Data Center Virtualization – Setting the Foundation

Ed Bugnion
VP/CTO, Cisco Server, Access and Virtualization Technology Group

Axioms

"I Fought the Law, and the Law Won" – Sonny Curtis and the Crickets

Moore's Law (Semiconductors)

Move from more GHz to many-cores

Volume drives sustainable innovation (Economics)

x86 and Ethernet win because scale drives innovation
Incorporate new volume use cases (e.g. virtualization)

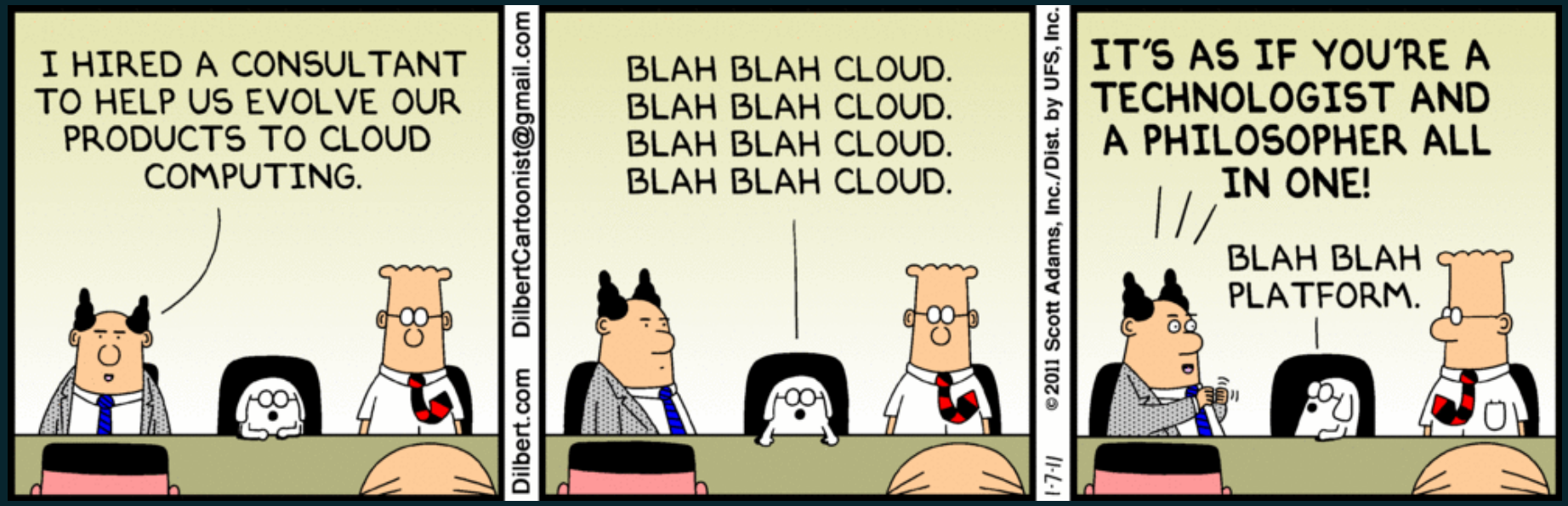
Economies of scale in delivery (Economics)

Cloud Computing and "The Big Switch" (see N. Carr)

Laws and Regulations (Politics)

Privacy and confidentiality laws
EU ICT Carbon targets (-20% by 2015)

Cloud in the Dilbert hype cycle



Licensed – PPT only

An Even Larger Cloud Is on the Horizon

Data Centers

Mobile Devices

Sensors

Reference: J. Rabaey, “A Brand New Wireless Day,” Keynote Presentation, ASPDAC Jan. 2008

Cisco's Cloud Strategy

Essential Infrastructure for BuildingClouds

For customers to build and operate public or private clouds

Solutions for DeployingCloud Services

vmware®

bmcsoftware

EMC² where information lives

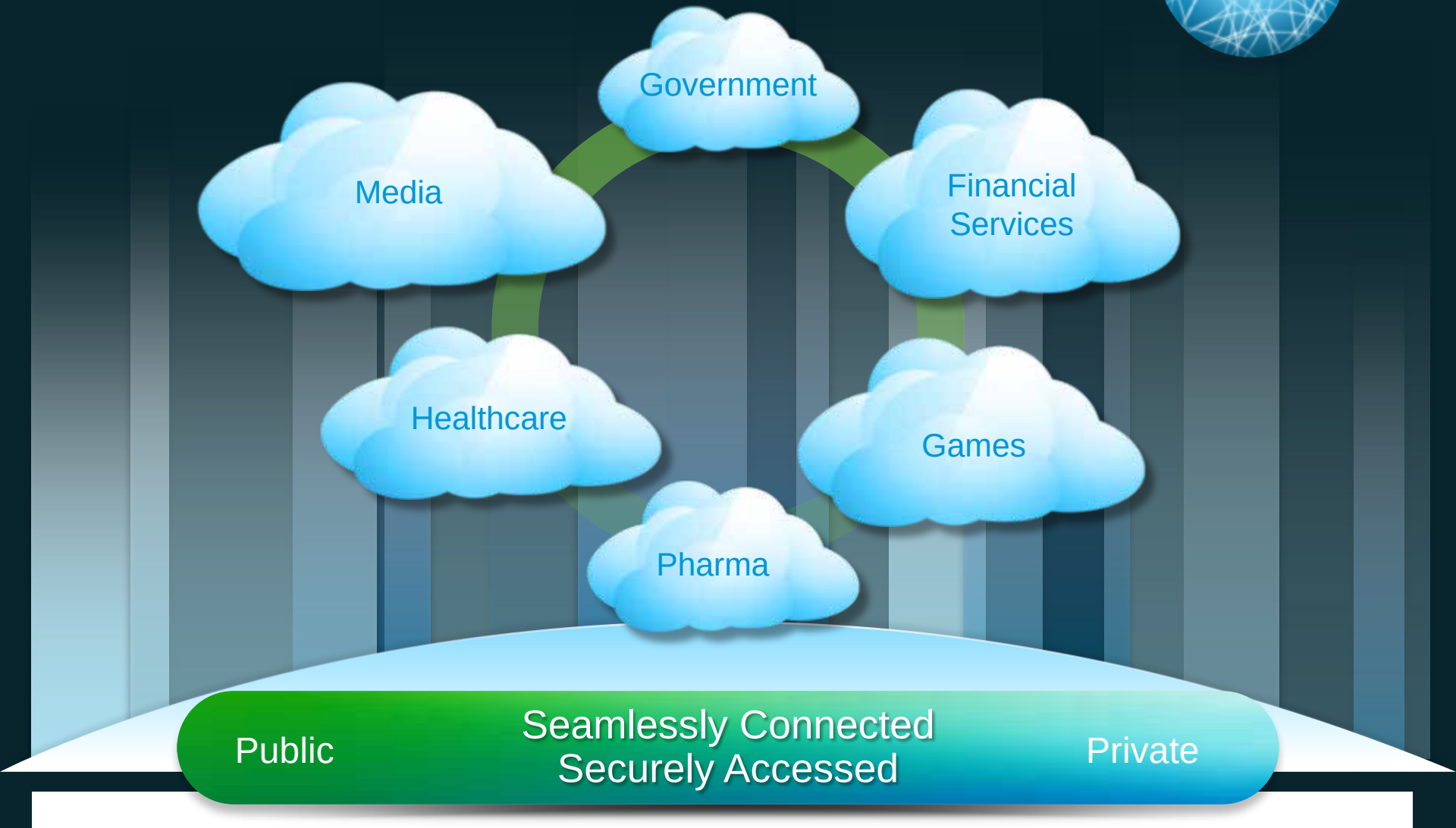
NetApp™

For customers to deploy fully-tested, best-of-breed cloud services

Innovation to Accelerate Use of Clouds

For users to access and collaborate using secure cloud services

A World of Many Clouds

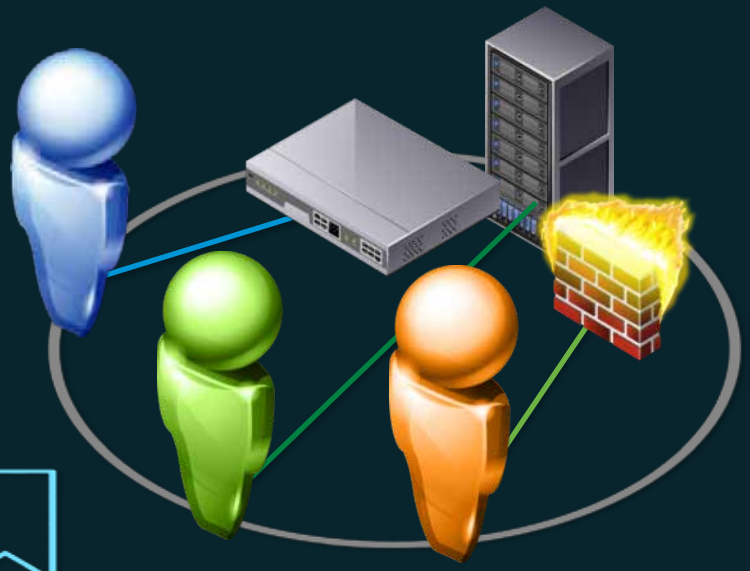


Architectural support for virtualization
10 year transition from obliviousness to awareness

- 2001 – ESX 1.0
- 2004 Intel VT-x: VM-aware instructions
- 2005 – Multicore CPUs
- 2006 – NPIV: vPort -aware Fibre Channel Storage
- 2008 – Multi-queue NICs: VM-optimized I/O
- 2009 – VT-x2 and VT-d: VM-aware MMU and chipsets
- 2010 – IEEE 802.1Qbg/Qbh: VM-aware Ethernet Bridging

Operational Evolution in the Data Center

Shared visibility with individual control



Transition from an explicit configuration mechanism to policy-driven mgmt

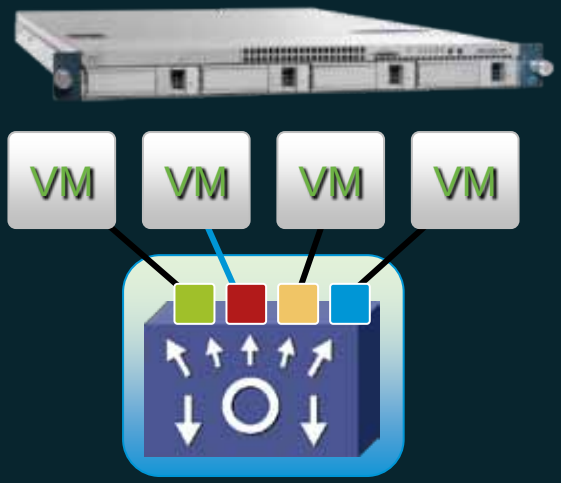
Silo-ed visibility and control

Cisco Nexus 1000V

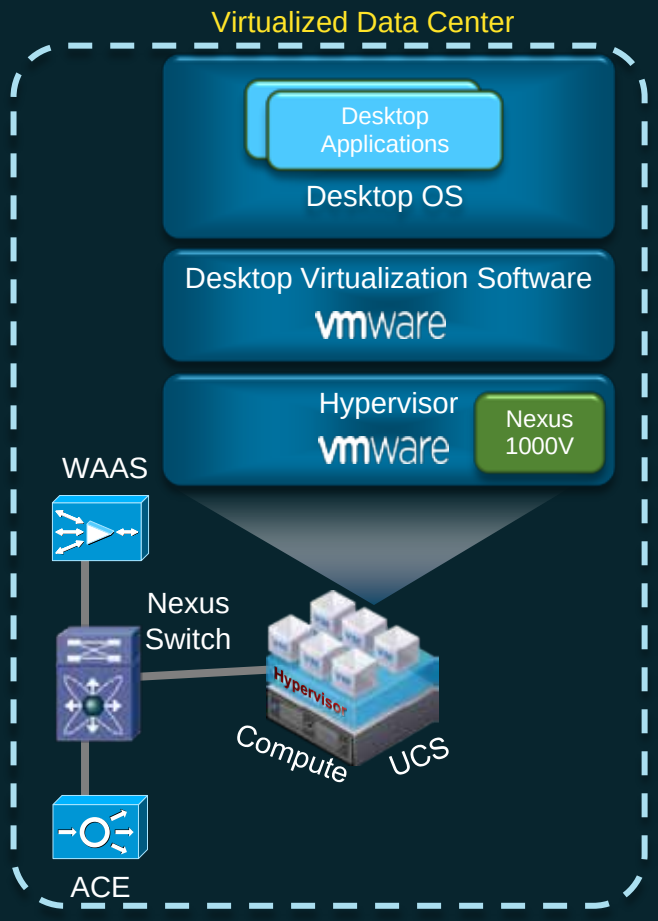
Market Momentum

- Introduced at VMworld 2008: Best of VMworld
- Shipped with VMware vSphere 4.0 in May 2009
- Licensed to over 3,000 customers
- Licensed over 1 Million Virtual Ethernet Ports

SearchServerVirtualization.com
BEST OF vmworld 2008



Use Case: Securing VMware View

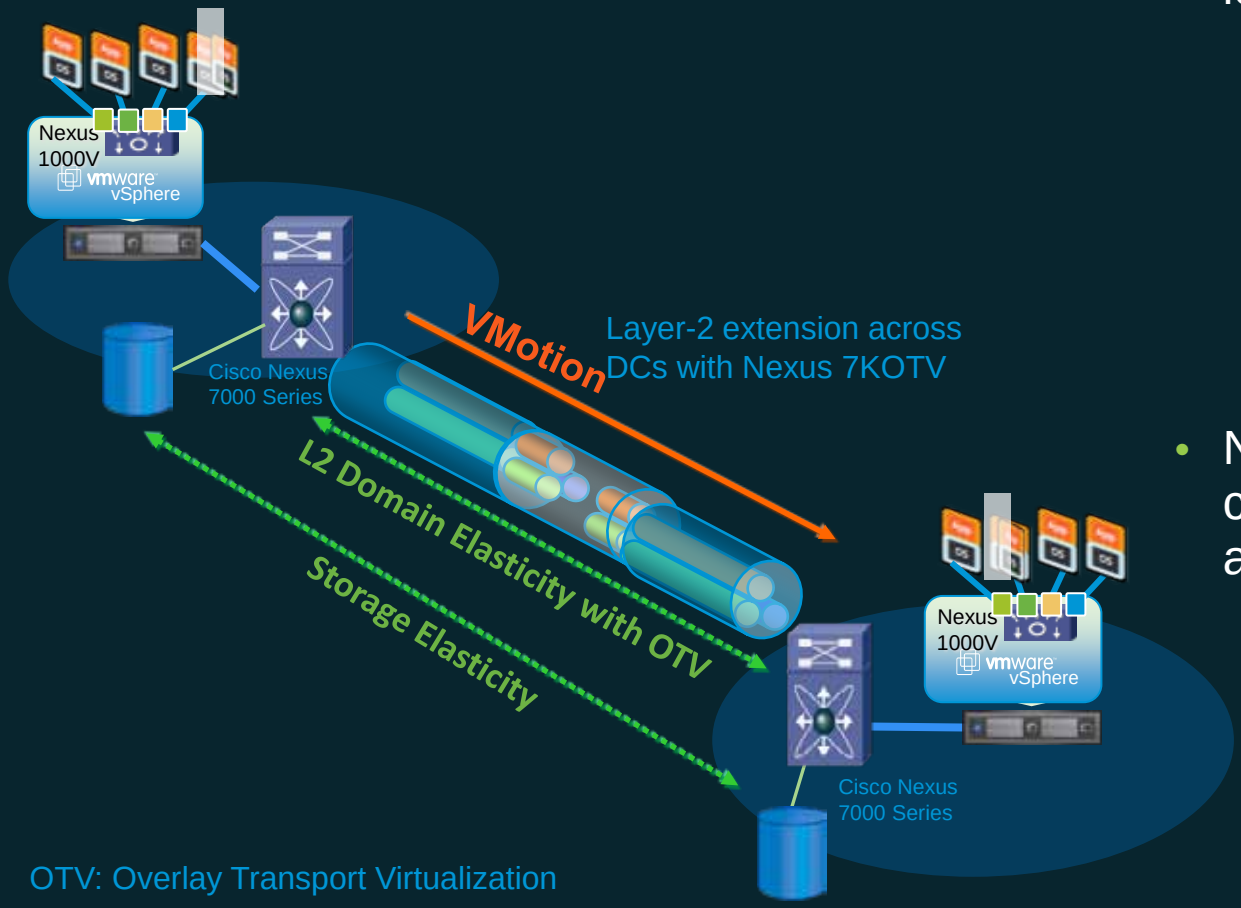


1000V Security Features for VDI

- Access Control List
- Port Security
- Private VLAN
- DHCP Snooping
- Dynamic ARP Inspection
- IP Source Guard

WAAS: Wide Area Application Service
ACE: Application Control Engine

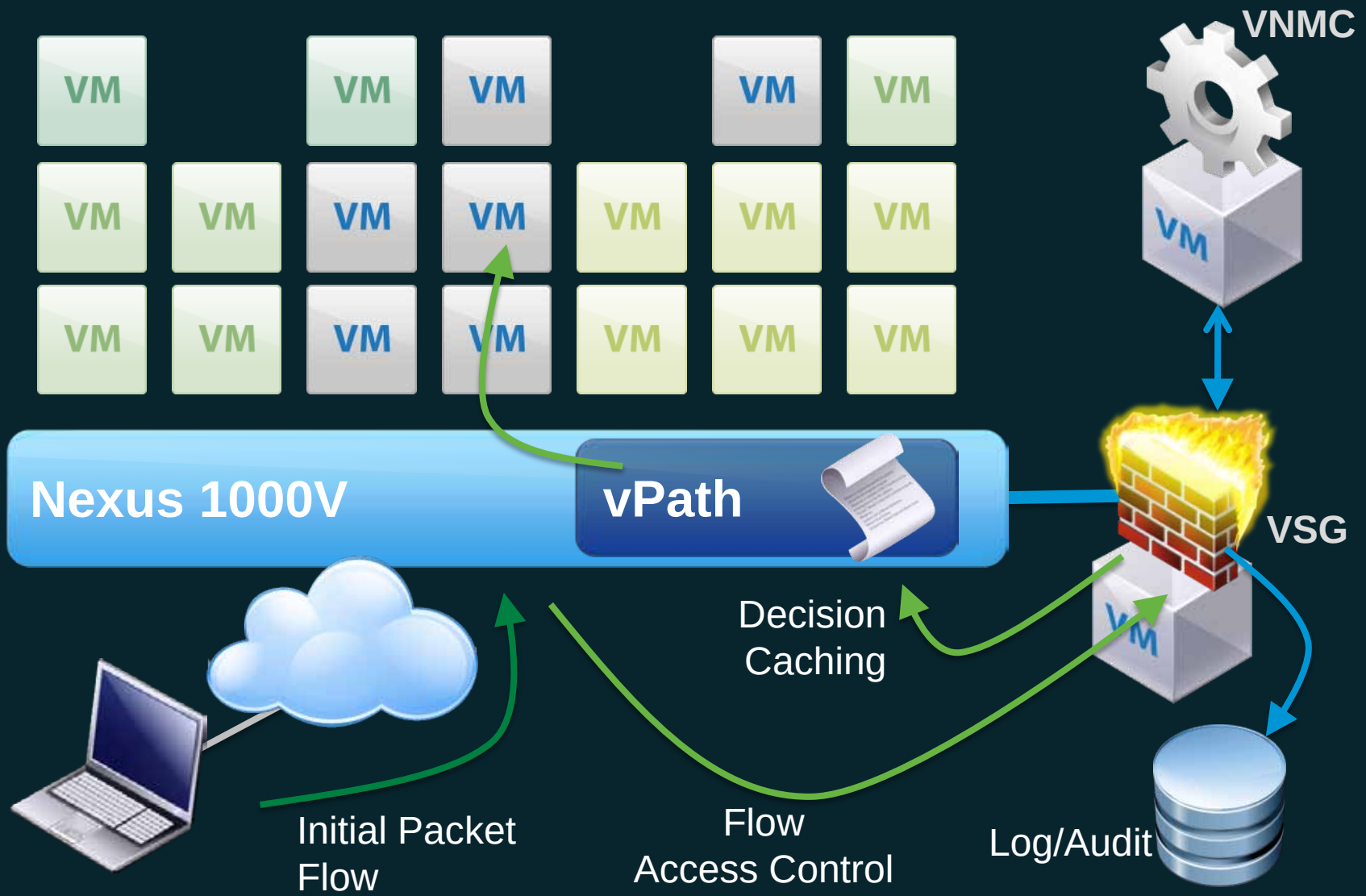
Use case: LD vMotion with DCI



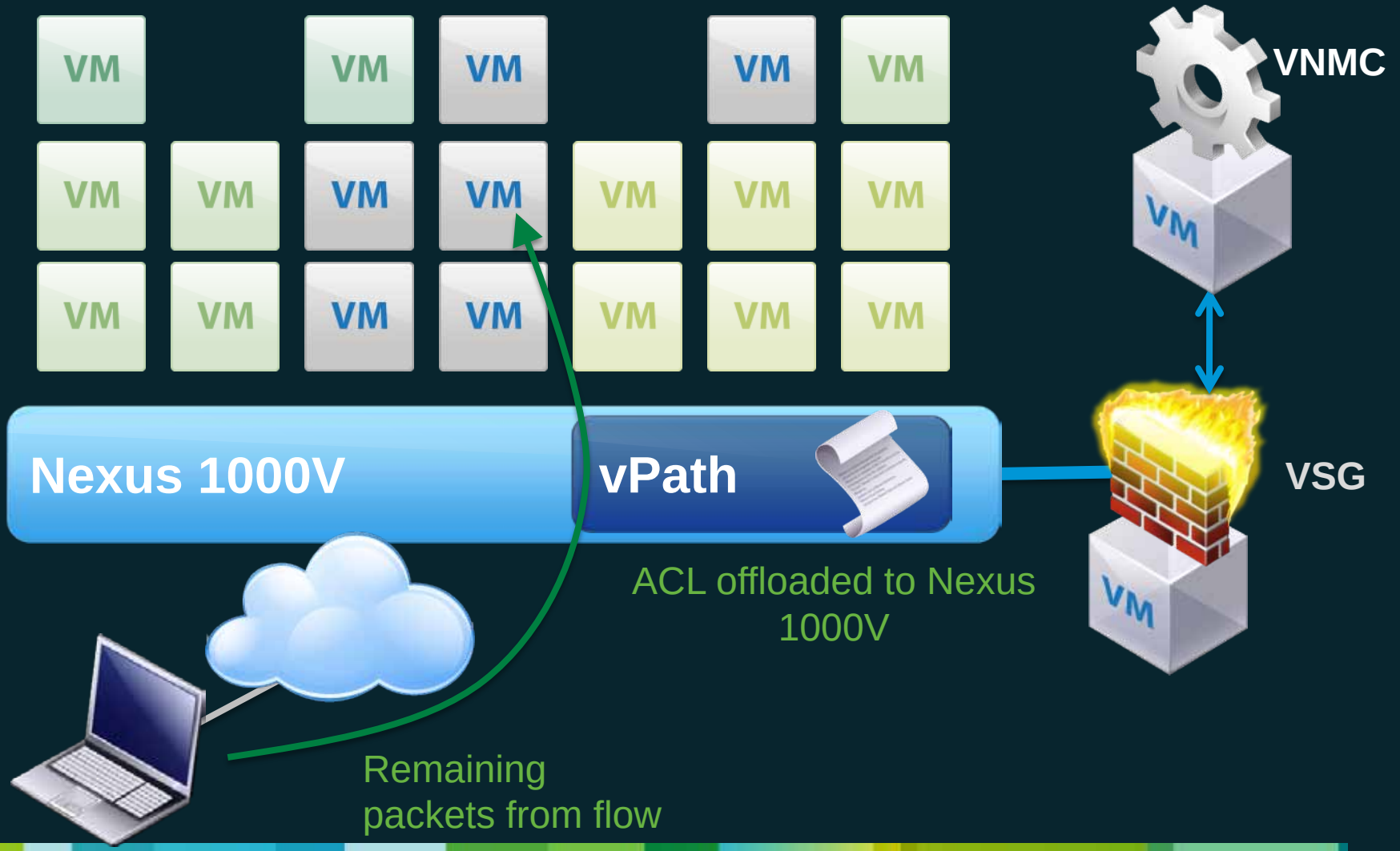
OTV: Overlay Transport Virtualization

- Network integrity is critical to long distance vMotion
  - Security
  - Quality of Service
  - Network Monitoring
  - Troubleshooting
- Nexus 1000V provides these critical network functions across data centers

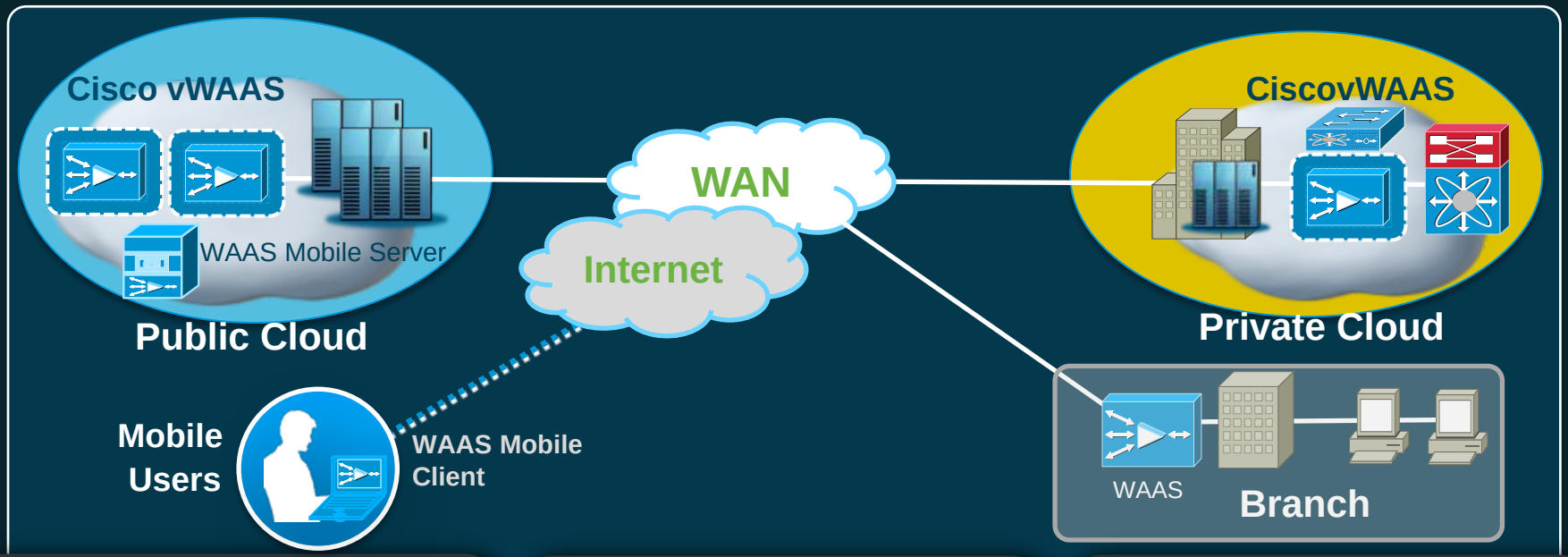
Intelligent Traffic Steering with vPath



Performance Acceleration with vPath



Cisco vWAAS: Cloud Ready WAN Optimization



Key Requirements

- Ø On demand deployment with elastic scalability
- Ø Minimal network configuration
- Ø VM mobility awareness
- Ø Multi-tenant deployment

Benefits

- Ø On-demand orchestration of WAN optimization
- Ø Fault tolerance with VM mobility awareness
- Ø Lower OPEX for Cloud Migration

Simplification

- Ø Integrated with Nexus 1000V vPath
- Ø Rapid creation of WAN Optimization Service
- Ø Consistent networking across deployments

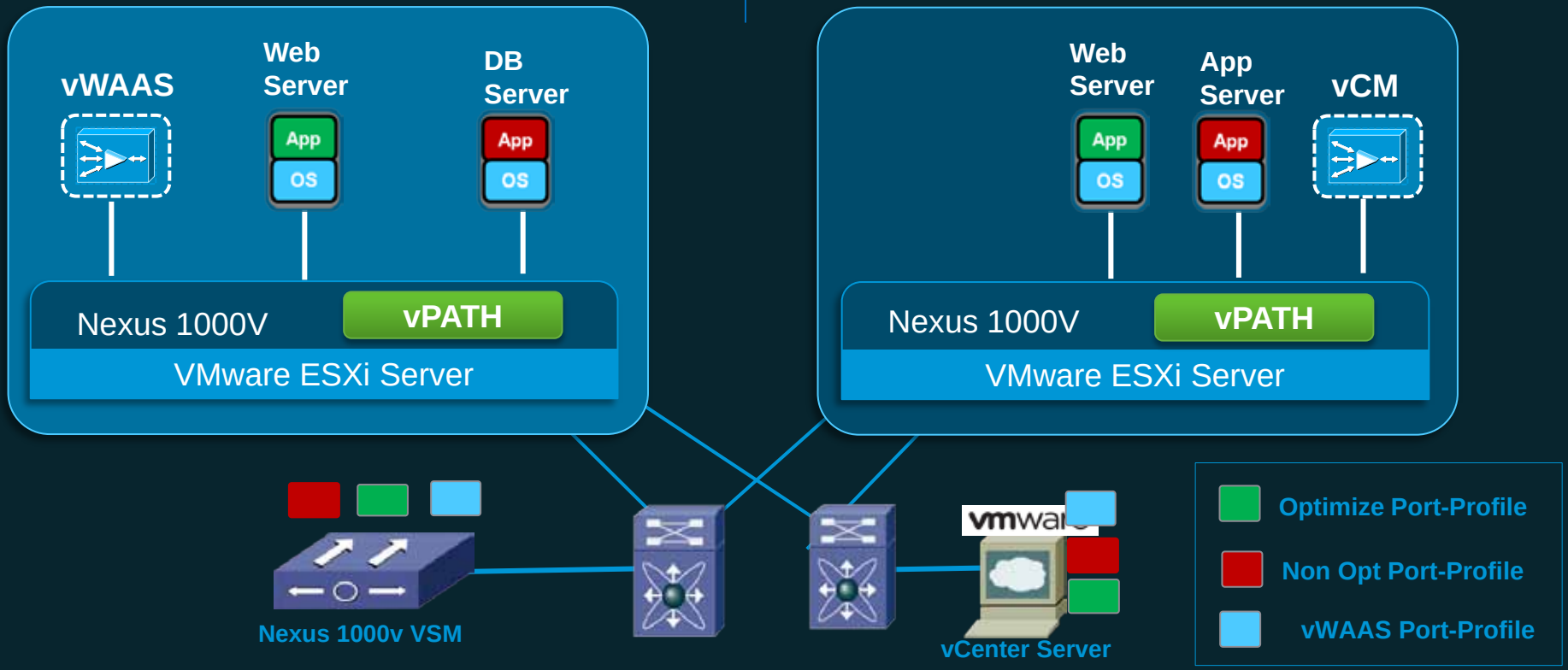
Dynamic WorkloadOptimization with Cisco vWAAS & 1000V vPath

Feature

1. Optimization based on the port-profile policy configured in Nexus 1000V
2. Policy gets propagated to vCenter automatically

Benefit

1. Provide on-demand service orchestration in the cloud without network disruption



Gartner on Fabric Computing

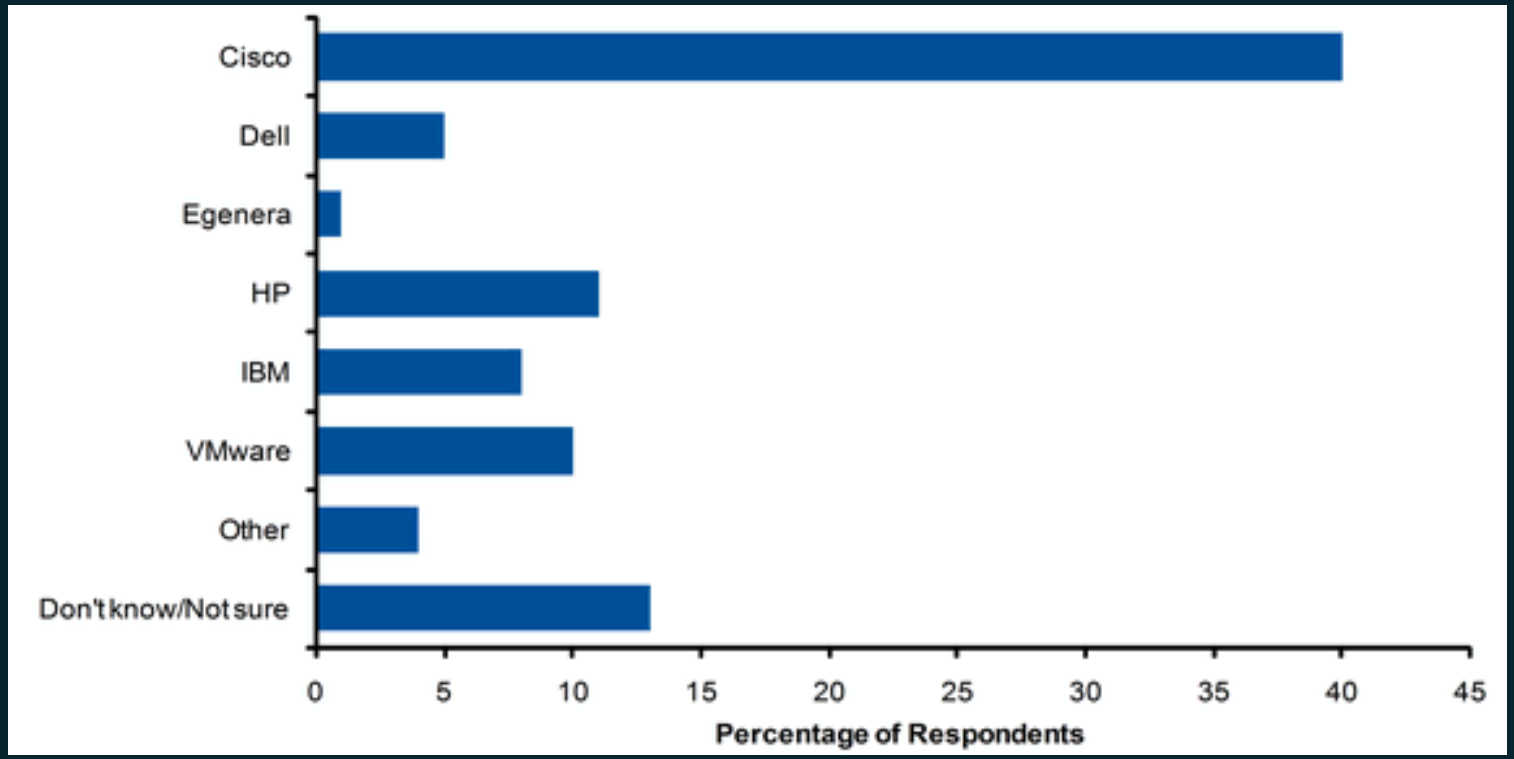
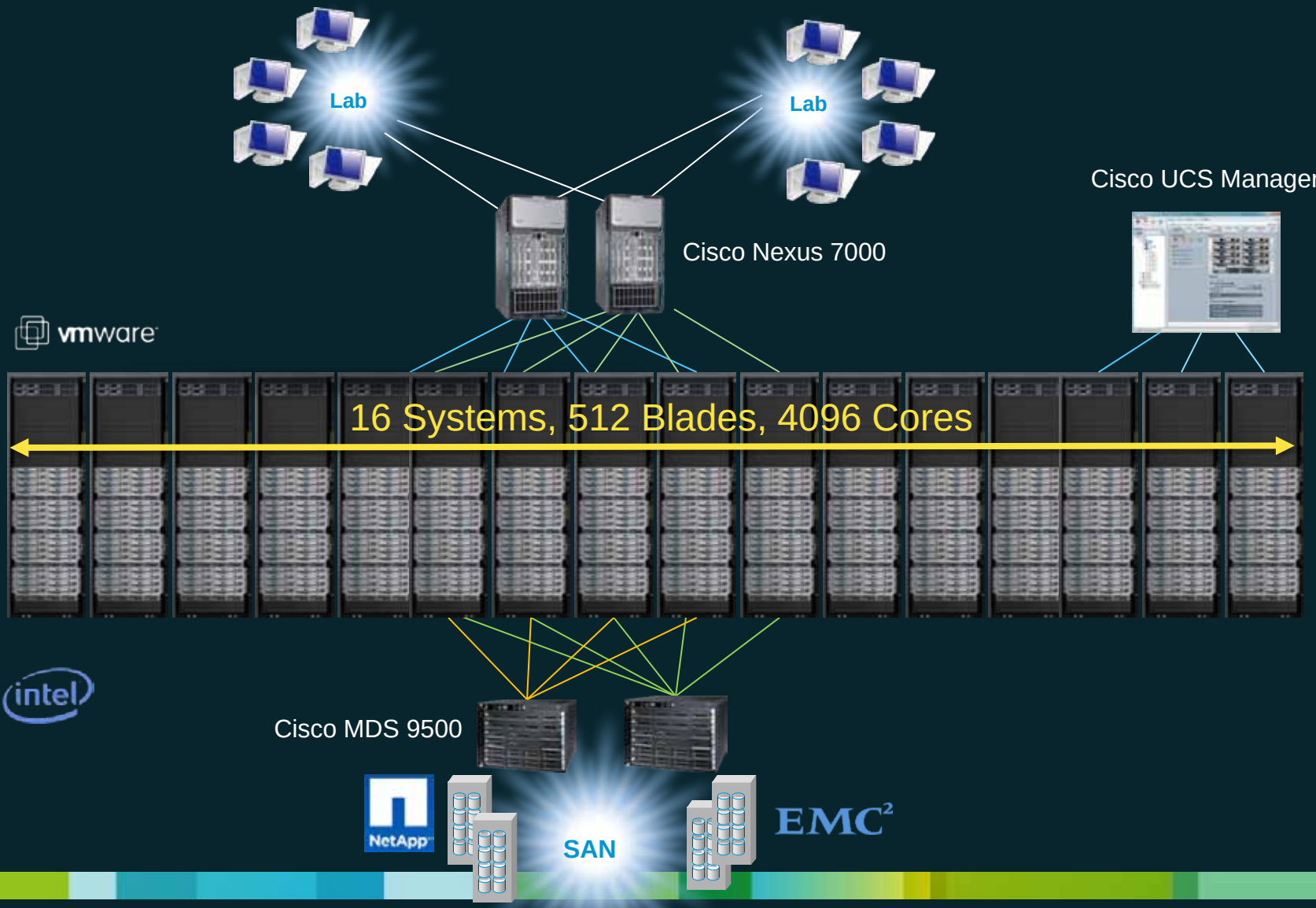


Figure 2. Which vendor would you perceive to be the most competent to deliver on a fabric-based strategy in your enterprise? (Source: Gartner, February 2011)

Large Private Clouds



Operating in clouds: UCS and VMware

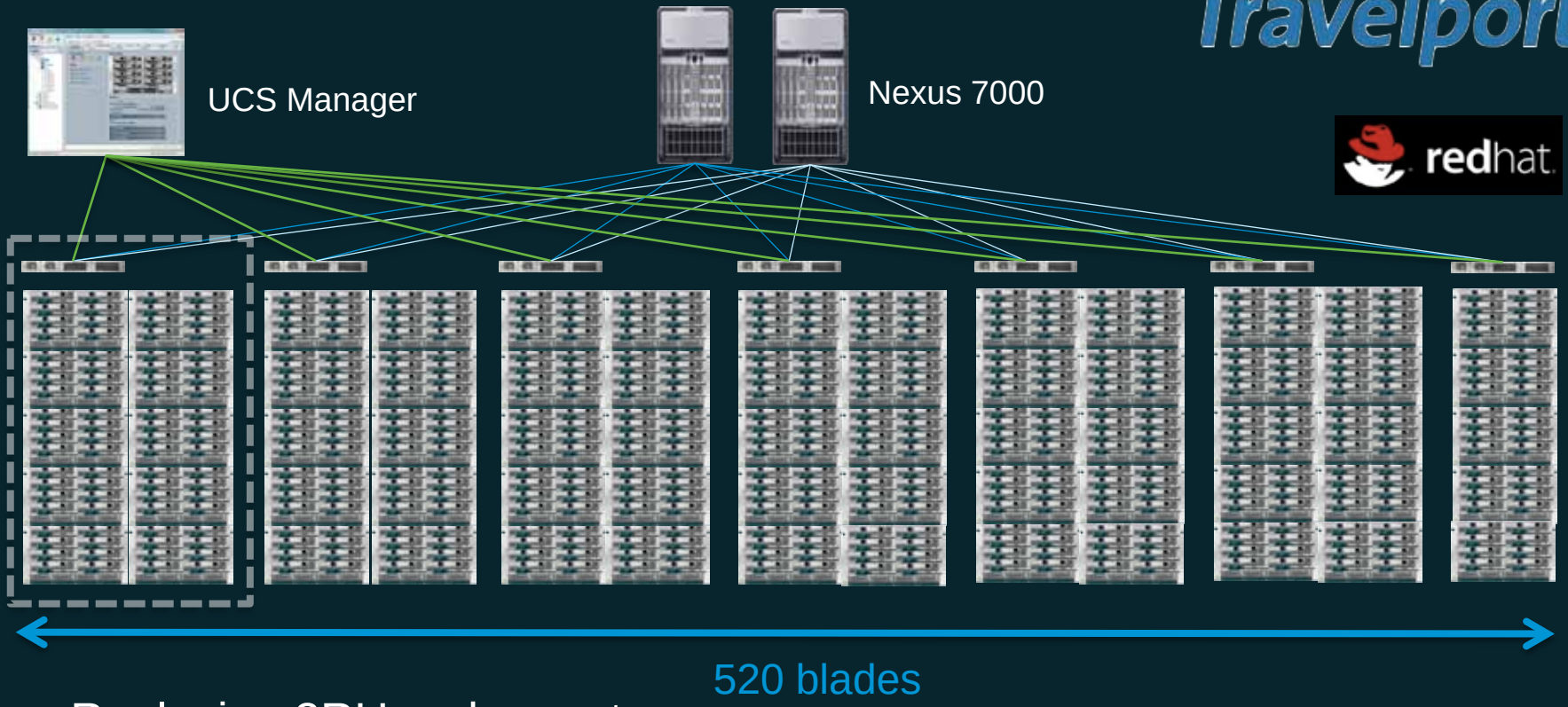
Global deployment of UCS over Terremark's network

terremark

vmware

- Reduced deployment time from 8 days to 30 min
- Easy movement of workloads

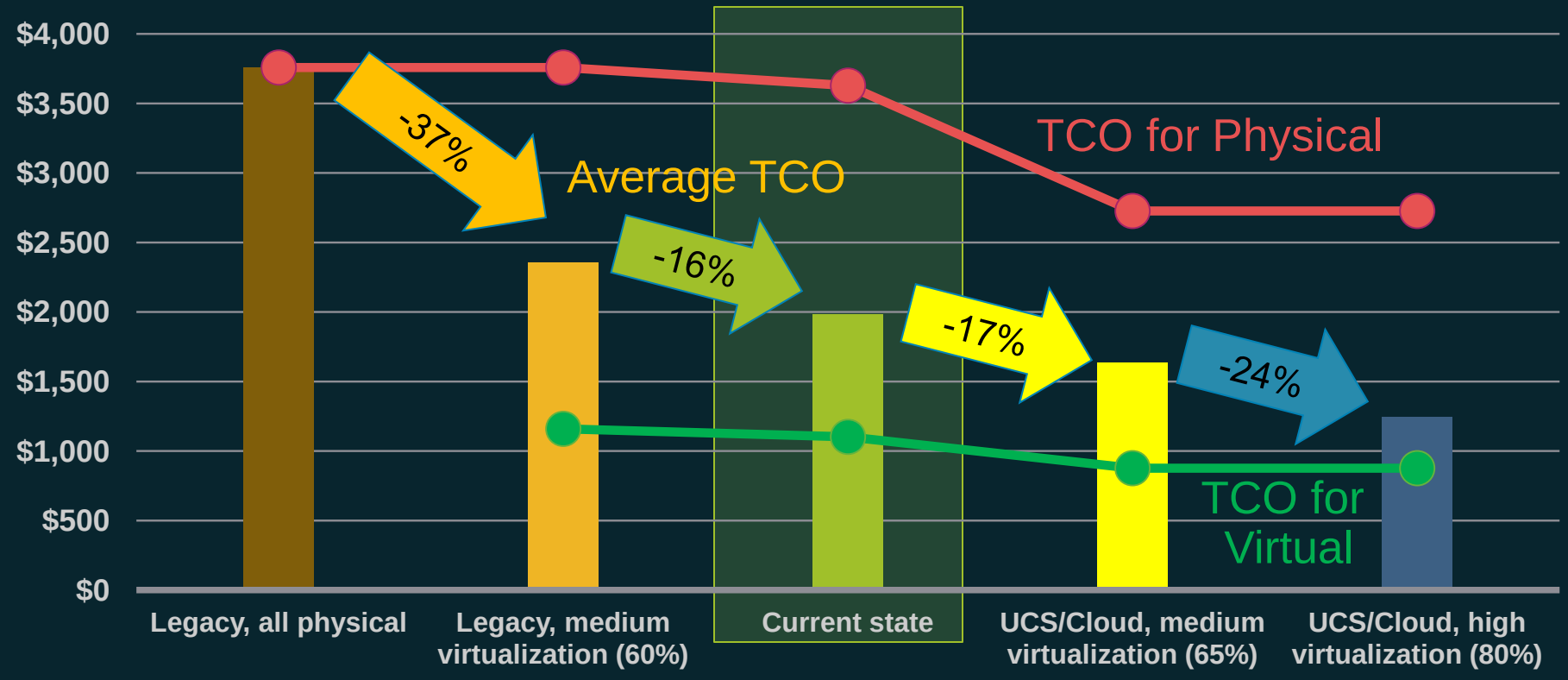
Case Study: Doing More with Less



- Replacing 2RU rackmounts
- Double the performance of previous system
- 87% less cables than 2RU ; 40% less racks
- Reduced provisioning time by 75%

CITIES: IaaS using UCS @ Cisco IT

Compute TCO Improvements ($ / Qtr / OS instance)



‘Medium aggressive’ Virtualization → Unified Computing & Automation → ‘Highly aggressive’ Virtualization

Delivery time		2-3 weeks (manual)	15 mins VM 2-9 days E2E	15 minutes (self-service)	15 minutes (self-service)

Source: Cisco IT NDCS, RCDN9 build-out cost tracking (state-of-art Tier-III DC facility), Dec 2009

Cisco Unified Computing System (UCS)

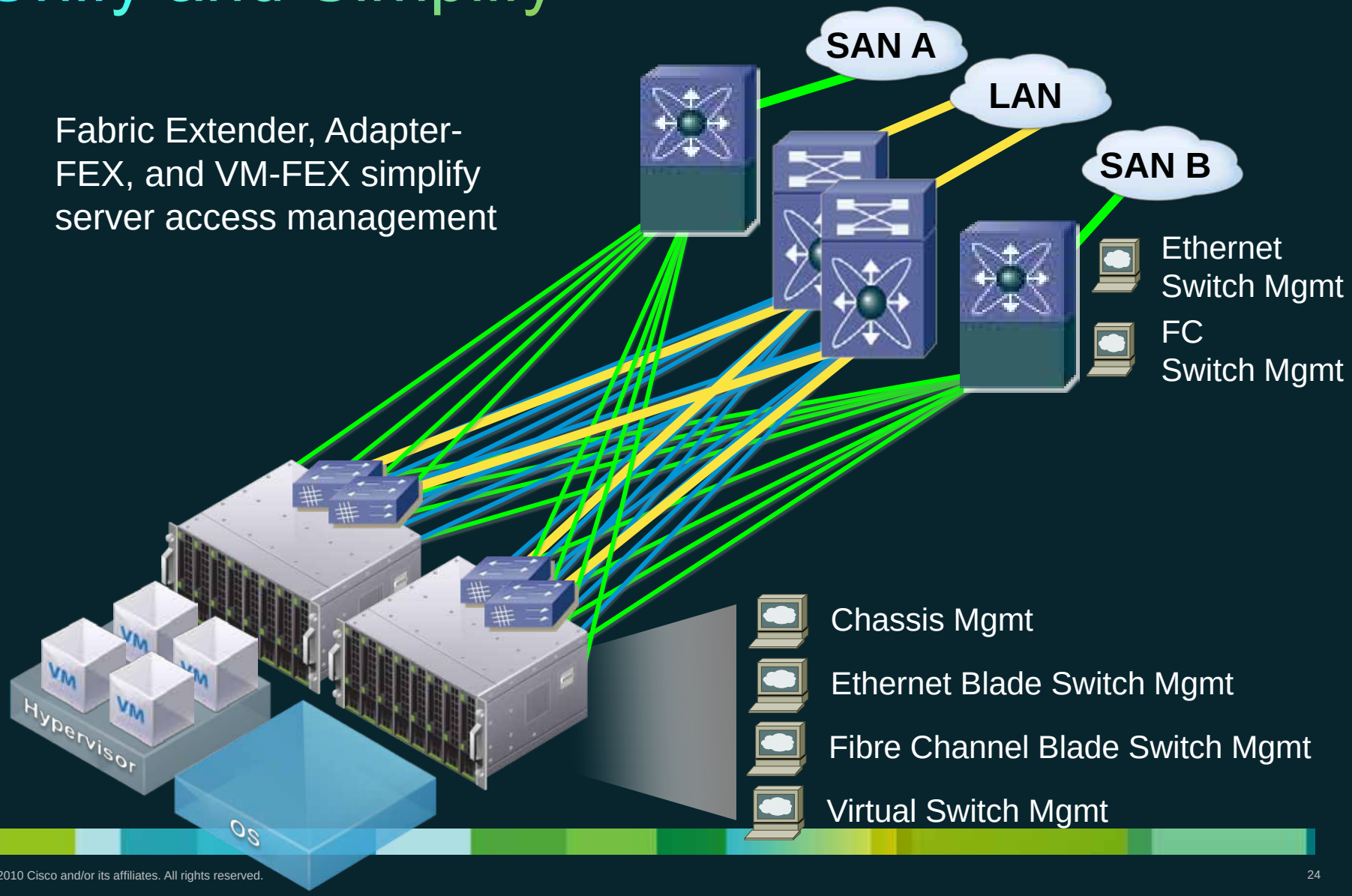
A New Approach to Server Infrastructure

Traditional Blade Server

Cisco Unified Computing System

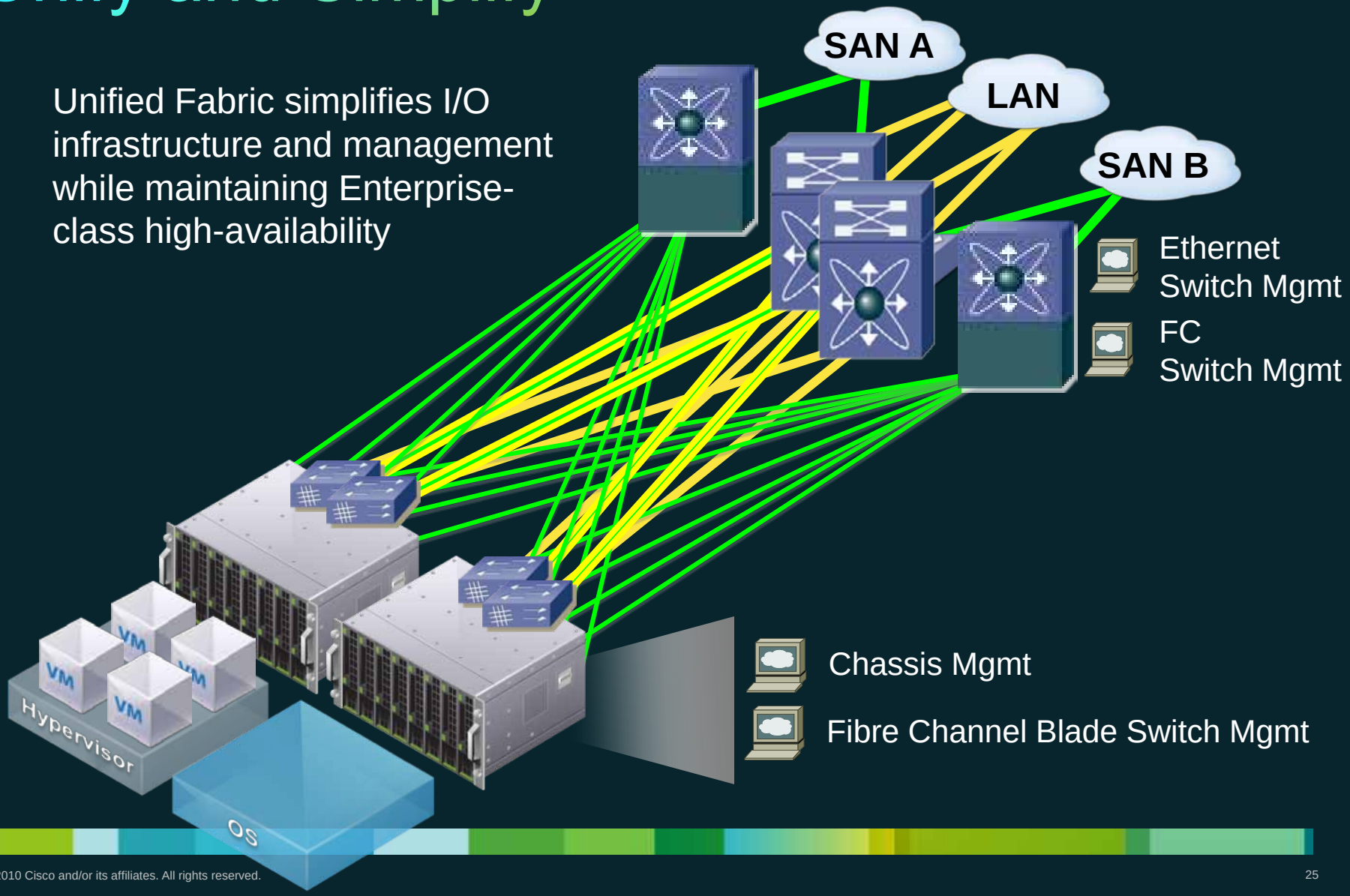
Unify and Simplify

Fabric Extender, Adapter-FEX, and VM-FEX simplify server access management



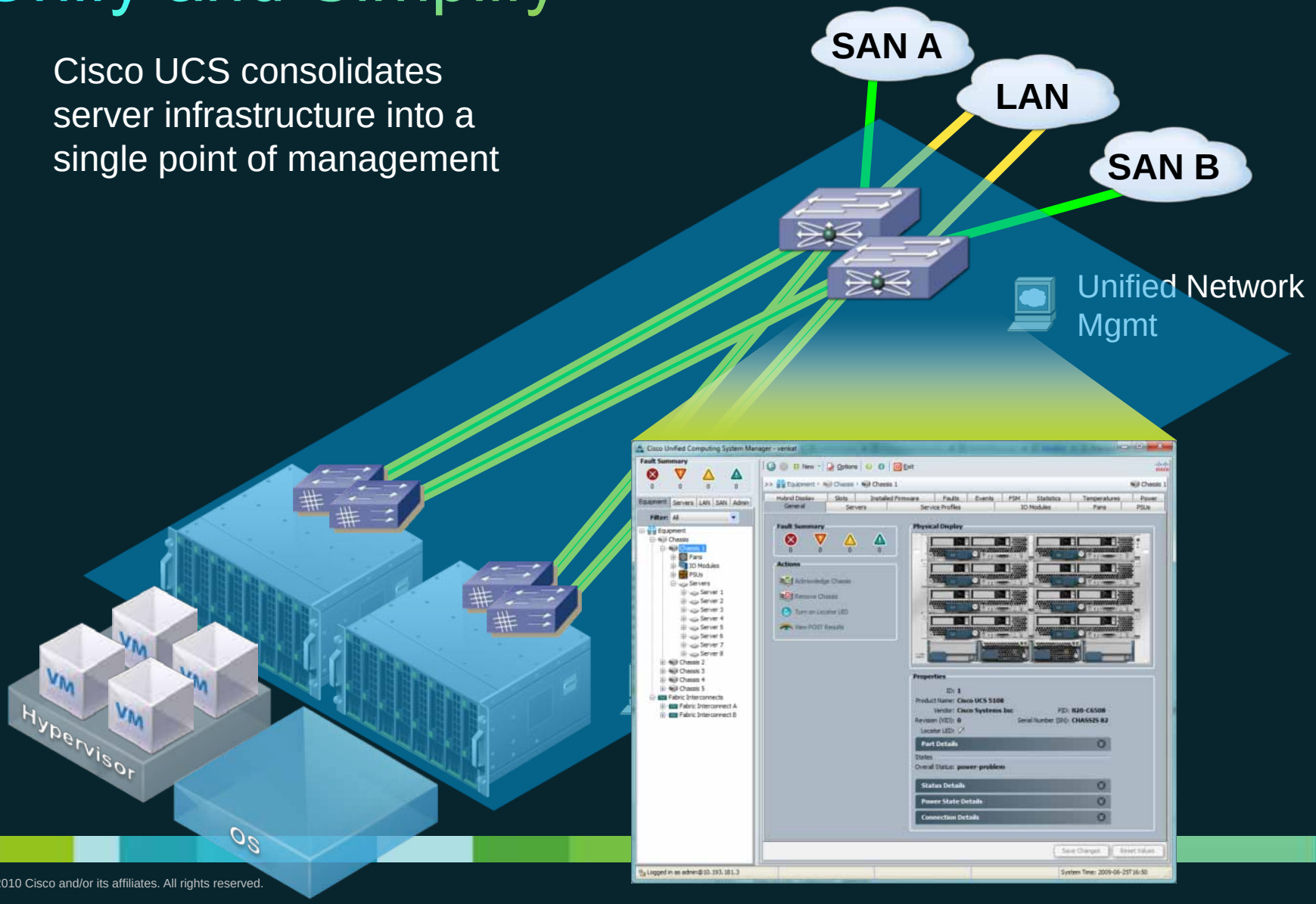
Unify and Simplify

Unified Fabric simplifies I/O infrastructure and management while maintaining Enterprise-class high-availability



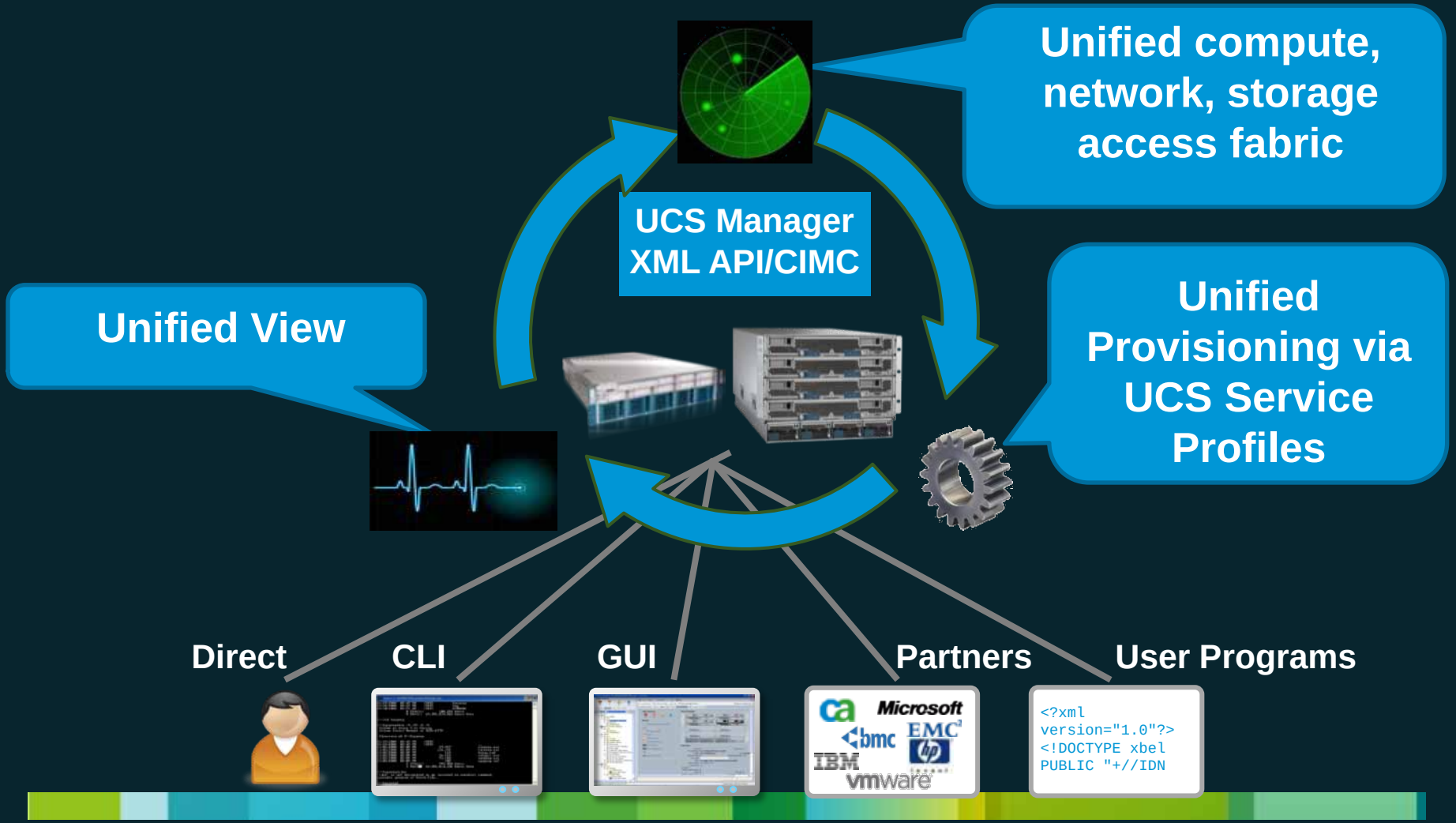
Unify and Simplify

Cisco UCS consolidates server infrastructure into a single point of management



UCS enables a Programmatic Infrastructure

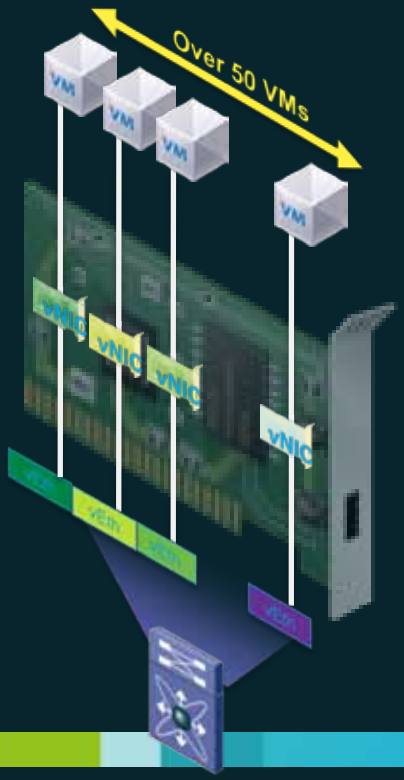
Develop with the Infrastructure, not just on the Infrastructure



Cisco Virtual Interface Card

"EMC IT [is] deploying a stateless infrastructure based on the Cisco UCS and VIC, EMC Symmetrix VMAX and VMware vSphere. The scalability, performance and flexibility of this architecture helps accelerate…migrations of mission critical applications and…the faster rollout of applications, such as VDI."

Paul DiVittorio, Director
Application Hosting Architecture, EMC IT

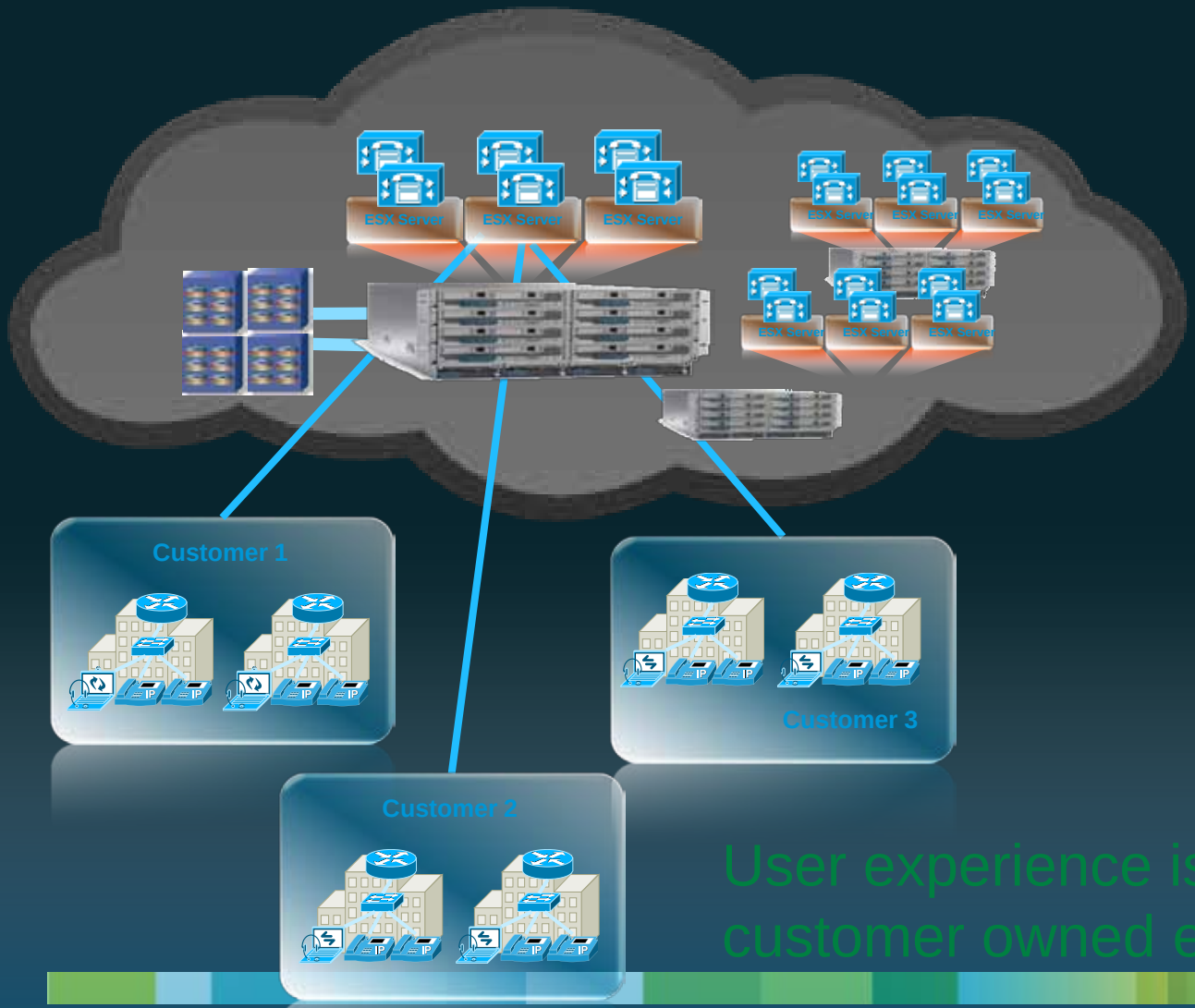


- Driver in box since vSphere 4.0 U1
  - Standard PCIe Device
  - Adapter-FEX and VM-FEX
- Broad certification as an FCOE Converged Network Adapter

3PAR EMC² compellent NetApp symantec.

Putting it together – scalable cloud solutions

Virtualized Unified Communications Platform



- UC 8.0
- On-premise or cloud-based
- Real-time apps running as VMs
- Enables significant DC consolidation

User experience is the same as customer owned equipment

Thank you.