Cisco Networking Academy®
Mind Wide Open™

Lucerne University of Applied Sciences and Arts
HOCHSCHULE LUZERN
Technik & Architektur
Weiterbildung

Virtualisierung im Datacenter

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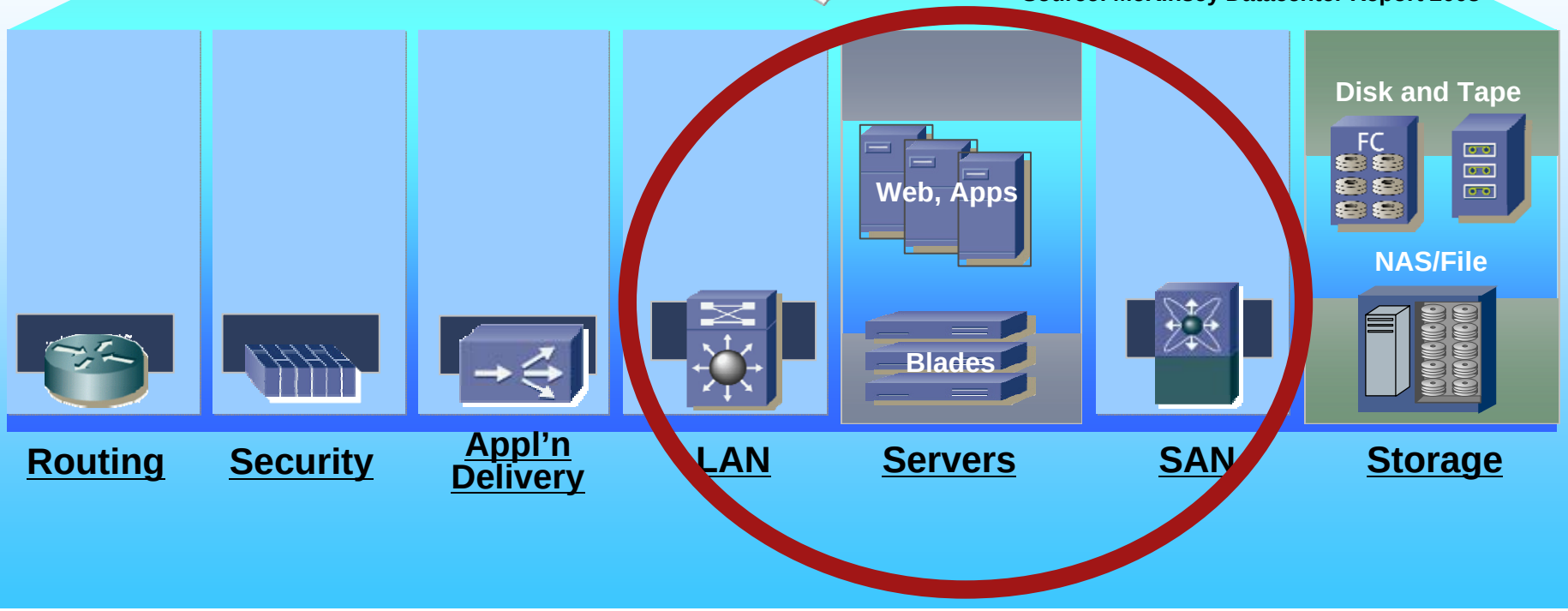
Agenda

- **Virtualisierung, wo genau?**
- Server Virtualisierung
- Netzwerk Virtualisierung

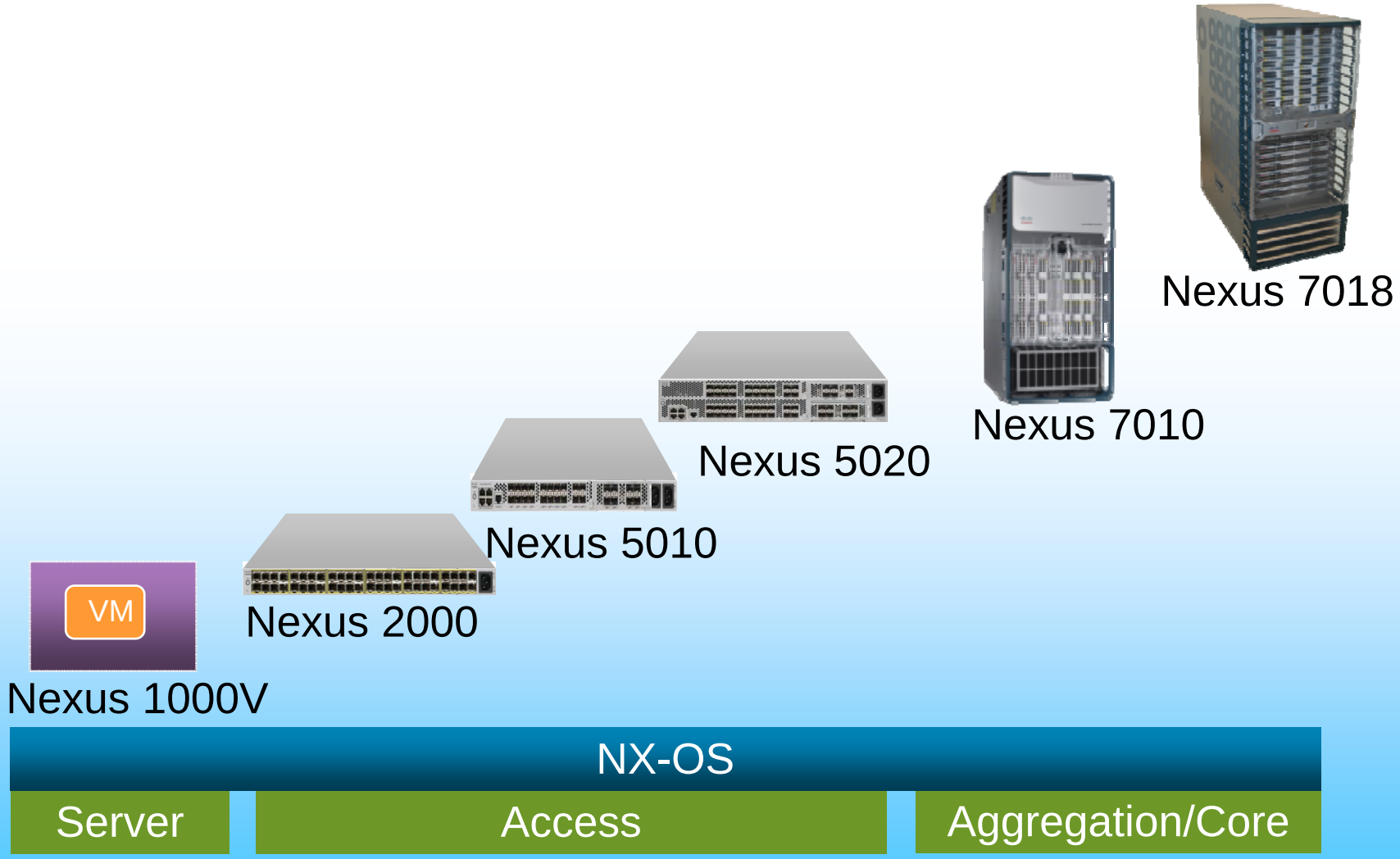
Datacenter Challenges

- Datacenter Anteil >50% des gesamten IT Budgets
- DC Betriebskosten steigen bis zu 20% (IT Kostenwachstum 6%)
- DC sind verantwortlich für den Hauptanteil der CO_2 Emissionen im Dienstleistungssektor
- Gesamte IT-Industrie ist für 2% der globalen CO_2 Emissionen verantwortlich - In etwa gleich wie die Flugverkehr Industrie

Source: McKinsey Datacenter Report 2008



Nexus Data Center Product Portfolio



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- **Server Virtualisierung**
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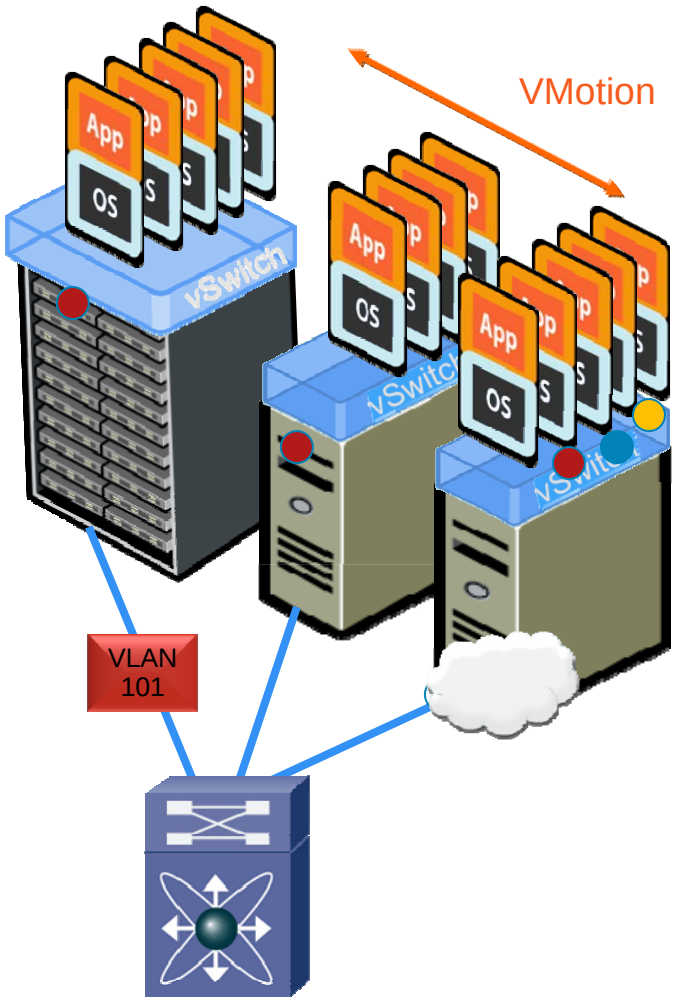
Challenges with Server-Virtualization



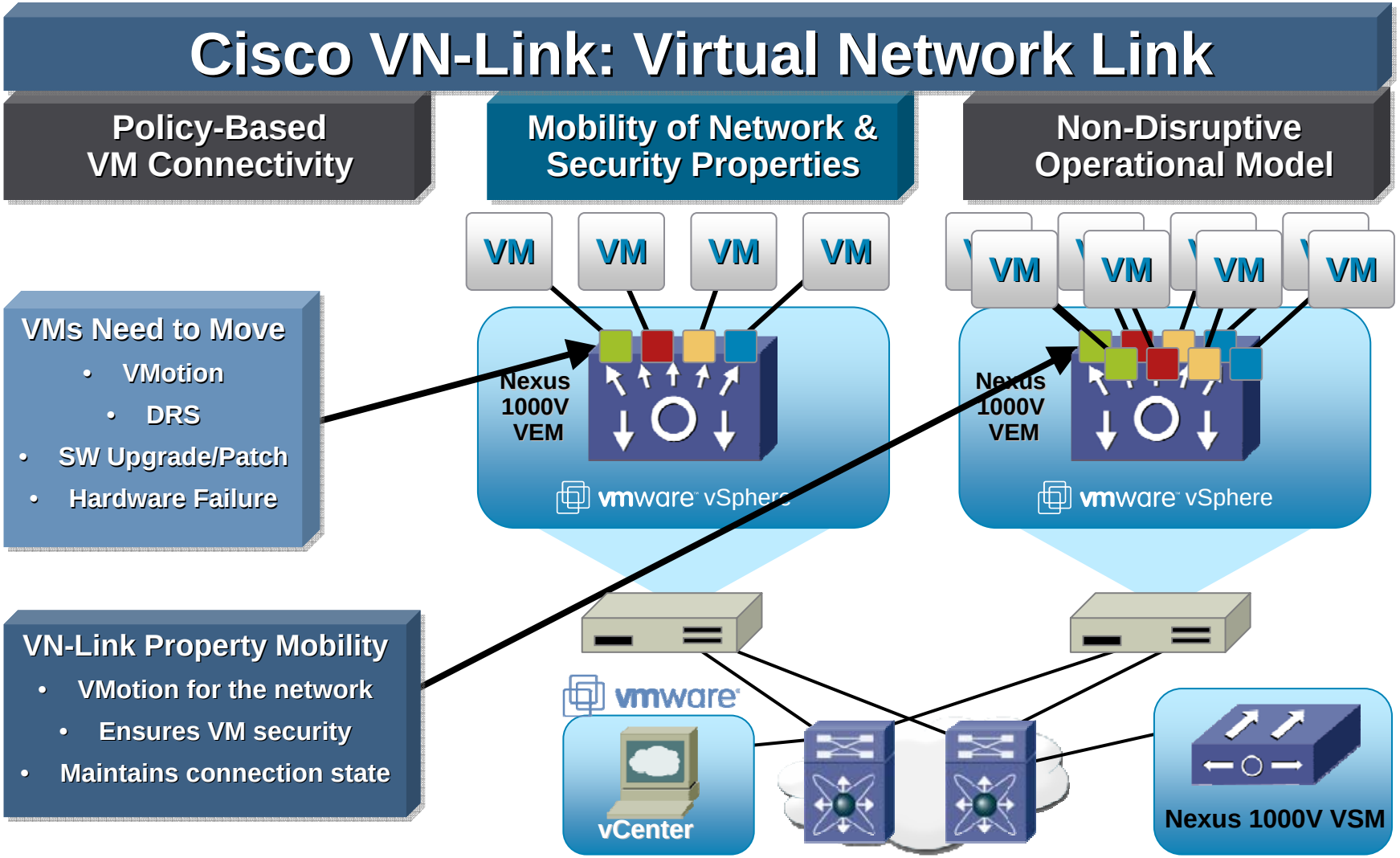
Problems:

- VMotion may move VMs across physical ports—policy must follow
- Impossible to view or apply policy to locally switched traffic
- Cannot correlate traffic on physical links—from multiple VMs

VN-Link:

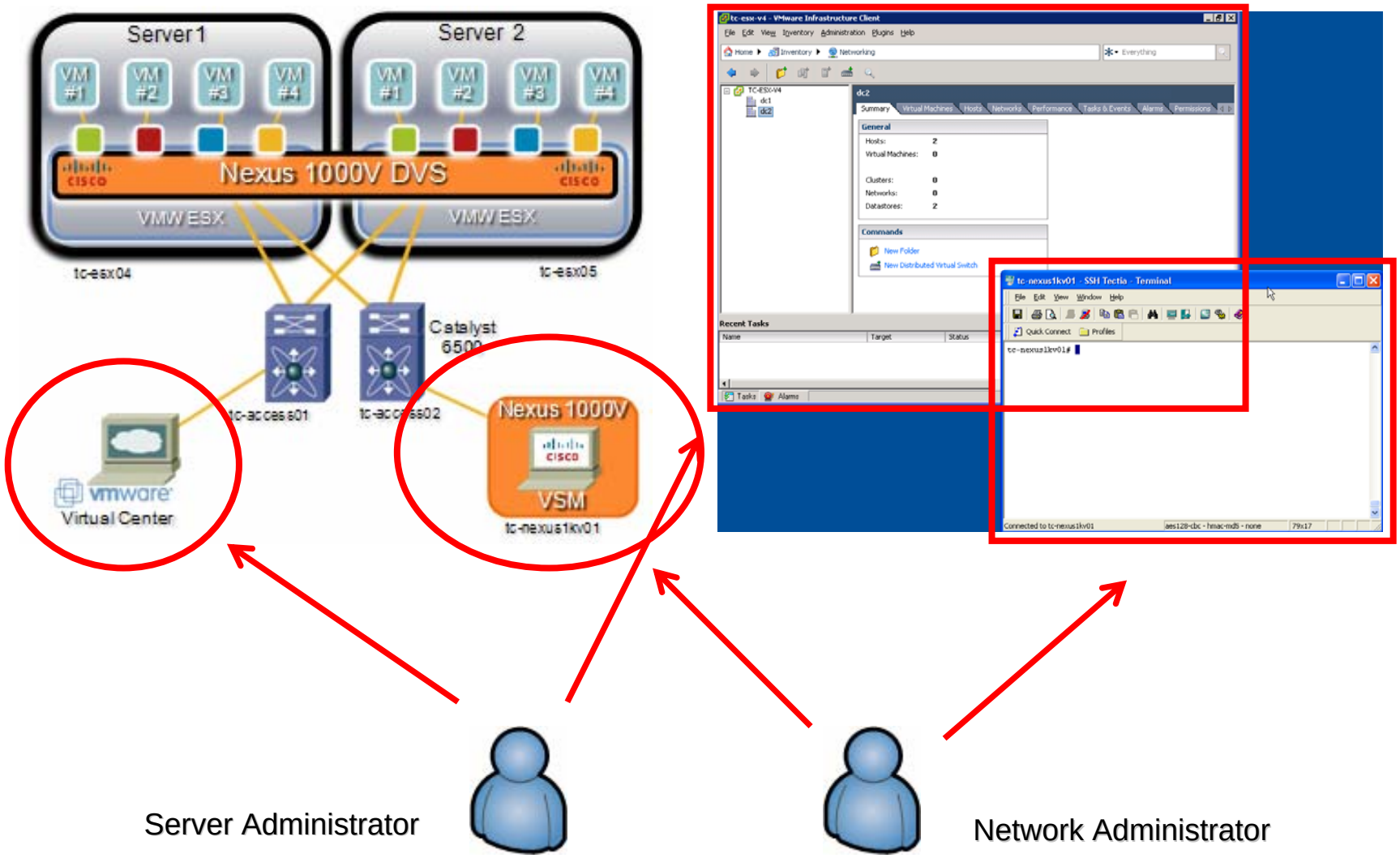
- Extends network to the VM
- Consistent services
- Coordinated, coherent management

Cisco Nexus 1000V



Non-disruptive Operational model

Management: Increase Operational Efficiency



Cisco Nexus 1000V

Three New Features that Make a Difference

Encapsulated Remote SPAN (ERSPAN)

- Mirror VM interface traffic to a remote sniffer
- Identify root cause for connectivity issues
- No host-based sniffer virtual appliance to maintain
- Follows your VM with VMotion or DRS

NetFlow v.9 with Data Export

- View flow-based stats for individual VMs
- Captures multi-tiered app traffic inside a single ESX host
- Export aggregate stats to dedicated collector for DC-wide VM view
- Follows your VM with VMotion or DRS

Private VLANs (PVLANs)

- Great for mixed use ESX clusters
- Segment VMs w/o burning IP addresses
- Supports isolated, community and promiscuous trunk ports
- Follows your VM with VMotion or DRS

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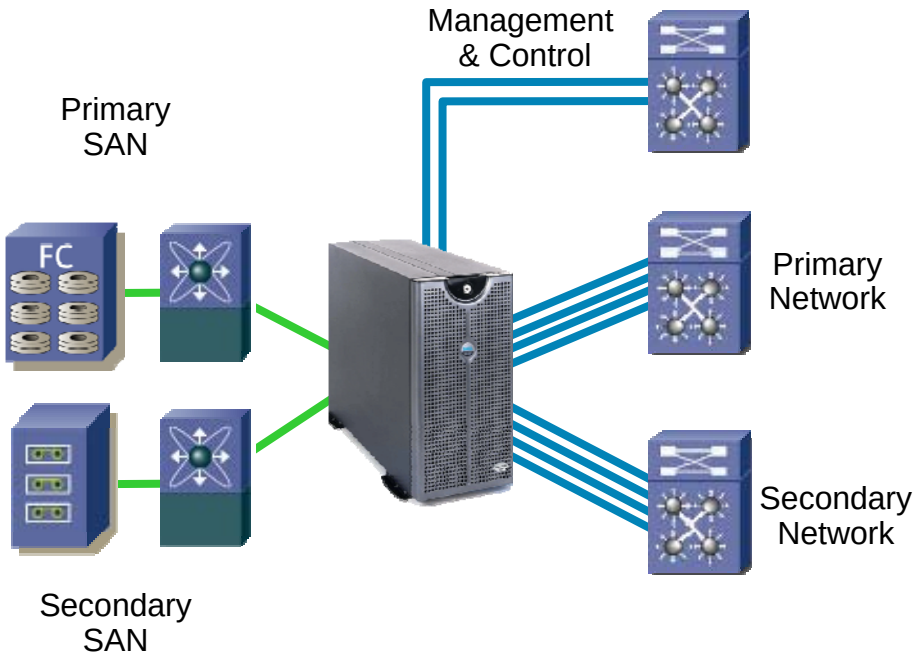
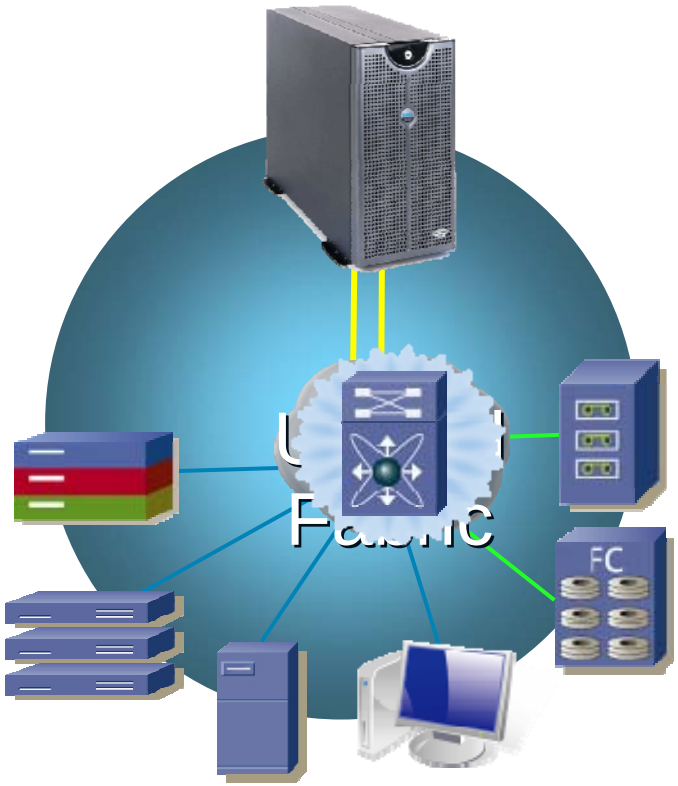
- **Netzwerk Virtualisierung**

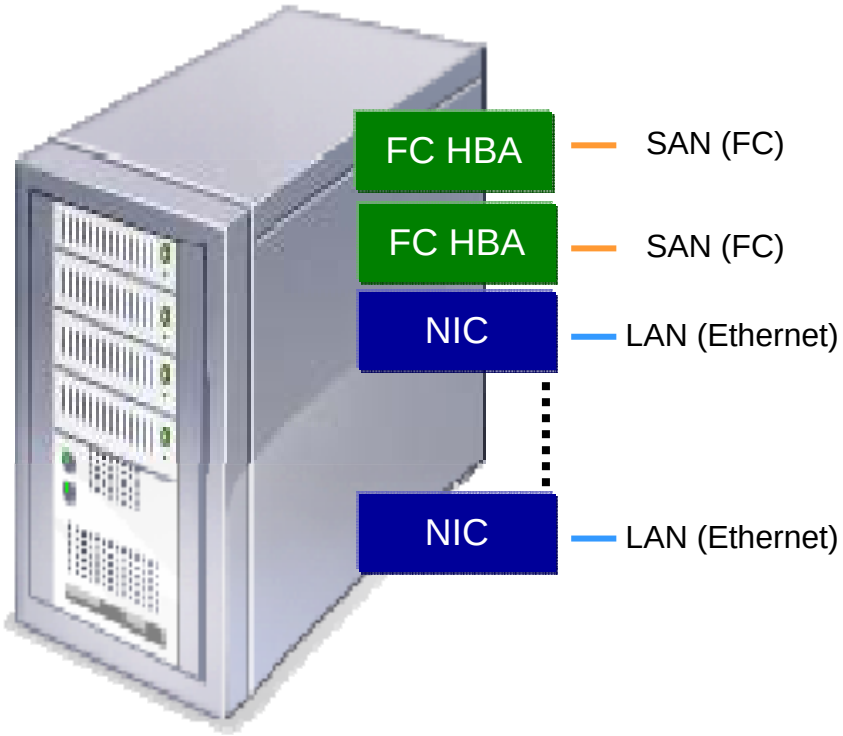
Our goal: Simplify = Unified Fabric :

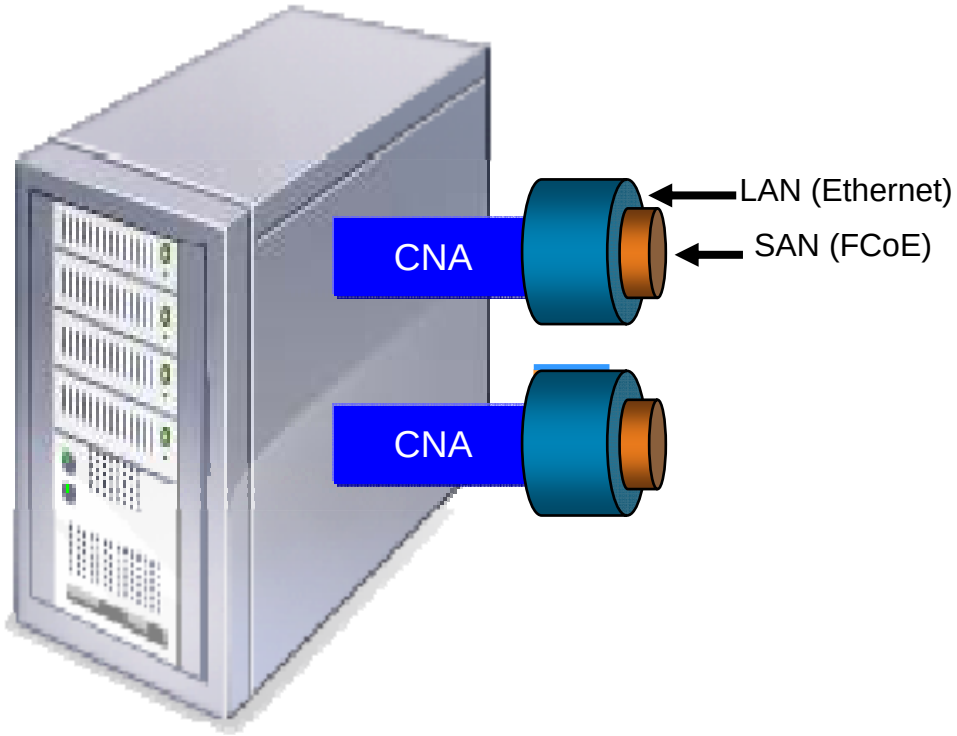
A single Ethernet Fabric for IP & Fibre Channel





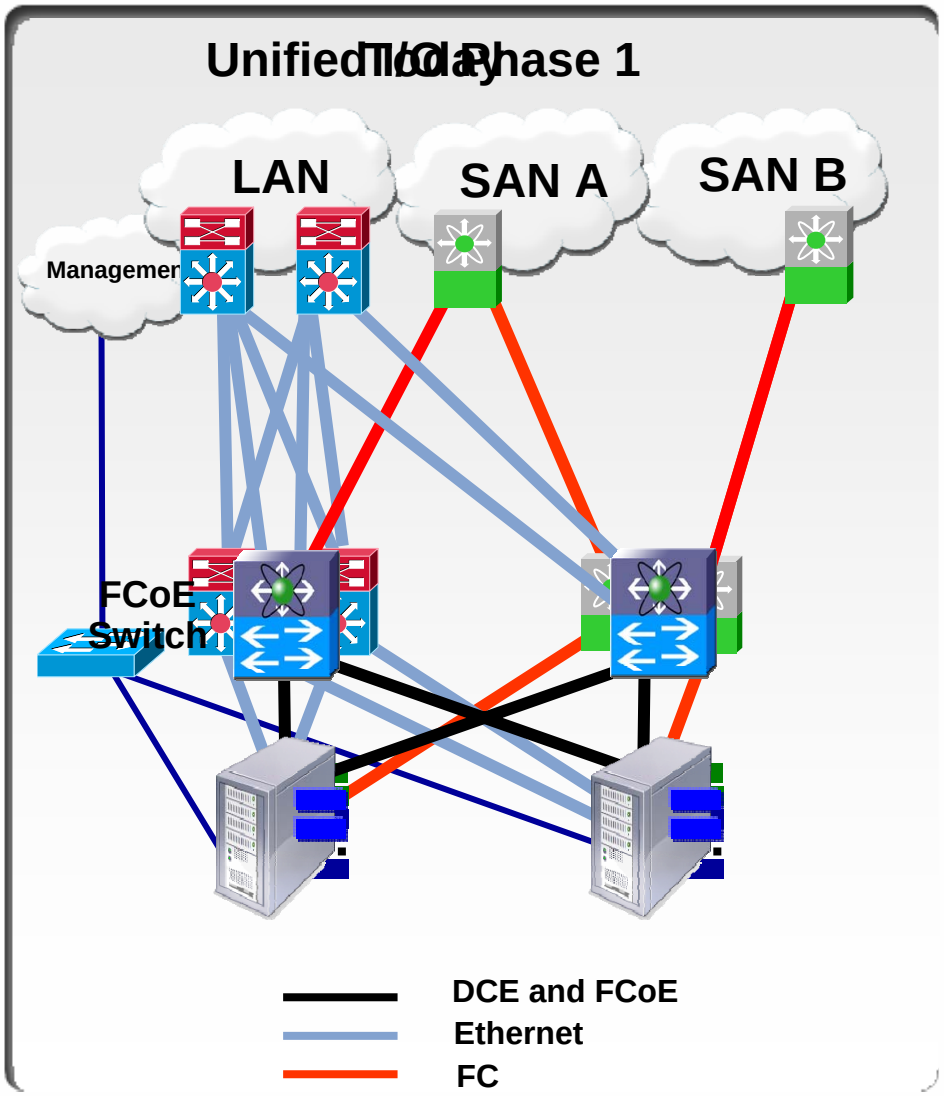
Unified I/O (FCoE):
Fewer HBA/NIC's per Server





CNA = Converged Network Adapter

Unified I/O Use Case



Today
Unified I/O Phase 1

- Parallel LAN/SAN Infrastructure
- Inefficient use of Network Infrastructure
- 5+ connections per server – higher installed base of existing LAN and SAN adapter and cabling costs
- L2 Multipathing Access – Distribution – Adds downstream port costs, cap-ex and op-ex
- Lower TCO
- Fewer Cables
- Investment Protection (LANs and SANs)
- Consistent Operational Model
- Reduction of server adapters
- Simplification of access layer & cabling
- Gateway free implementation – fits in
- Each connection adds additional points of failure in the fabric
- Longer lead time for server provisioning
- Multiple fault domains – complex diagnostics
- Management complexity – firmware, driver-patching, versioning

Traditional Data Center Architectures

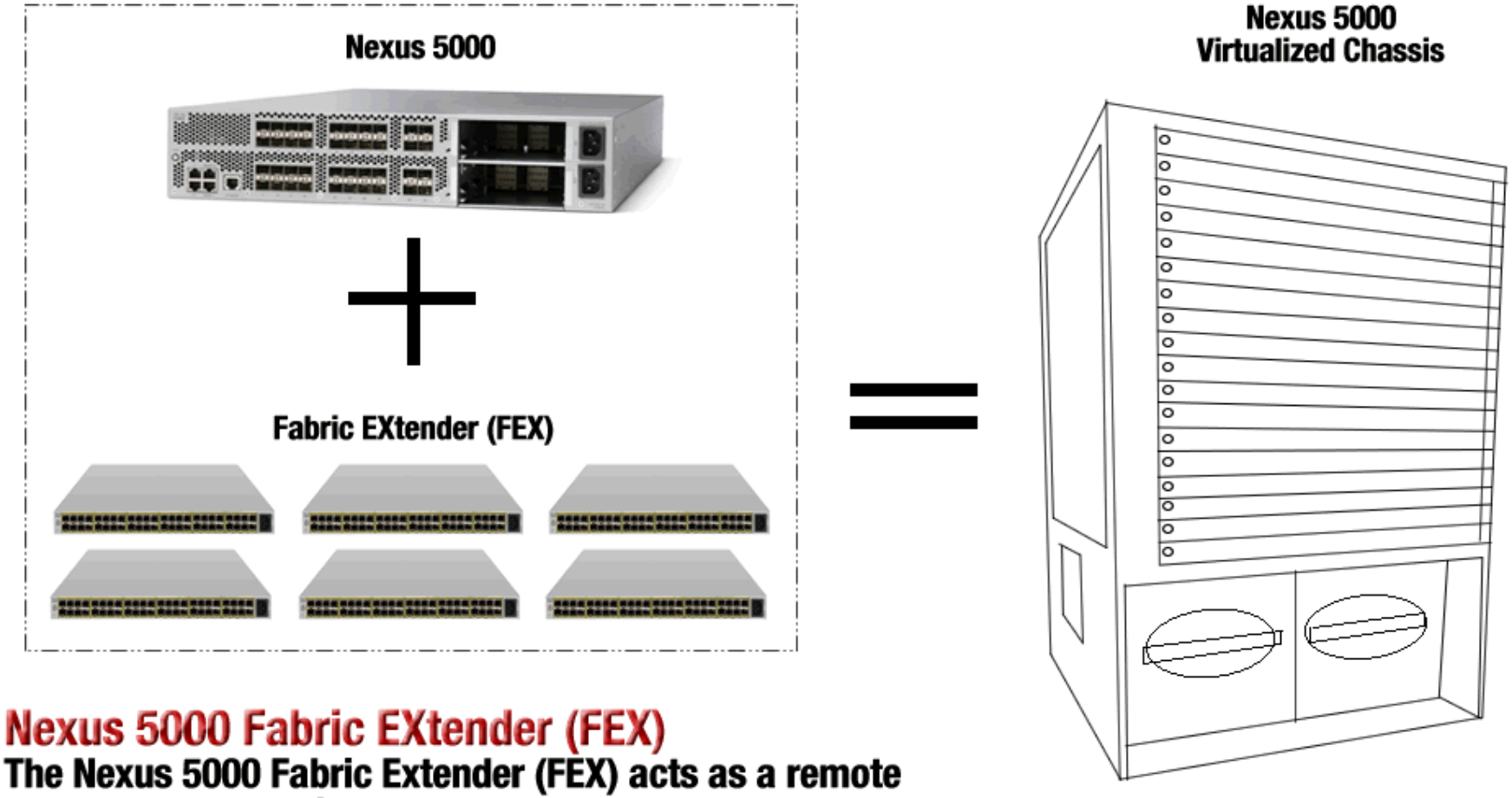
Top of Rack (ToR) Architecture

- Flexible and scalable POD design
- Ease in replication of racks
- Shorter server-to-access switch cabling
- Fewer across-rack cables
- Lower cabling costs

End of Row (EoR) Architecture

- Fewer configuration and management points in the network
- Fewer devices; require less power
- Lower CapEx and OpEx
- Ease in rolling out services and software upgrades
- Maintain feature consistency (Security, QoS, Multicast etc.)
- Allows high-density server aggregation at access layer

Virtualized Chassis

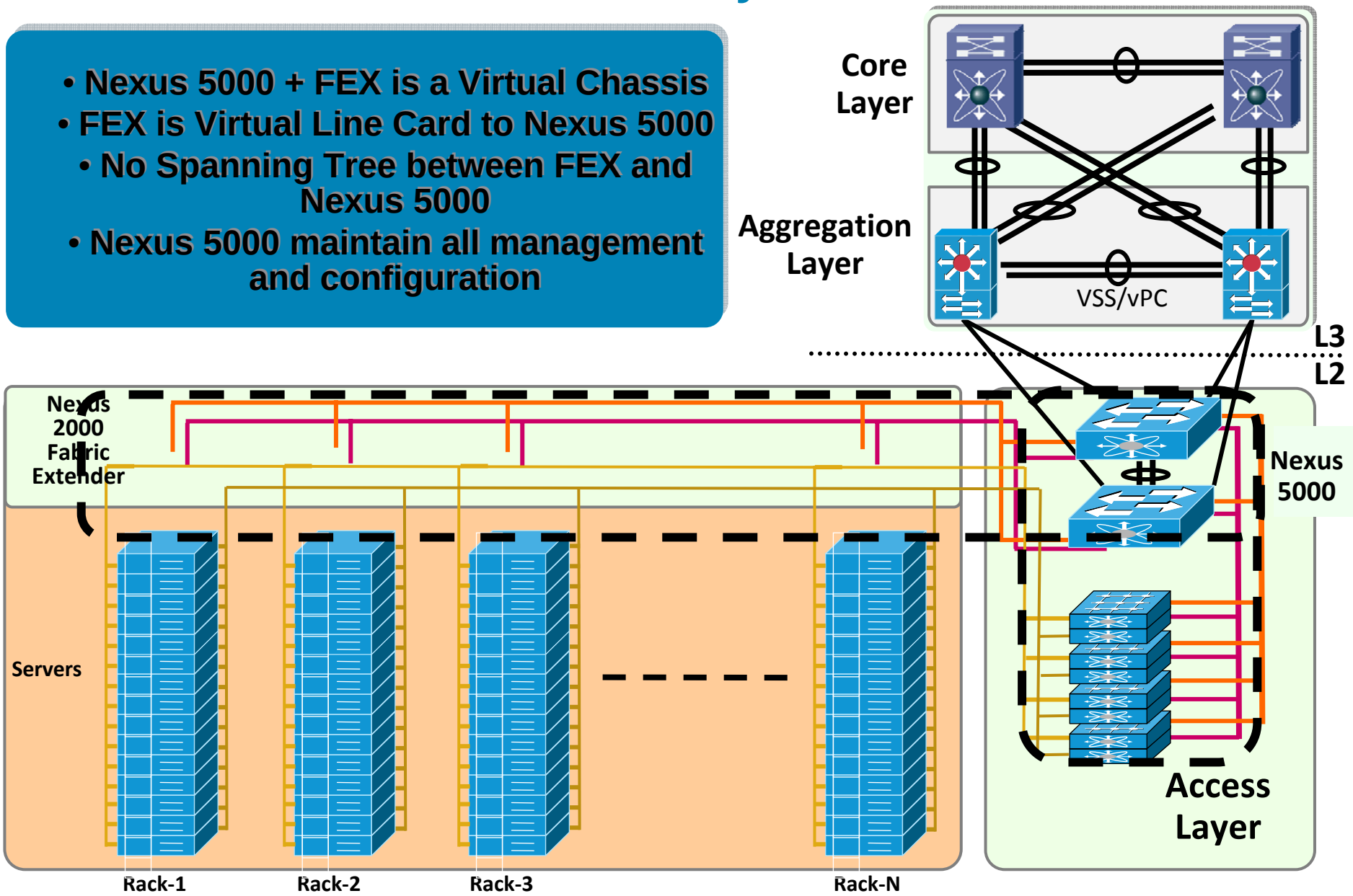


Nexus 5000 Fabric EXtender (FEX)

The Nexus 5000 Fabric Extender (FEX) acts as a remote line card (module) for the Nexus 5000, retaining all centralized management and configuration on the Nexus 5000, transforming it to a Virtualized Chassis

FEX Virtualizes Access-Layer

- Nexus 5000 + FEX is a Virtual Chassis
- FEX is Virtual Line Card to Nexus 5000
- No Spanning Tree between FEX and Nexus 5000
- Nexus 5000 maintain all management and configuration



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Network Virtualization with Cisco Nexus 7000 Series

Device Consolidation
Virtual Device Contexts
Efficient physical and power design

Zero Service Disruption design
Graceful systems operations
Integrated lights-out management

Dense 40GbE/100GbE ready
Unified fabric
Layer 2 Scalability

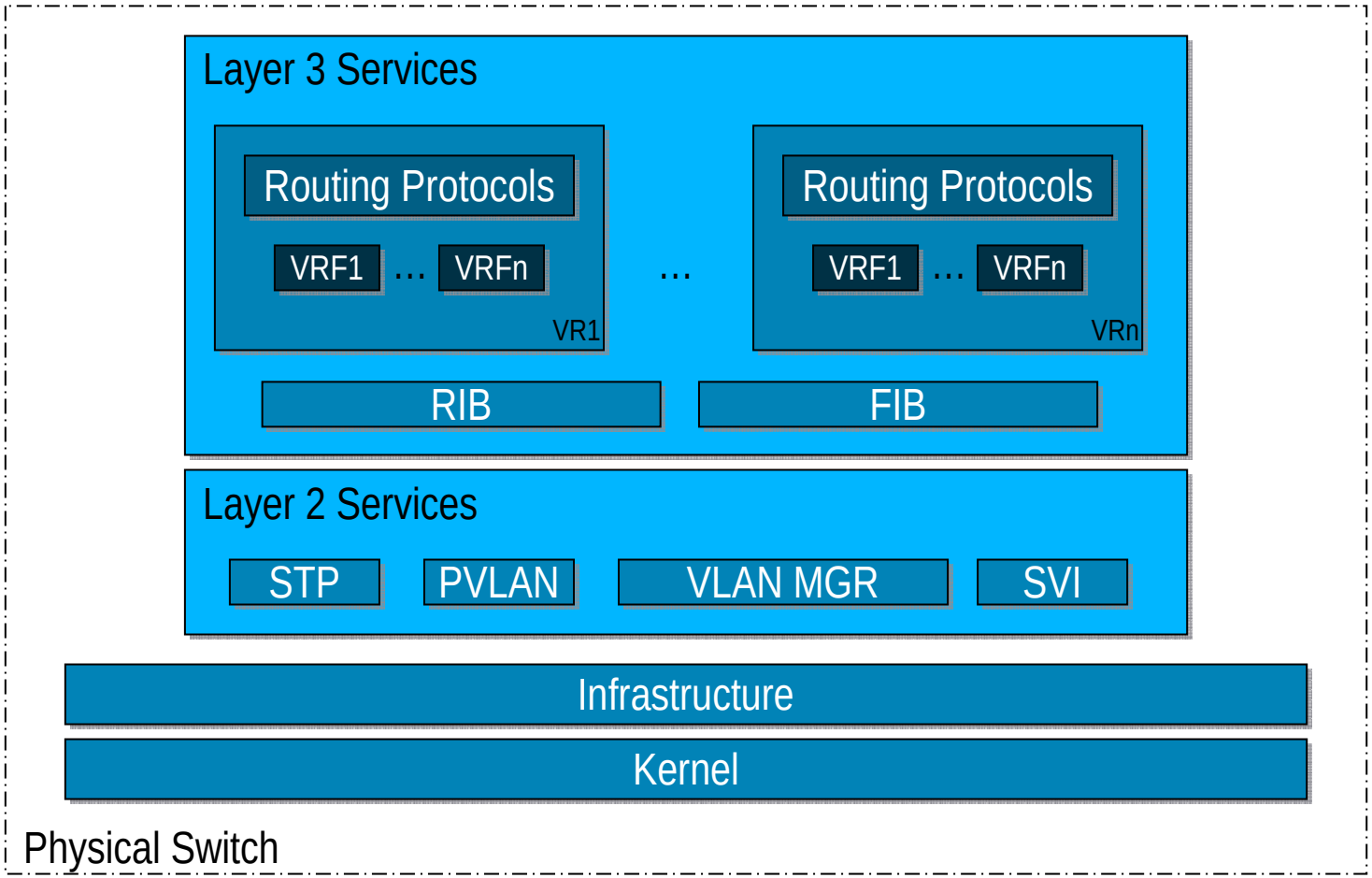
Manage Capacity

Operational Continuity

Infrastructure Scalability

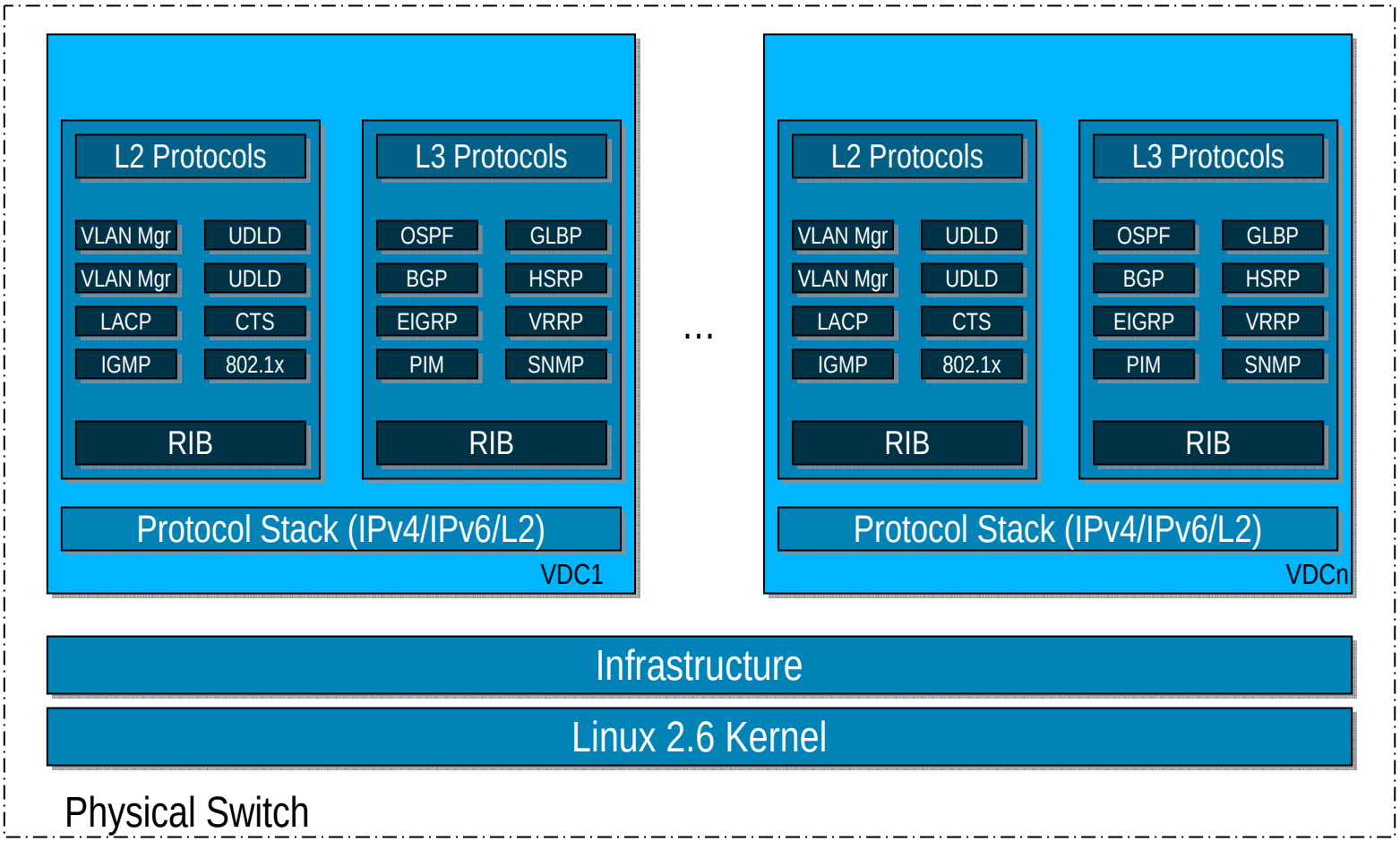
Virtual Device Contexts
Virtualization Today

Existing switches provide levels of virtualization such as VRF and VLAN, but this level of virtualization exists within the confines of a single device context…



Virtual Device Contexts
An Introduction to the VDC Architecture

Virtual Device Contexts provides virtualization at the device level allowing multiple instances of the device to operate on the same physical switch at the same time…



Cisco Datacenter Vision