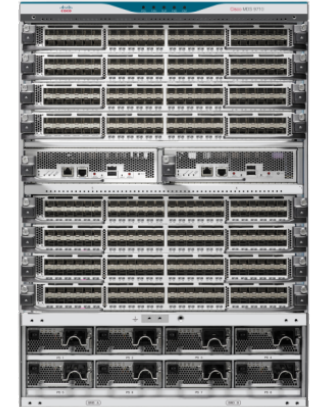
Cisco MDS 9336

- 96x16Gbit/s FC
- 2RU
- Starts with 48 ports
- 12 port licensing model



Cisco MDS 9250i

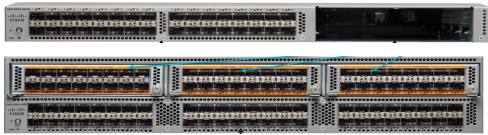
- 20x16Gbit/s FC
- 8x10Gbit/s FCoE
- 2x1/10Gbit/s iSCSI/FCIP
- 2RU
- Starts with 20 ports
- 20 port licensing model



Cisco MDS 9700 Series

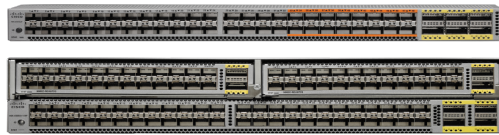
- 6 and 10 slot chassis
- 48x16Gbit/s FC cards
- 48x10Gbit/s FCoE
- 9/14RU

But what about the Nexus



Nexus 5500

- 5548UP & 5596UP
- All ports are unified
- All ports FCoE
- 1&2RU
- 8 port licensing model



Nexus 5600

- 5672UP, 56128P, 5672UP-16G
- 16 & Modules are unified
- All ports FCoE
- 1&2RU
- 16 port licensing model



Nexus 5696Q

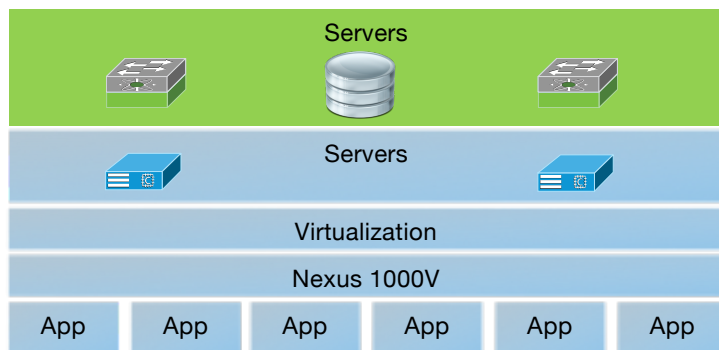
- 8 slots chassis
- 0-160 8Gbit/s FC
- All ports FCoE
- 4RU
- modul licensing model



Nexus 2348UP

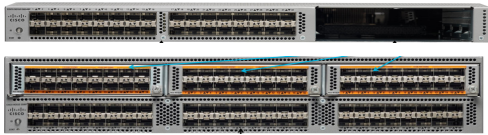
- 48 Unified ports
- All ports FCoE
- 1RU
- Licensing the parent

FCoE SAN



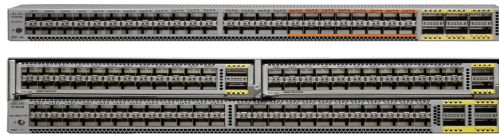
- Rising star
- It is managed the same way
- Dedicated bandwidth based on protocols
- Network&App team separation
- Lack of knowledge
- Easy to reuse infrastructure
- ...

Nexus



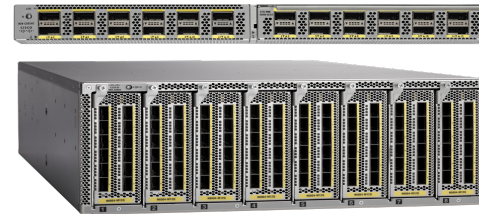
Nexus 5500

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- 1&2RU
- 8 port licensing model



Nexus 5600

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- 1&2RU
- 16 port licensing model



Nexus 5600Q

- 8 slots chassis
- 0-160 8Gbit/s FC
- All ports FCoE
- 4RU
- modul licensing model



Nexus 2348UP
Nexus 2232P

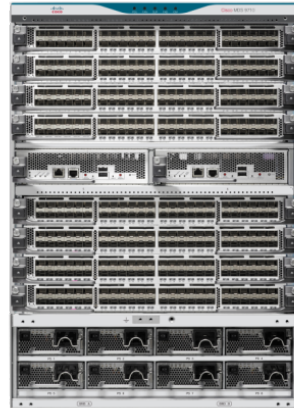
- 48 Unified ports
- All ports FCoE
- 1RU
- Licensing the parent

Nexus & MDS



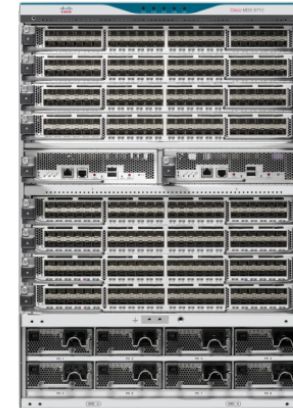
Cisco MDS 9250i

- 20x16Gbit/s FC
- 8x10Gbit/s FCoE
- 2x1/10Gbit/s iSCSI/FCIP
- 2RU
- Starts with 20 ports
- 20 port licensing model



Cisco MDS 9700 Series

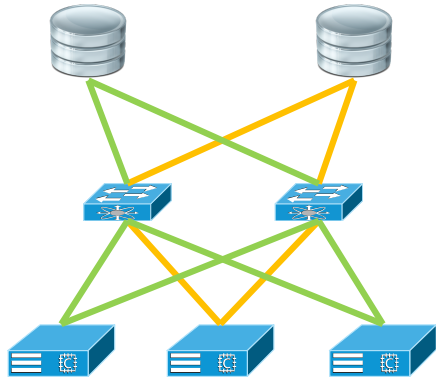
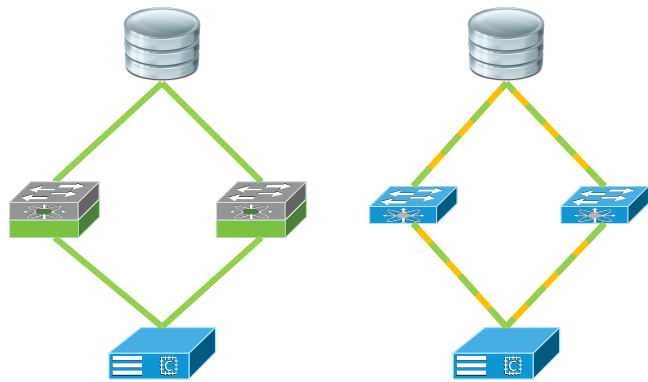
- 6 and 10 slot chassis
- 48x16Gbit/s FC cards
- 48x10Gbit/s FCoE
- 9/14RU



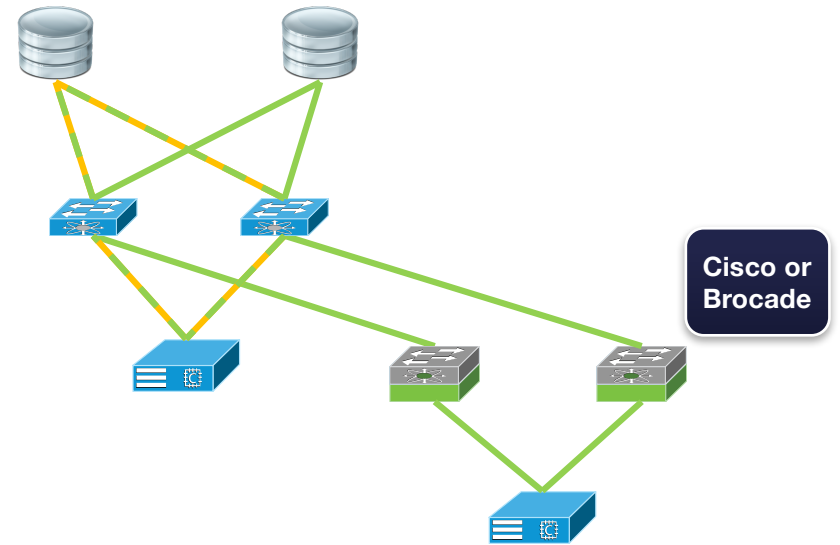
Cisco Nexus 7700 Series

- 2,4,6,10,18 slot chassis
- 48x10Gbit/s FCoE
- 9/14RU

MDS&Nexus Designs

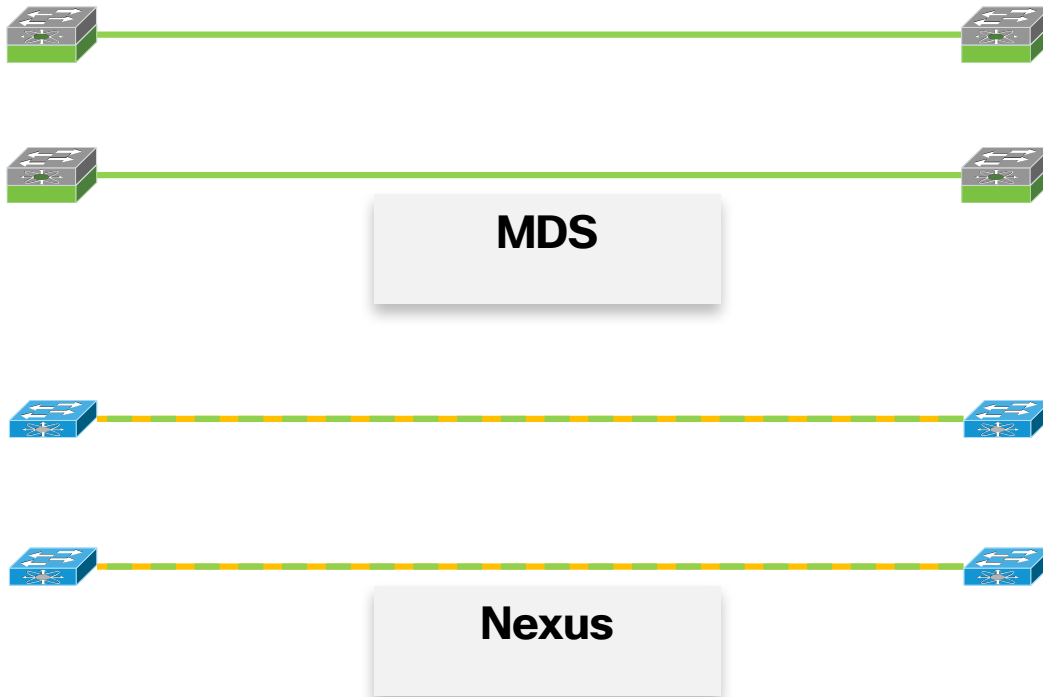


Simpler



Migration

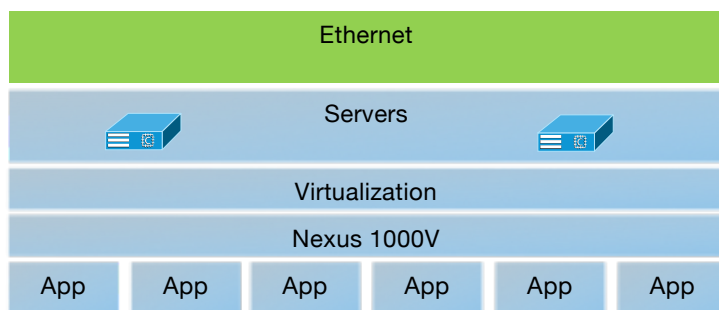
MDS&Nexus Designs



- Distance meters ... a lot
- Protocol and distance meters ... a lot
- Protocol, distance and platform meters ...a lot.
- MDS&Nexus for FC B2B Credits
- Nexus FCoE every platform is different

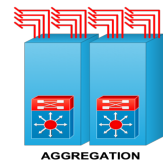
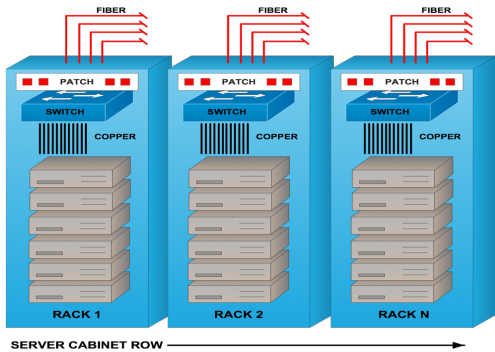
Let talk about Ethernet and IP

- Classic
- Automation & Cloud
 - SDN
 - Programmability

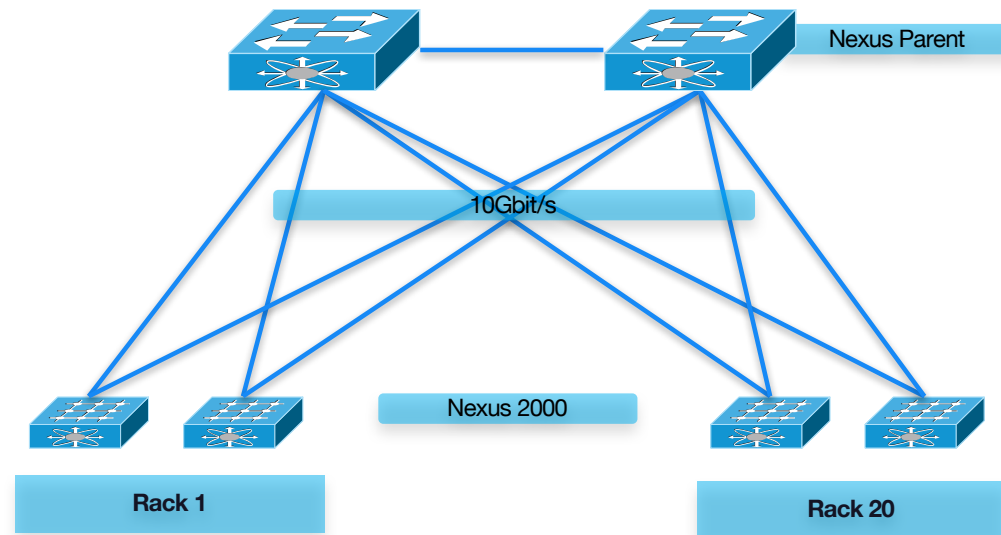
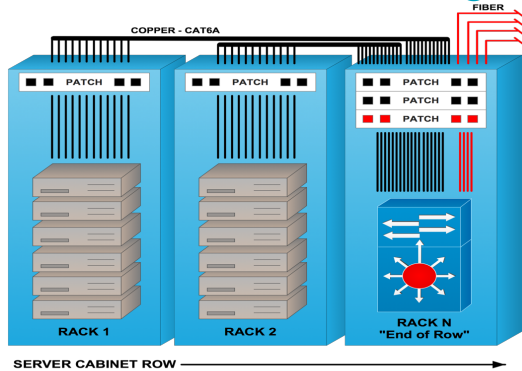


Nexus 2000

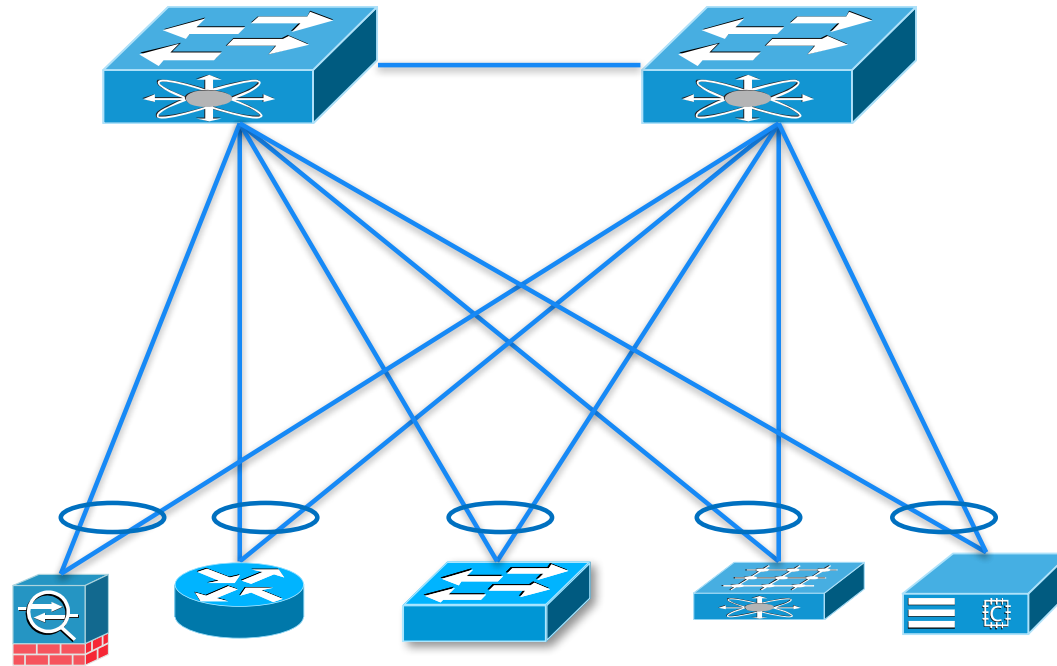
Top of Rack Design



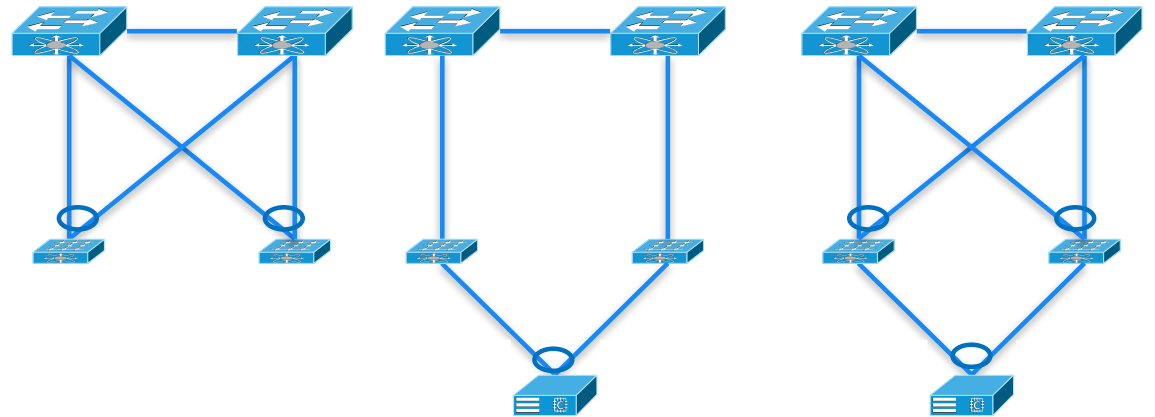
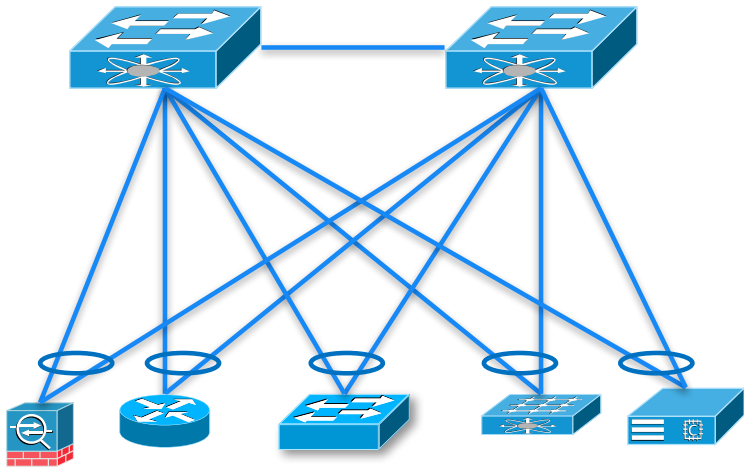
End of Row Design



vPC, vPC&FEX, EvPC

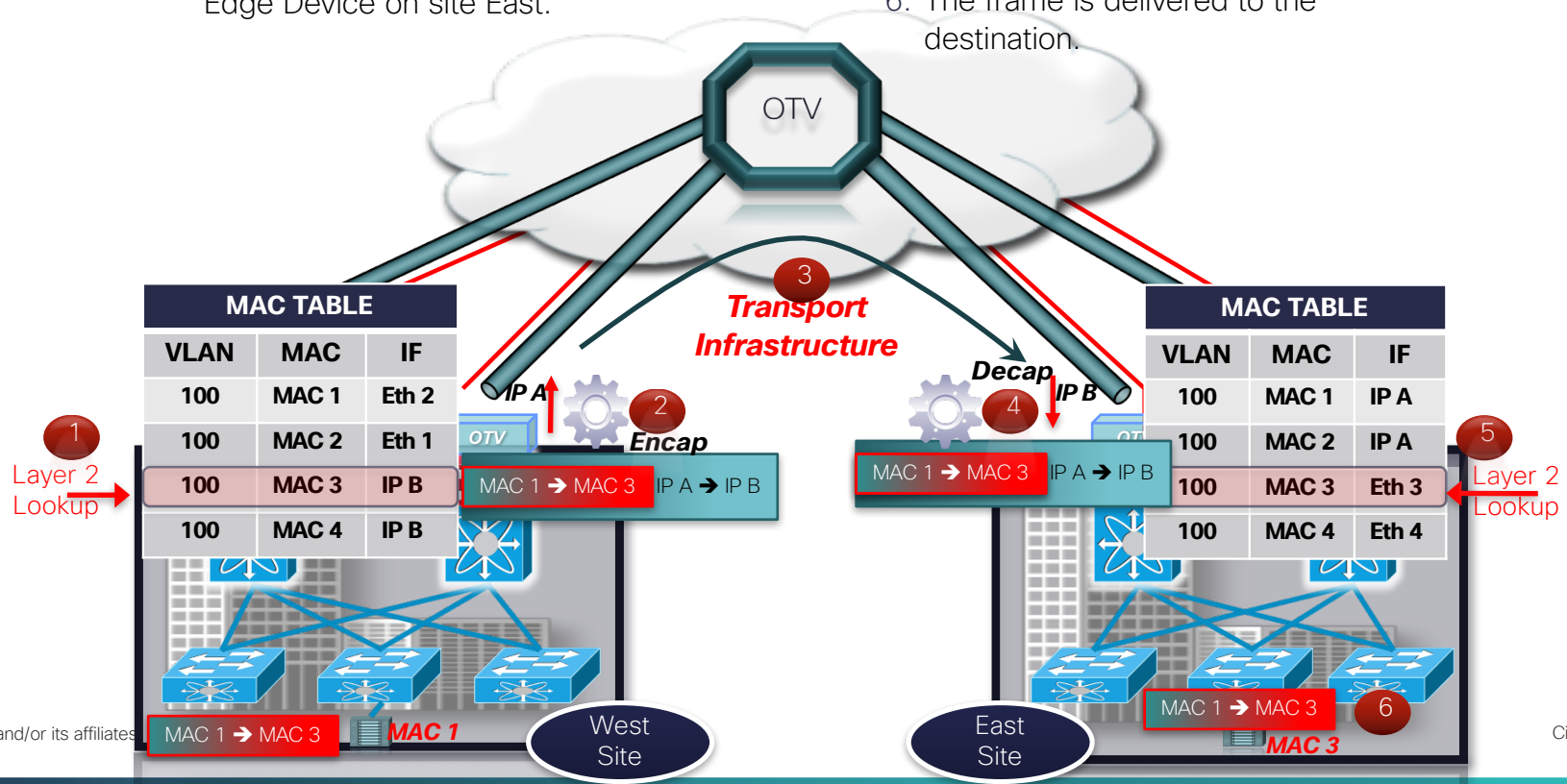


vPC, vPC&FEX, EvPC



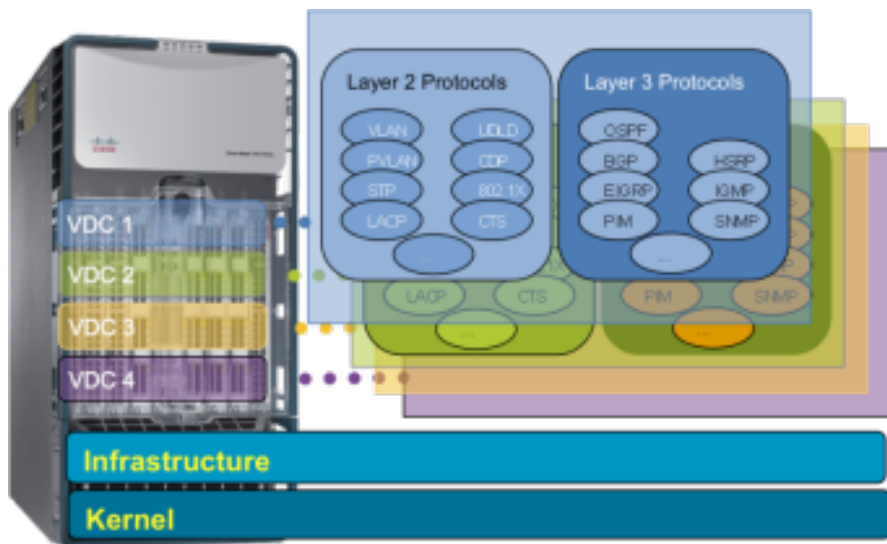
OTV

1. Layer 2 lookup on the destination MAC. MAC 3 is reachable through IP B.
2. The Edge Device encapsulates the frame.
3. The transport delivers the packet to the Edge Device on site East.
4. The Edge Device on site East receives and decapsulates the packet.
5. Layer 2 lookup on the original frame. MAC 3 is a local MAC.
6. The frame is delivered to the destination.



Virtual Device Context

Enabling Device Consolidation



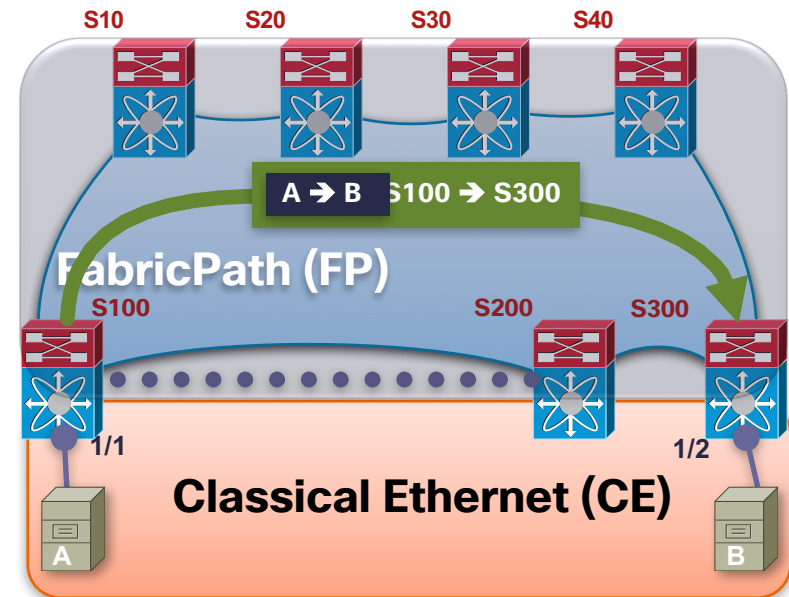
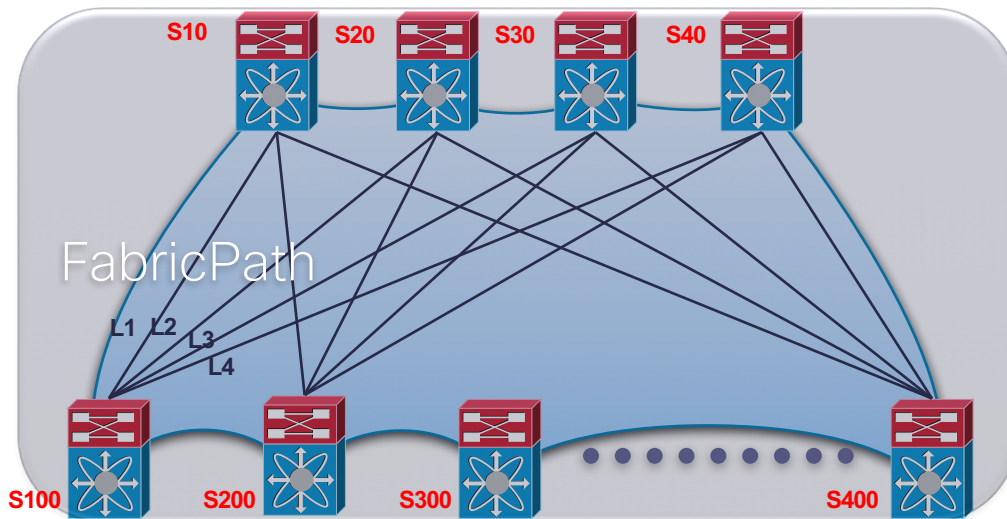
- Consolidate multiple devices into smaller footprint
- Maintain segmentation between different parts of networks
- Increase ROI by saving on power, cooling, management
- 90% of Nexus 7000 Customers leverage this functionality

FabricPath

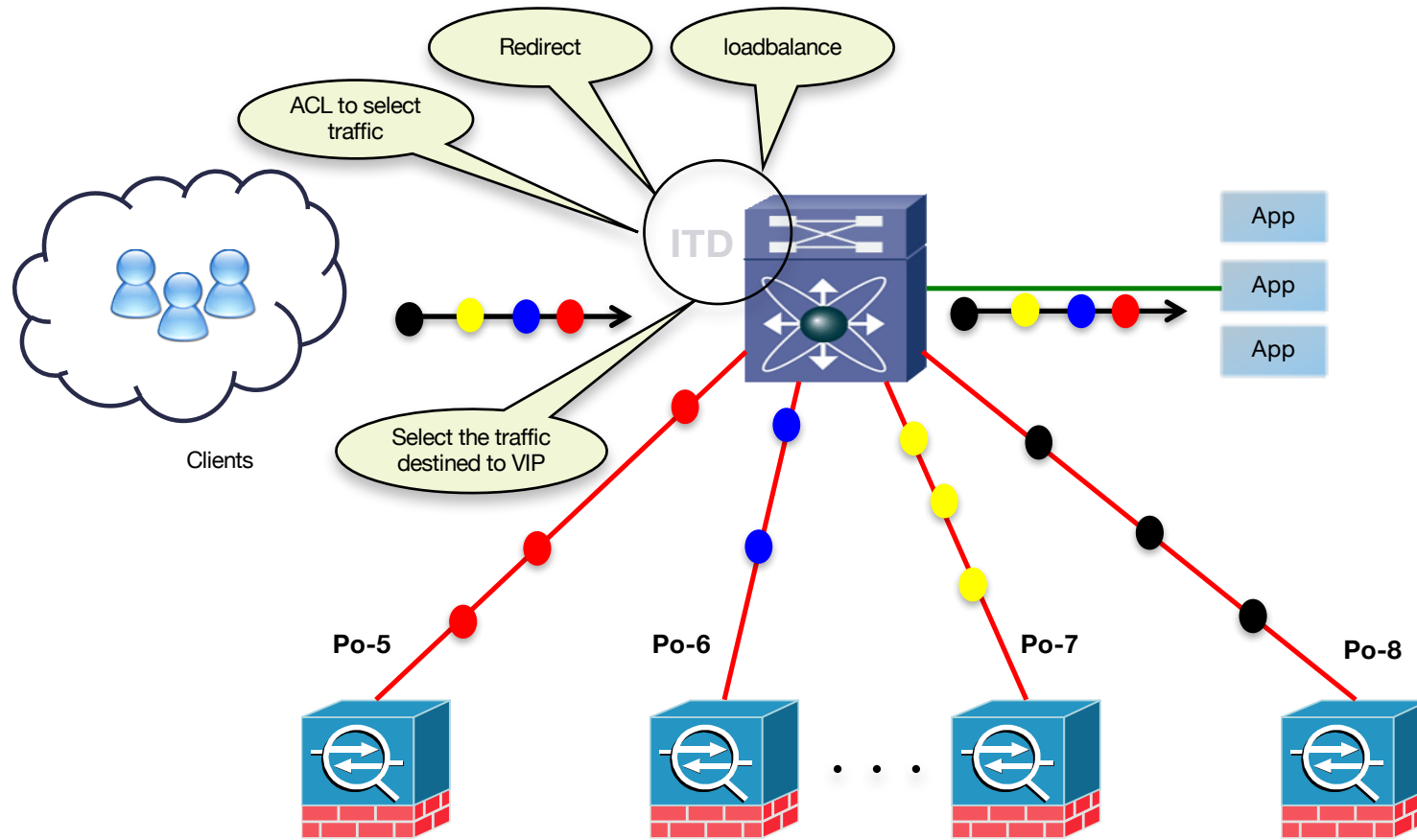
New Control Plane

Plug-n-Play L2 IS-IS manages forwarding topology

- IS-IS assigns addresses to all FabricPath switches automatically
- Compute shortest, pair-wise paths
- Support equal-cost paths between any FabricPath switch pairs



ITD



Note: the devices don't have to be directly connected to N7k

Cisco Nexus® Unified Fabric

Continued Evolution of Data Center Switching



AUTOMATION

Python, XML/ Netconf, TCL, EEM, PoAP

PROGRAMMABILITY

JSON/ REST APIs, Linux container, ODL

ORCHESTRATION

OnePK, OpenFlow, Openstack

SCALABLE SECURE SERVICES

CTS, WCCP, RISE, ITD

BUSINESS CONTINUITY/ DISASTER RECOVERY

LISP, OTV, VPLS

VIRTUALIZATION/ MULTI-TENANCY

MPLS, VxLAN, Enhanced Forwarding, VRF

SLA & ANALYTICS

SPAN, Netflow, NAM, 1588 Timestamping

SECURITY

RBAC, CoPP, DAI, ACL, FHS, uRPF, IPSG

HIGH PERFORMANCE FABRIC

40G/100G Density, FabricPath, VxLAN

FLEXIBLE ARCHITECTURE

FEX, BiDi, VDC

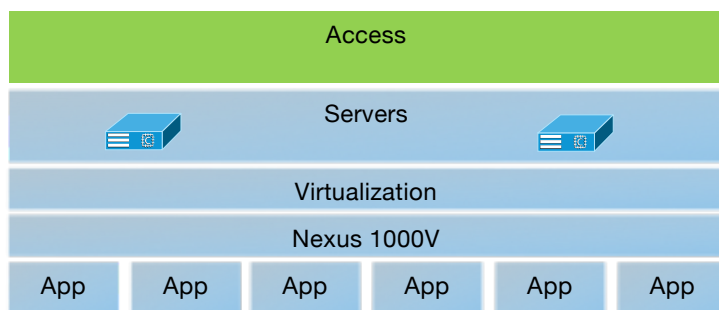
ULTRA HIGH AVAILABILITY

Hitless ISSU, BFD, FastBoot, Patching

CONVERGENCE

FC/ FCoE, Unified Port, Director Class

Access Layer



- Every Nexus is OK
- But the most effective is Nexus 2000
- Flexible connectivity
 - Central point of management
 - Ethernet, FCoE & FC
 - Cost effective
 - Scalability
 - Not a lot of reasons not to use it

Nexus 2000 Portfolio



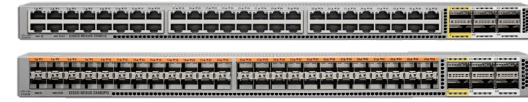
Nexus 2248T

- 48x1Gbit/s BASE-T
- 4x10Gbit/s SFP+ uplinks



Nexus 2232

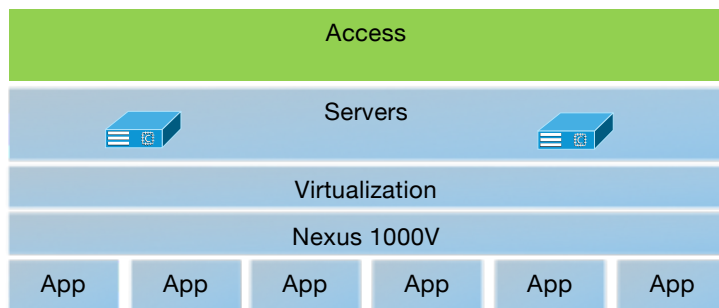
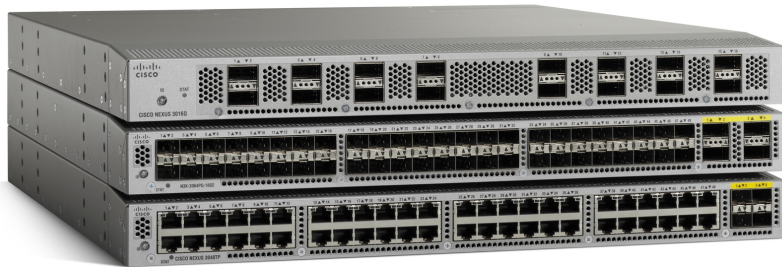
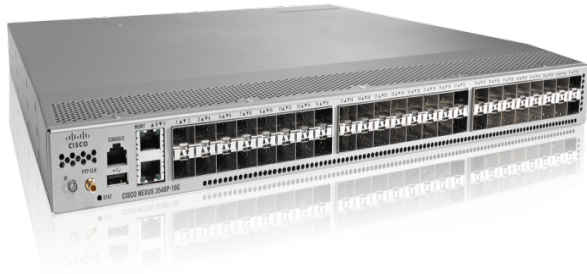
- 32x1/10Gbit/s BASE_T
- 32x1/10Gbit/s SFP+
- 8x10 SFP+ uplinks



Nexus 2348

- 48x1/10Gbit/s BASE_T
- 48x1/10Gbit/s SFP+
- 6x40 QSFP+ uplinks

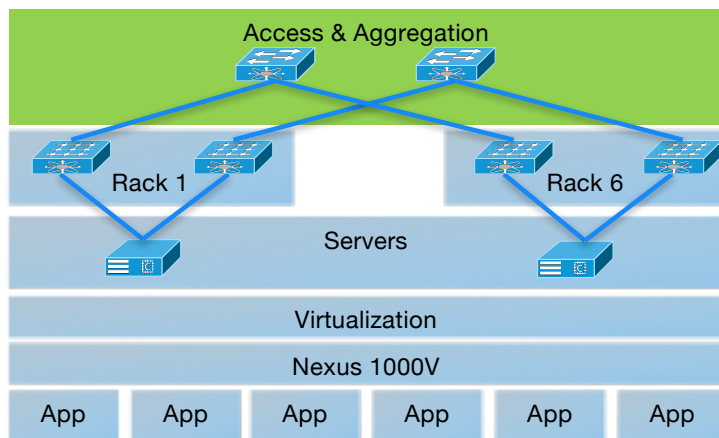
Access Layer – Nexus 3000



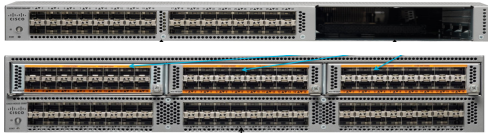
- 10/25/40/50/100Gbit/s
- Low latency
- Programmability
- There are better options

Access & Aggregation Layer – Nexus 5000

- FEX/Scale
- L2/L3
- Unified port
- FCoE
- 1/10/40Gbit/s
- vPC, EvPC, vPC+
- FabricPath
- Airflow
- Buffers
- ITD

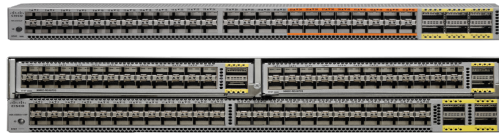


Nexus



Nexus 5500

- 5548UP & 5596UP
- All ports are unified
- All ports FCoE
- 1&2RU
- 8 port licensing model



Nexus 5600

- 5672UP & 56128P
- 16 & Modules are unified
- All ports FCoE
- 1&2RU
- 16 port licensing model



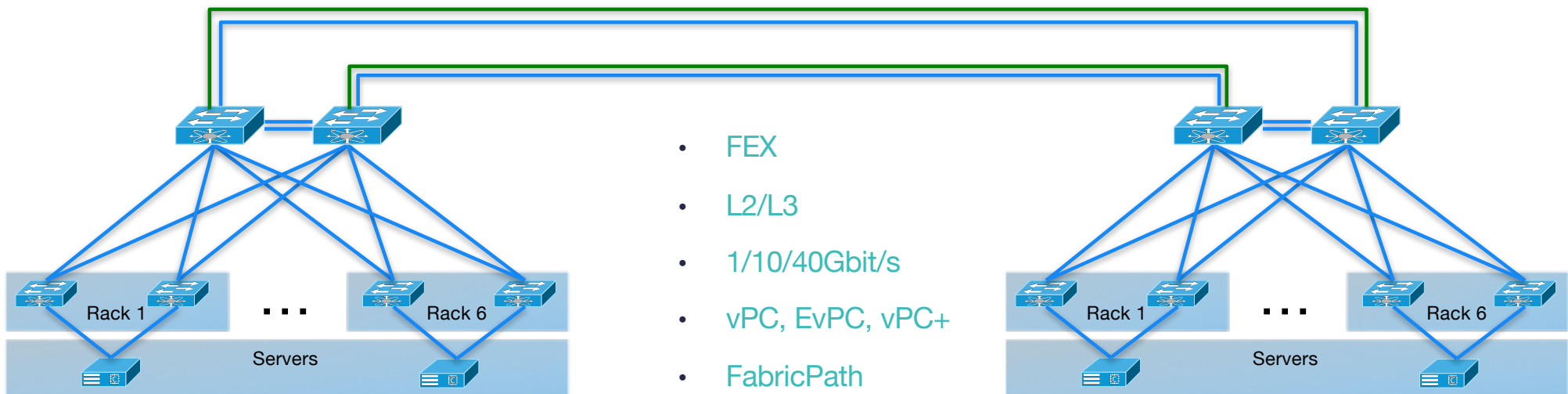
Nexus 5600Q

- 8 slots chassis
- 0-160 8Gbit/s FC
- All ports FCoE
- 4RU
- modul licensing model

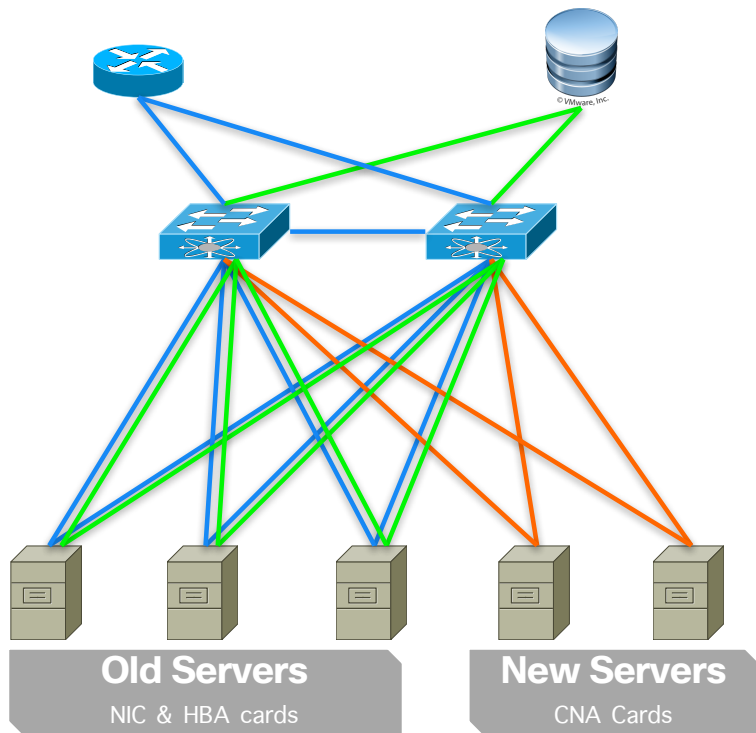


- 98108 & 93180
- 48 10G/25Gbit/s
- 6 40/100Gbit/s
- 1RU
- Tetratation

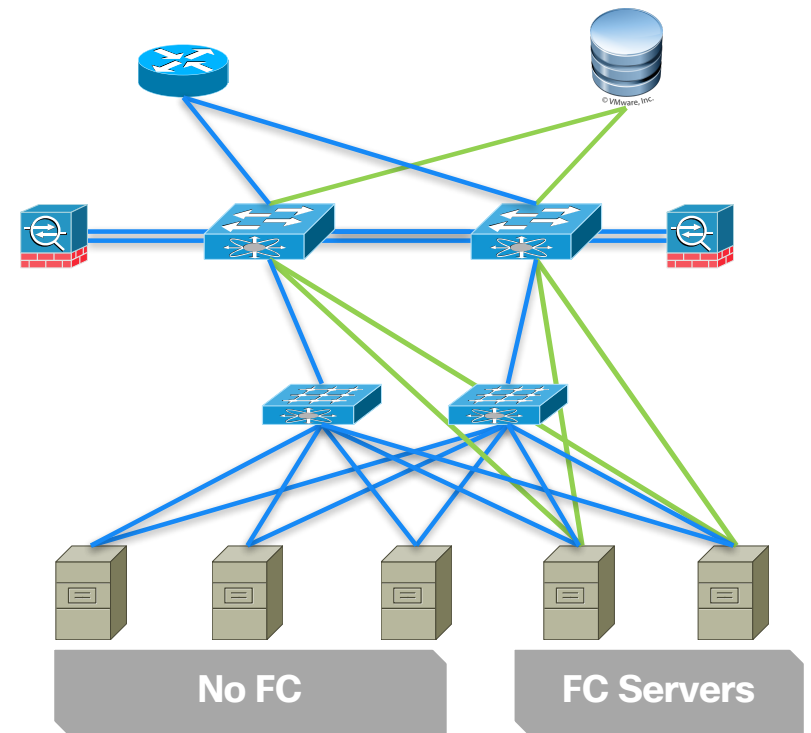
Example – Average Bank and Utility company



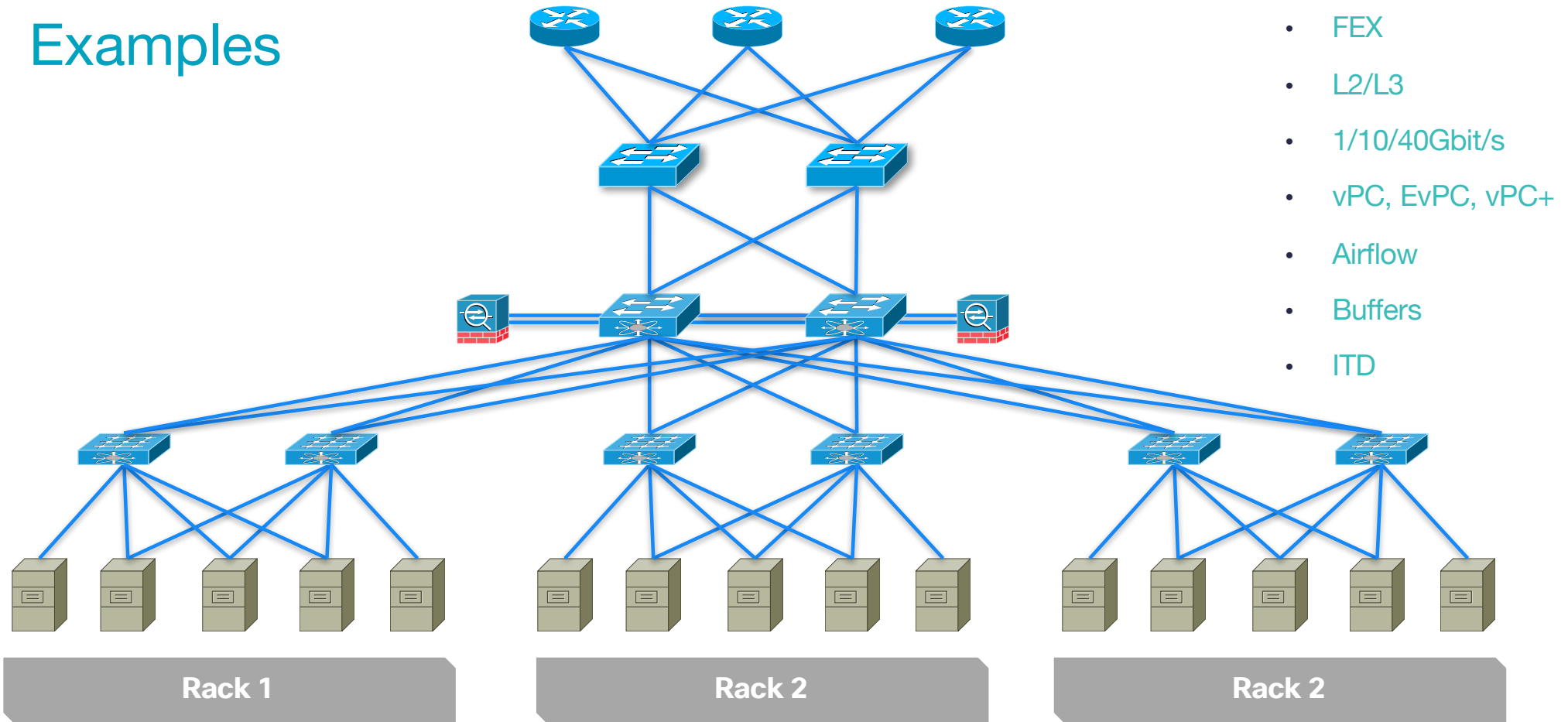
Example – Storage Connectivity



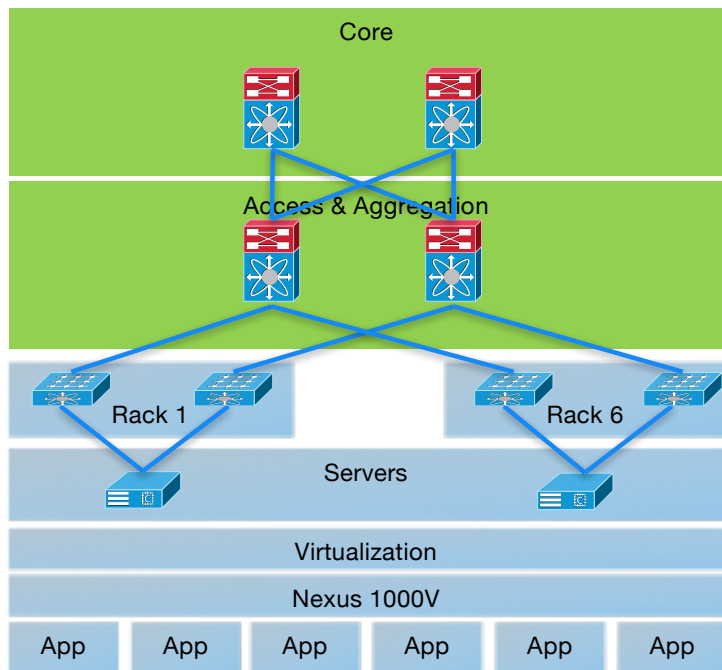
- FEX
- L2/L3
- Unified port
- FCoE
- 1/10/40Gbit/s
- vPC, EvPC, vPC+
- Airflow
- Buffers
- ITD



Examples



Access & Aggregatio Layer – Nexus 7000



- Nexus 5000 (-EvPC and few more)
- Modular - Life Sup/Fabric/Module
- MACSec
- VDC
- OTV
- ISSU
- Scale/Performance
- LISP
- MPLS

Nexus&MDS

Cisco Nexus 7000 Series Switches



- 4,9,10 & 18 slot chassis
- 48x10Gbit/s cards
- 12x40Gbit/s cards
- 6x100Gbit/s cards
- Front-to-back, side-to-side



- 2,6,10 and 18 slot chassis
- 48x10Gbit/s cards
- 24x40Gbit/s cards
- 12x100Gbit/s cards
- Front-to-back

Nexus&MDS



- 4,9,10 & 18 slot chassis
- 48x10Gbit/s cards
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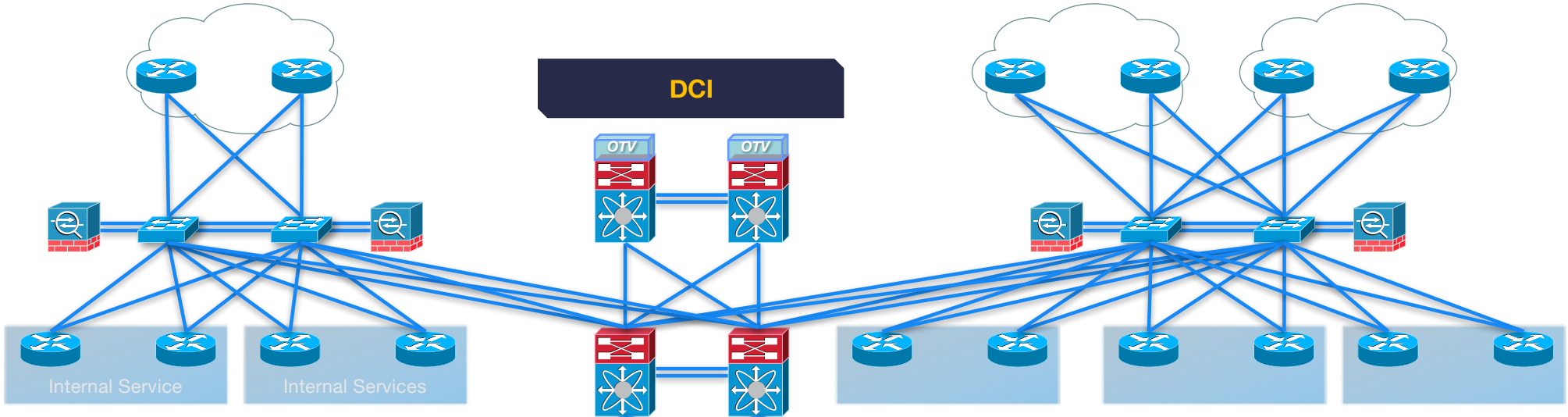


- 2,6,10 and 18 slot chassis
- 48x10Gbit/s cards
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- Front-to-back

Nexus 7000

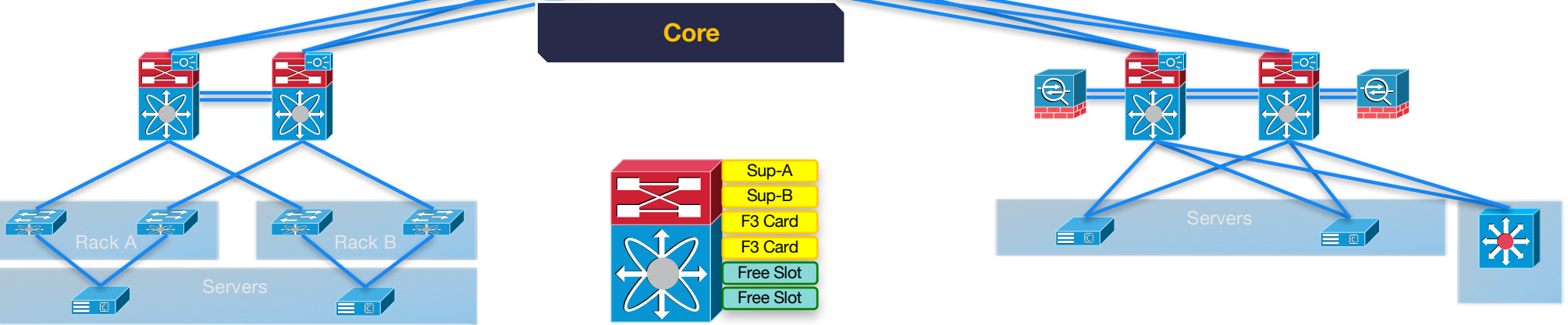
External Corporate

External SP



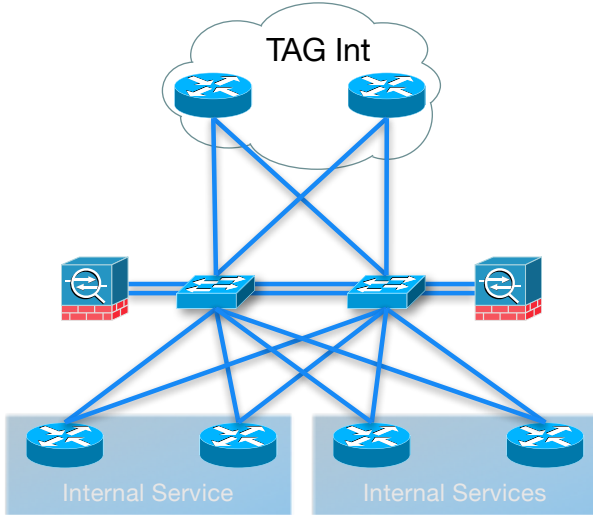
Corporate DC

SP DC

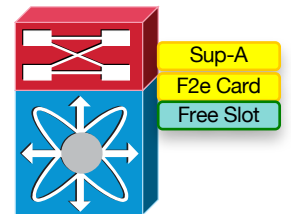
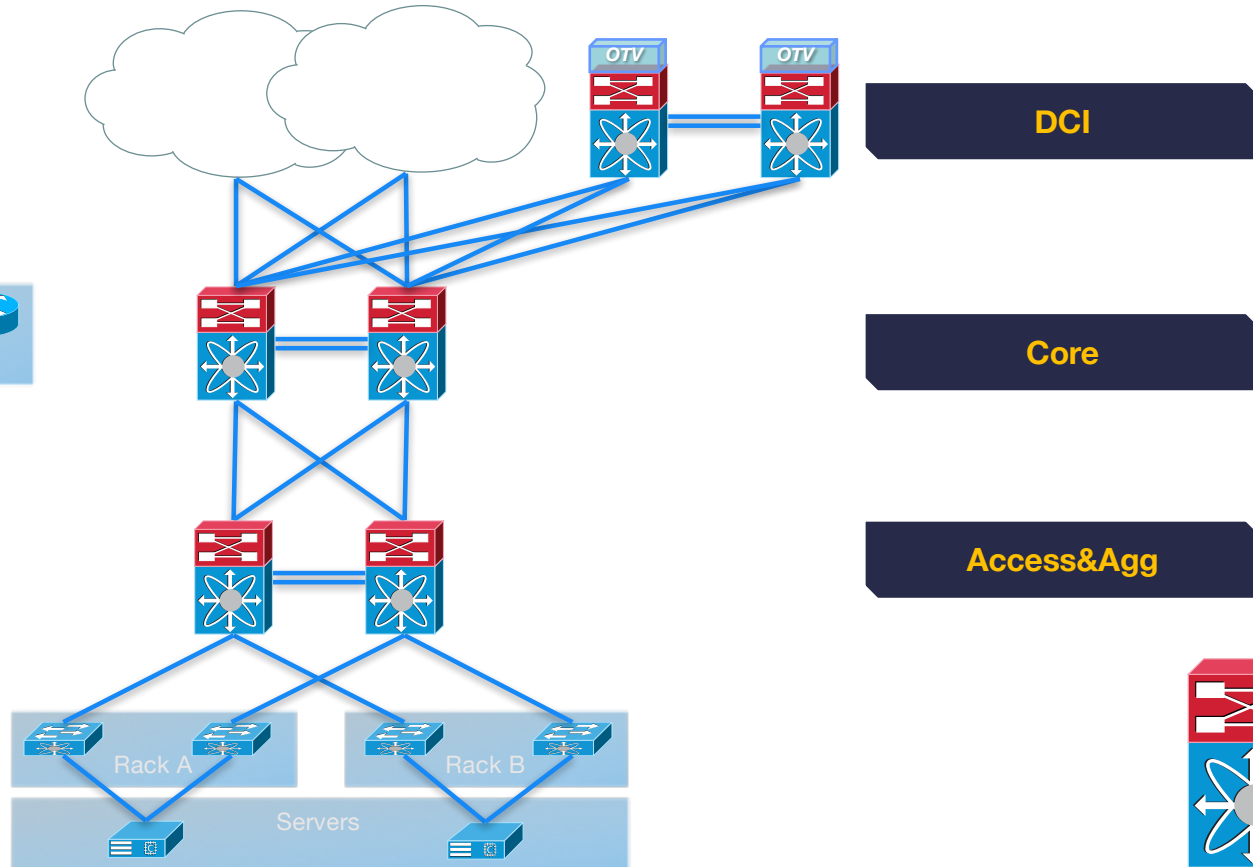


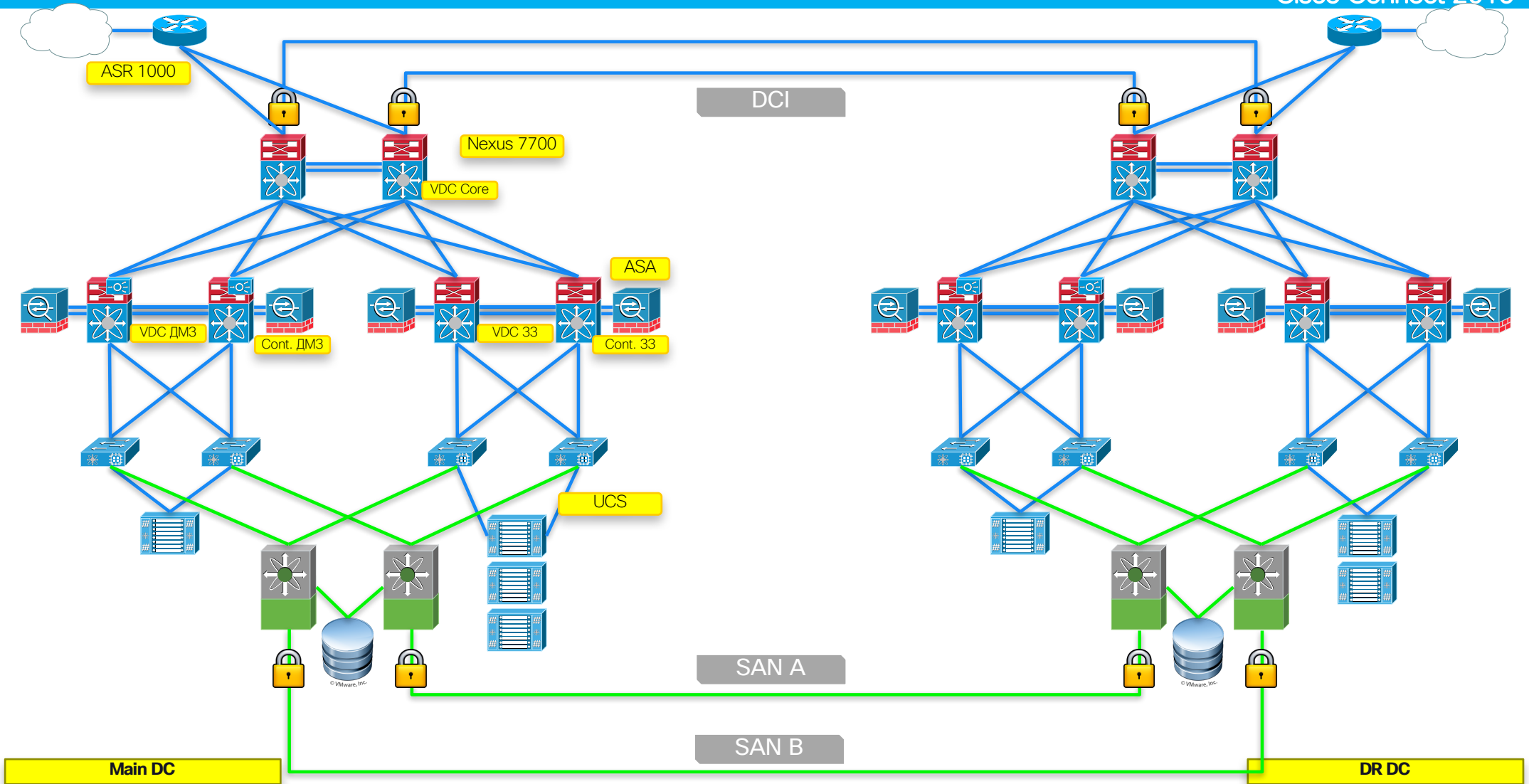
Nexus 7000

Card Operations

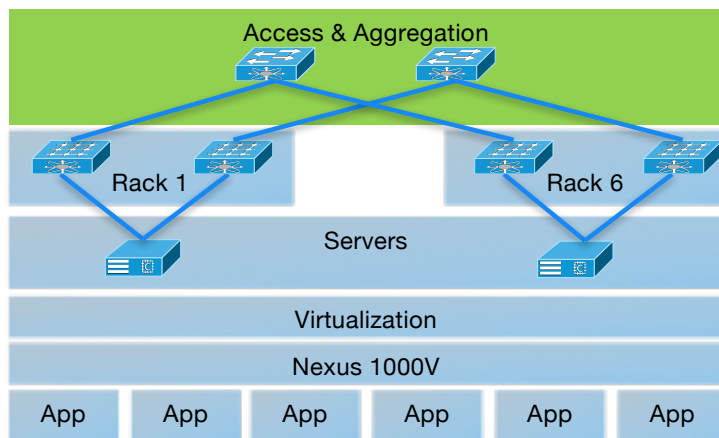


Corporate DC





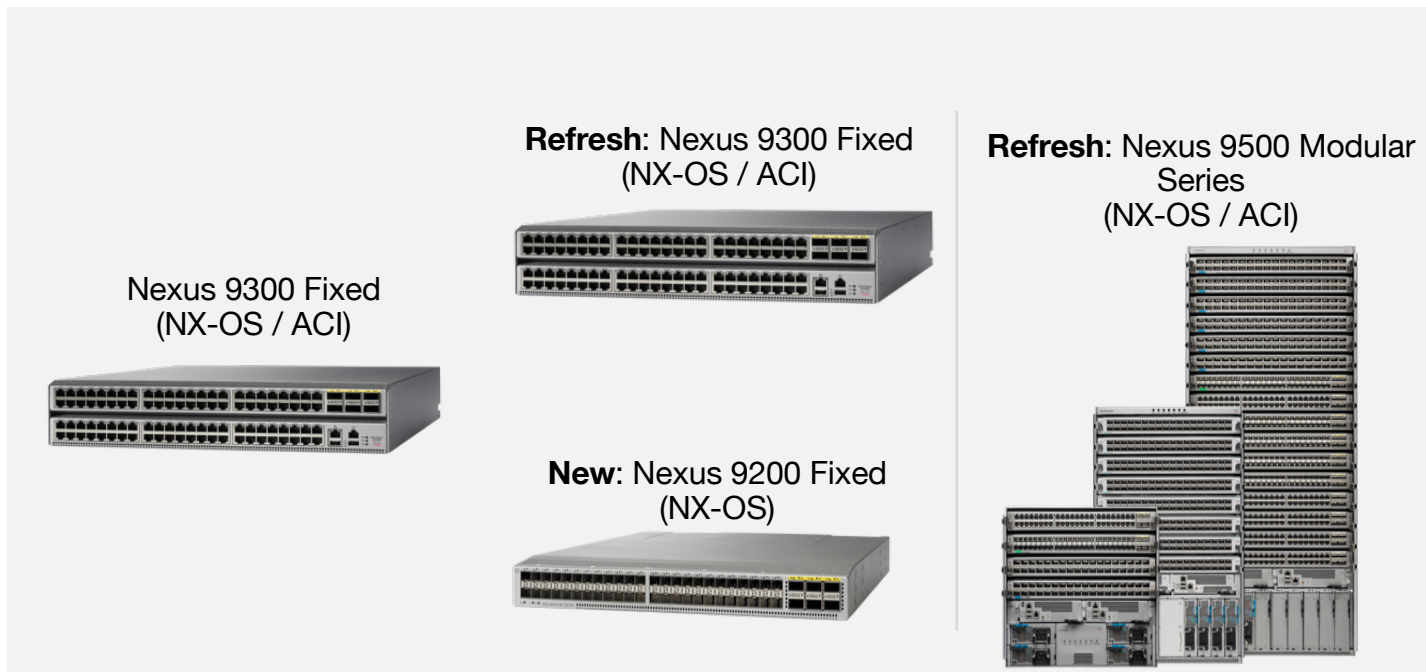
Access & Aggregatio Layer – Nexus 9000



- Overall Cisco Data Center product portfolio
- Price
- Programmability
- Road to ACI
- Modular and fixed
- 1/10/40/100Gbit/s
- Missing some stuff
- UP ports - expecting

Leadership with Innovation

Driving 10/25/40/50/100G Across the Entire Portfolio



PRICE

~50% Less Cost per 100G port

PERFORMANCE

3.6 Tbps / Slot

PORT DENSITY

33% more line rate 100G ports

PROGRAMMABILITY

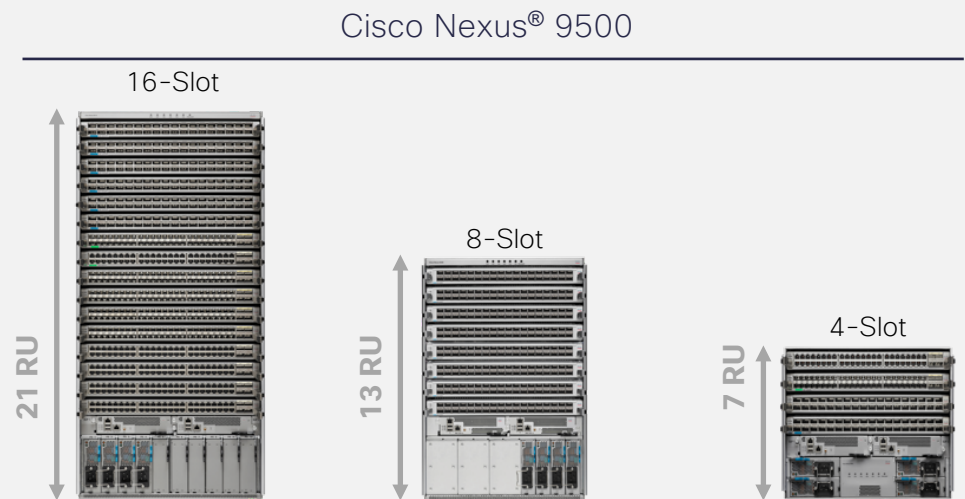
Open NX-OS

POWER EFFICIENCY

~15% less power per 100G port

Cisco Nexus 9500 Platform Switches

Density in DC Optimized Footprint



	Nexus 9516	Nexus 9508	Nexus 9504
Payload Slots	16	8	4
Capacity	30 Tbps	15 Tbps	7.5 Tbps
100G Density	128	64	32
40G Density	576	288	144
10G Density	2304	1152	576

CY13-15

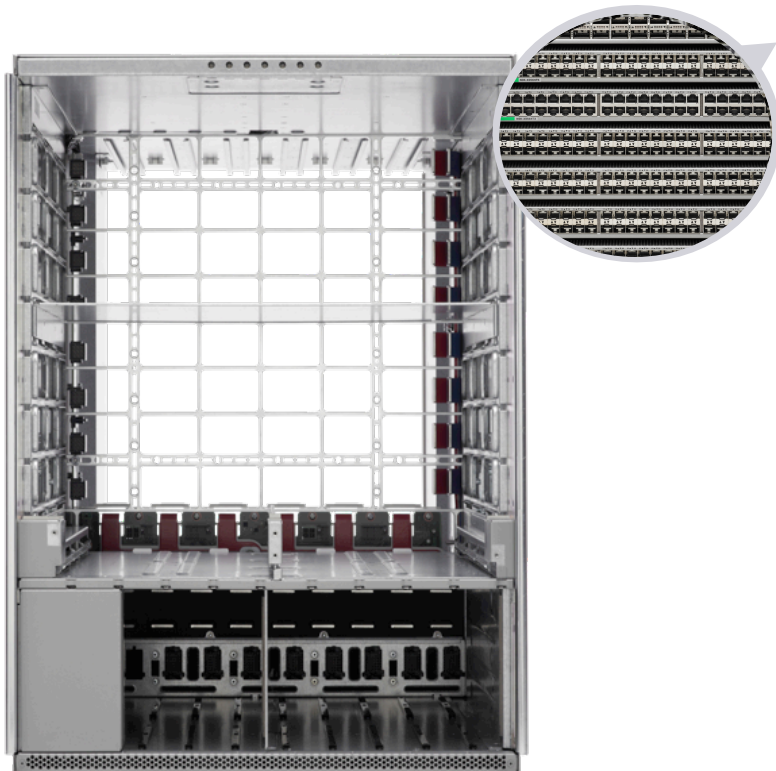
Fabric Bandwidth:
1.92 Tbps/ slot

Cloud Deployment Options:
ACI, VxLAN, NX-OS

Multi-Generation
Investment Protection:
No Mid-plane, Power Supply
Headroom

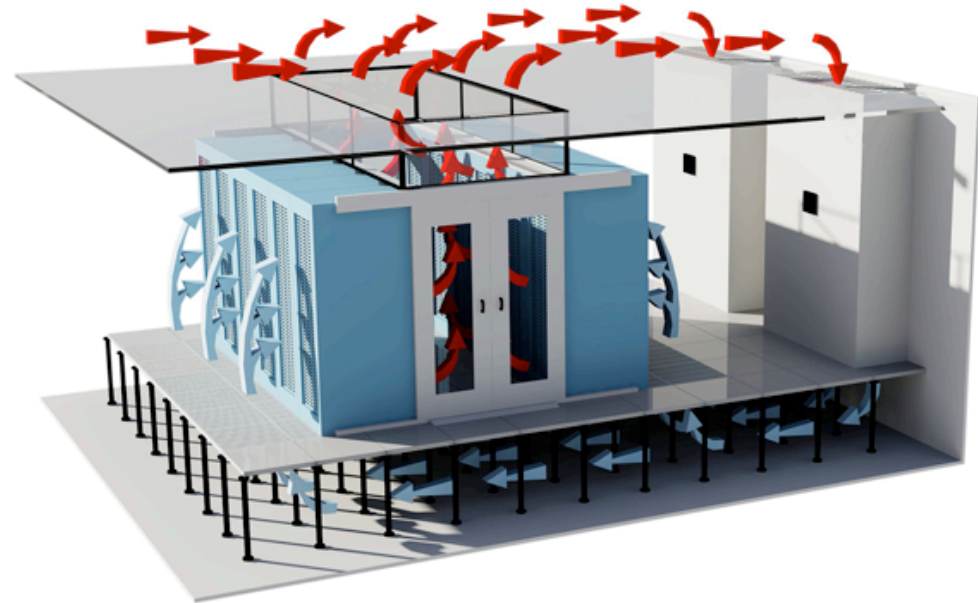
True Front-To-Back Airflow

Streamlined Operations For Next-Generation Data Center Designs



No Mid Plane and Perforated Faceplate for True Front-to-Back Cooling

- Save Cooling and Power
- Same chassis for multiple generations of line cards and fabric modules



Nexus 9300 Fixed Series ACI Leaf and NX-OS Switches

Integrated Uplink | CY'14-15

Modular Uplink | 2HCY'13

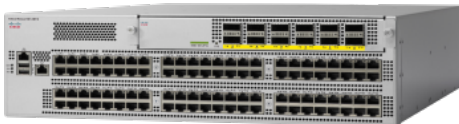
9396 SFP+(48x10+12x40G)



9396 Copper (48x10+12x40G)



93128 Copper (96x10+8x40G)



Available Uplinks

- 12p 40G QSFP+
- 6p 40G QSFP+
- 6p 40G QSFP+ E
- 4p 100G CFP2



9332 QSFP+ (32x40G)



9372(E) SFP+ (48x10+6x40G)



9372 (E) Copper (48x10+6x40G)



93120 Copper (96x10+6x40G)



CY13-15

Dual-core CPU
64 GB SSD
16 GB Memory

Nexus 9200 and 9300 Fixed Series

NEW: Nexus 9200 (NX-OS)

9236C QSFP (36p 100G) 30MB Buffer



9272Q QSFP (72p 40G) 30MB Buffer



92160YC-X SFP+ (48p 10/25G + 4p 100G/6p 40G) 20MB Buffer



9296TC-X Copper (48p 10G+4p 100G/6p 40G) 20MB Buffer



New Q1'CY16



REFRESH: Nexus 9300 (ACI & NX-OS)

40MB Buffer, Netflow*

New Q2'CY16

93180YC-EX SFP+ (48p 10/25G + 6p 40/100G)



93108TC-EX Copper (48p 10G+ 6p 40/100G)



CY16+

Dual-core CPU
64 GB SSD
16 GB Memory

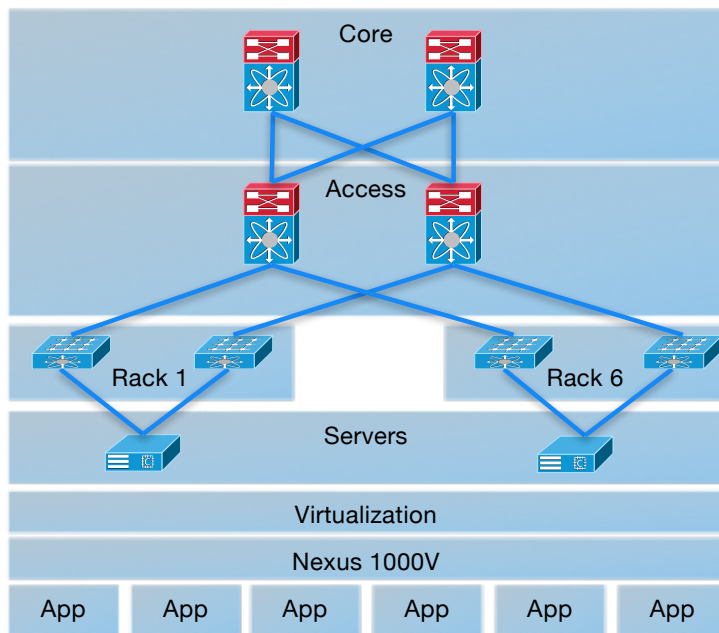
350K L3 Table

Hybrid 10/25G SFP+ port for flexible access migration

Hybrid 40/100G QSFP+ port for flexible uplink migration

* Hardware Readiness, Check software roadmap for enablement timelines

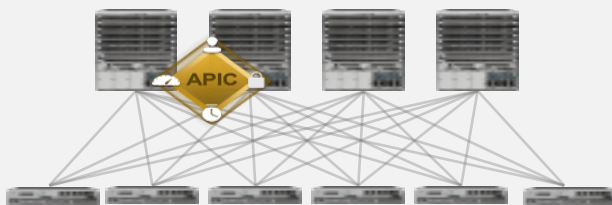
SDN/Programmability



- Why SDN
- It is faster
- Tasks are repeatable and reusable
- M2M communication
- DC are growing the teams are not
- Integration with cloud
- Simplify operations
- Increased security
- Policy based network management

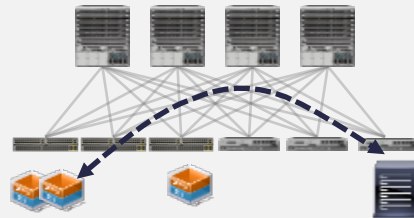
Choose one

Application Centric Infrastructure



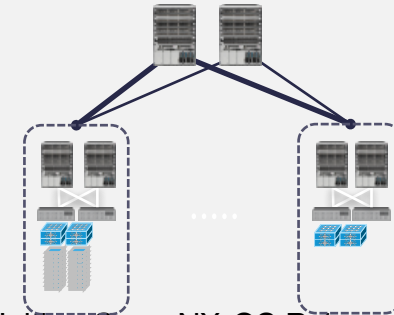
- ACI Fabric
- ACI Policy Model
- APIC (The Controller)
- Hypervisor Integration, VMWare, MSFT and KVM
- Integration and Automation of L4-7 Services
- Nexus 9000

Programmable Fabric VTS 2.0



Virtual Topology System (VTS) for software overlay provisioning and management across for Nexus 2K-9K (2H 2015) • Standards-based fabric support on Nexus 5600/7x00 with VXLAN BGP EVPN (shipping with Nexus 9000 today)

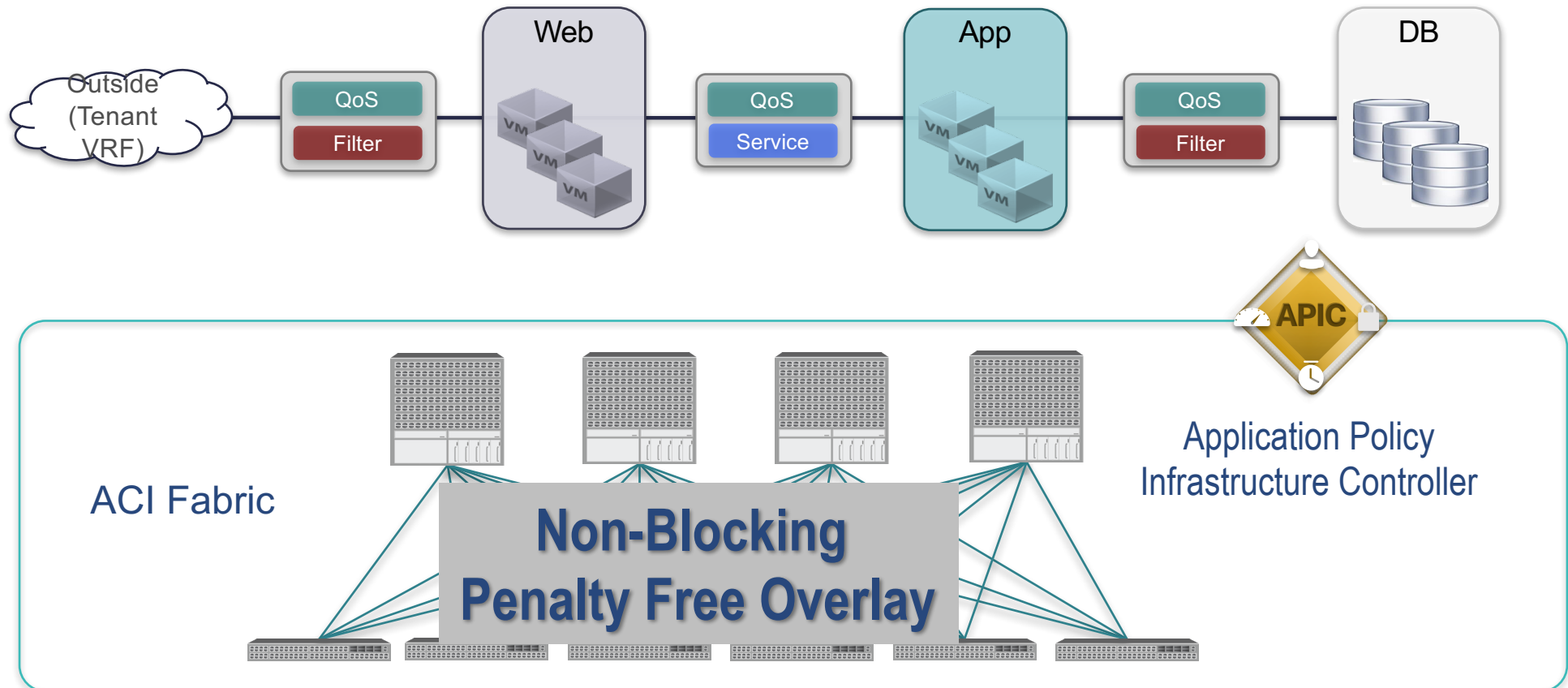
Programmable Network



NEW! Unified Open NX-OS Release for Nexus 3000 and Nexus 9000 (Q3 2015) • Enhancements to NX-API – object store and model driven • Native 3rd party RPM applications integration (tcollector, Nagios, Ganglia, Puppet / Chef etc.) • Linux utilities support for seamless tool integration across compute and network • SDK for custom application integration
NEW! Common NX-API across N2KN9K (2H 2015)

ACI Fabric

Logical network provisioning of stateless hardware

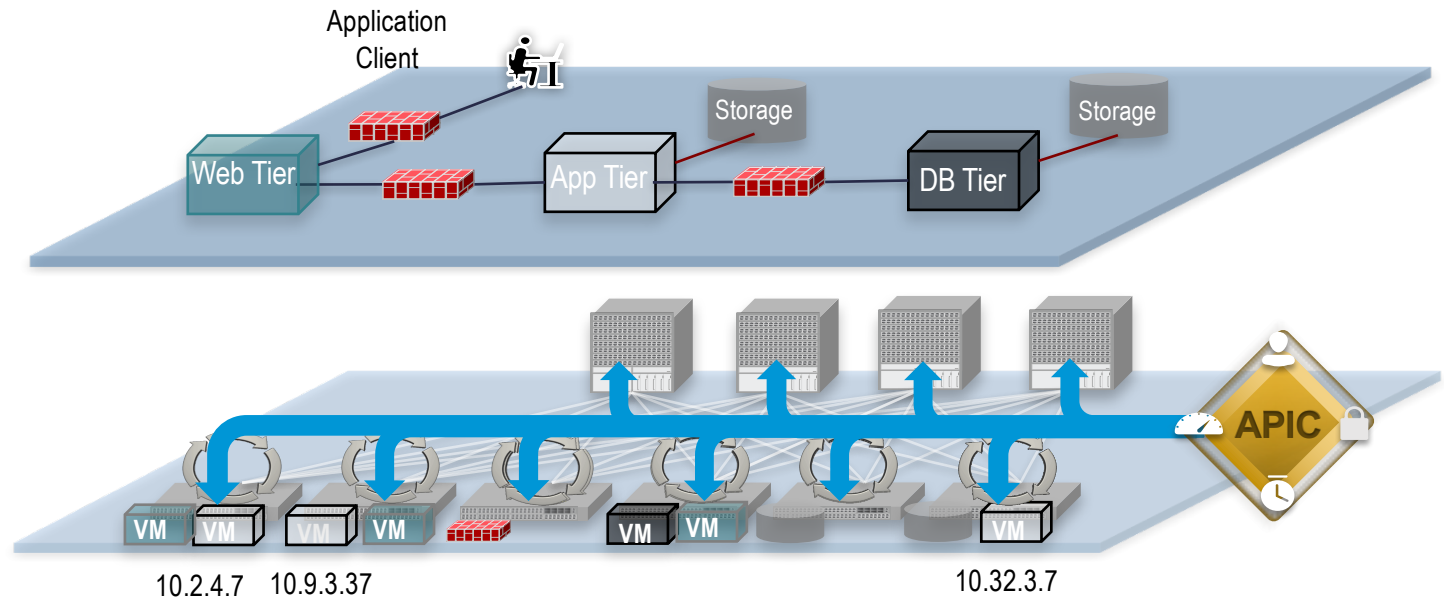


ACI – 21st Century Distributed Systems in Action

Application Policy Model: Defines the application requirements (Application Network Profile)

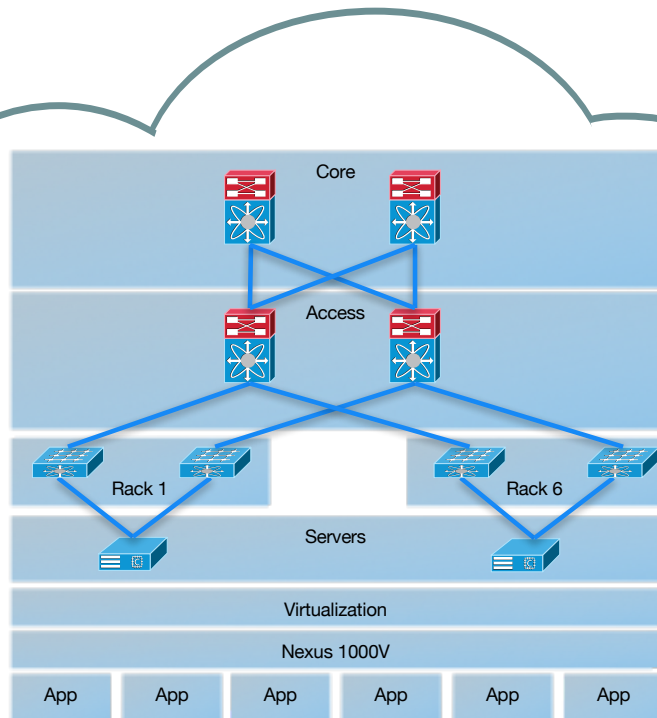


Policy Instantiation: Each device dynamically instantiates the required changes based on the policies



- All forwarding in the fabric is managed via the Application Network Profile
 - IP addresses are fully portable *anywhere* within the fabric
 - Security & Forwarding are fully *decoupled* from any physical or virtual network attributes
 - Devices autonomously update the state of the network based on configured policy requirements

Cloud – UCS Director

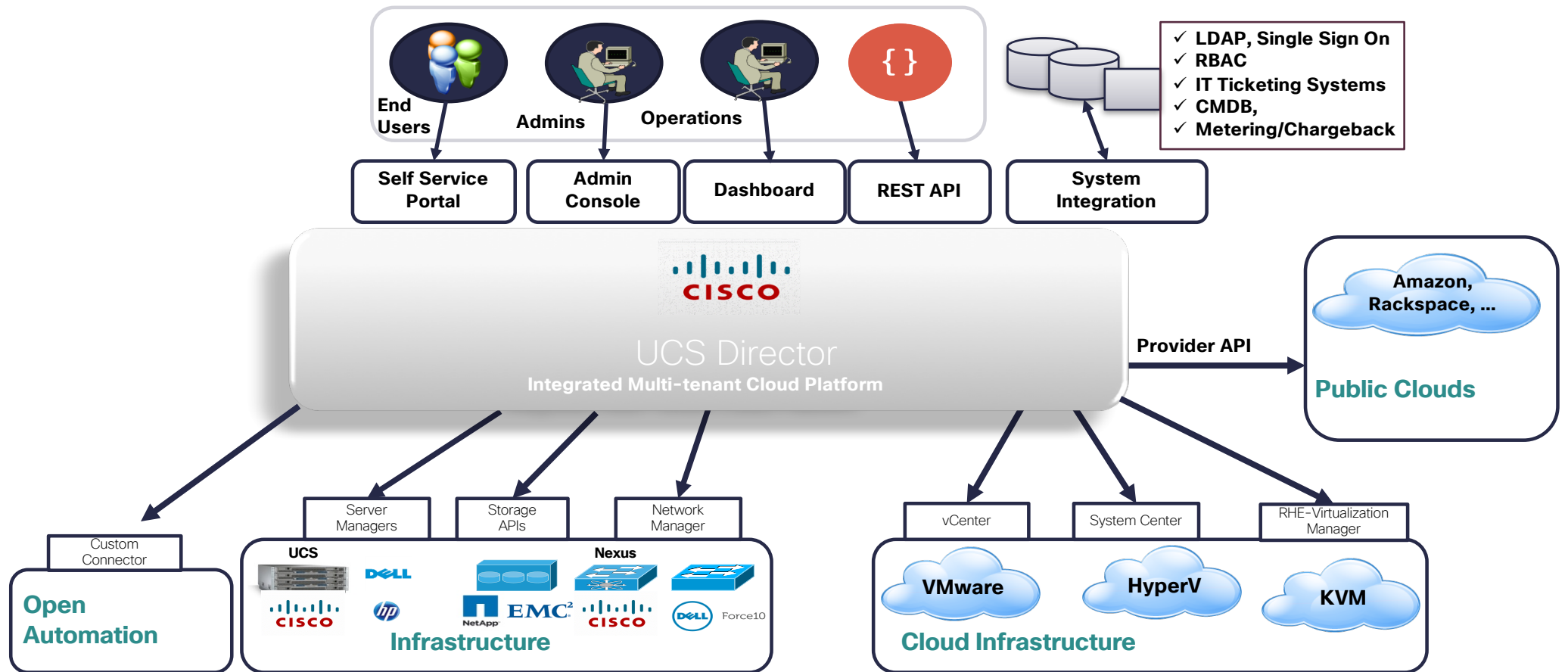


A **multi-vendor, multi-tenant, multi-hypervisor provisioning and management solution** that provides comprehensive infrastructure control, management and monitoring via a single pane of glass

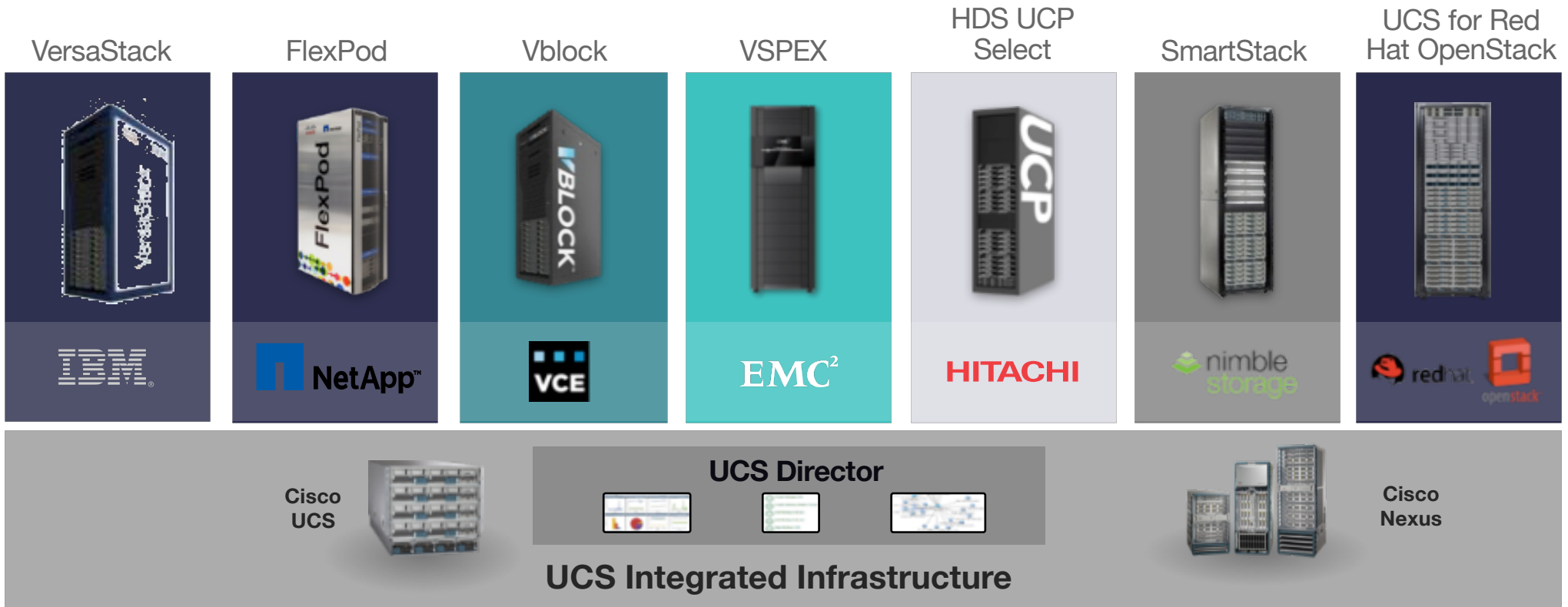
Cisco UCSD automates the provisioning of resource pools across **physical and virtual** from a unified centralized management console, reducing time-to-value for both applications and end users.

Cisco UCSD delivers **unified management** for the industry's leading **converged infrastructure solutions**, which are based on the Cisco Unified Computing System (UCS) and Nexus platforms.

Cisco UCSD Turn-Key Solution Overview



UCS Integrated Infrastructure



Cisco is #1 and a partner in ~69% of all Integrated Infrastructure*

Exclusive in the top 2 solutions (FlexPod and Vblock) and ~50% in the #3 solution (VSPEX)*

*IDC Worldwide Integrated Infrastructure and Platforms Tracker, April 29, 2014

Thank you.

