

Deploying Services in a Virtualized Environment

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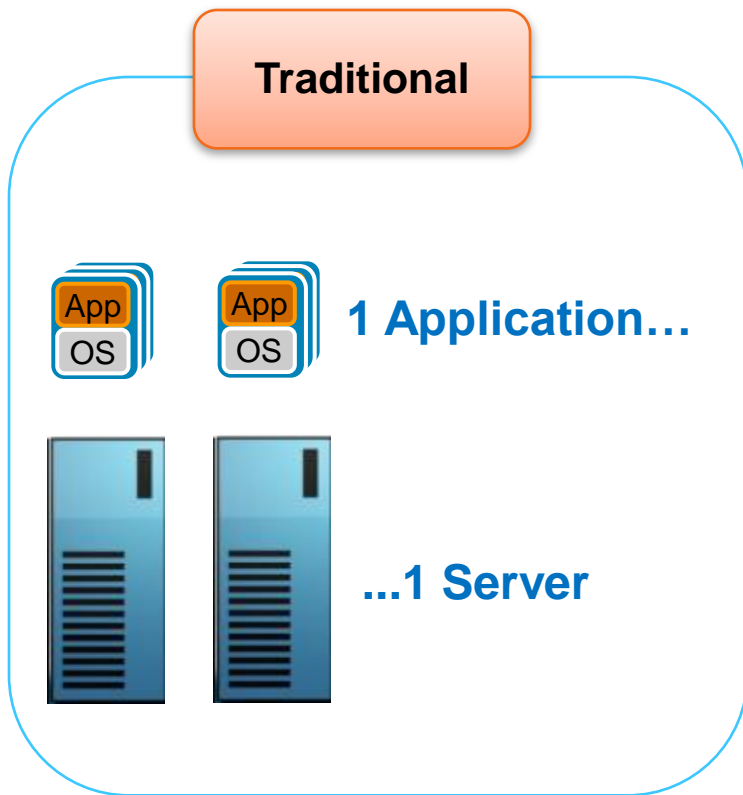
BRKVIR-2011

Agenda

- Overview
- Virtualization/Cloud Trends
- Requirements for Virtualized Services
- Virtual Machine Networking Architectures
 - Nexus 1000V for Virtualized Services
- Implementing Virtualized Services
 - Virtual Security Gateway (VSG)
 - Virtual WAAS (vWAAS)

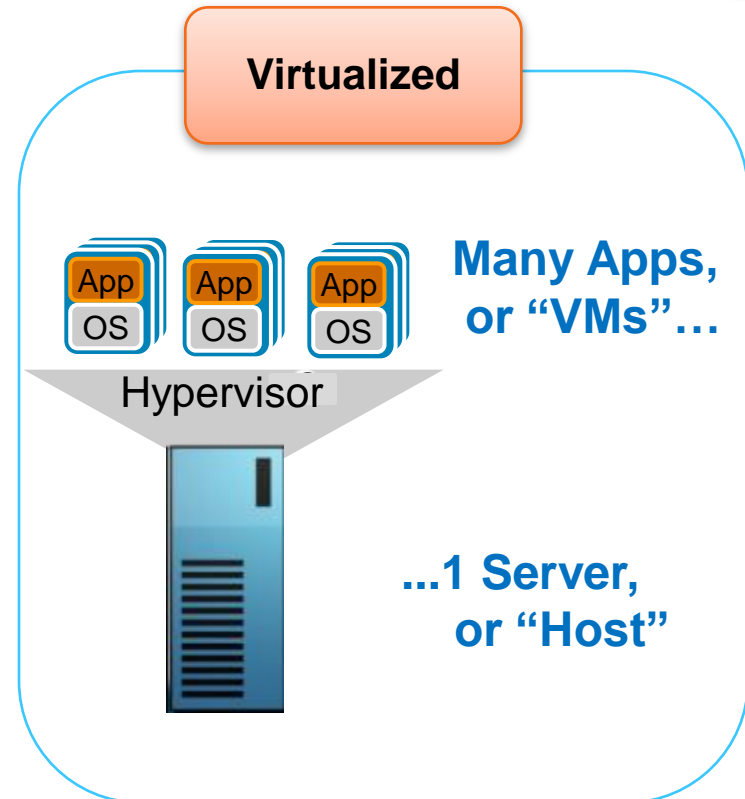
Present Day Virtualization

Virtualizing Consolidated Data Centers



Traditional Model:

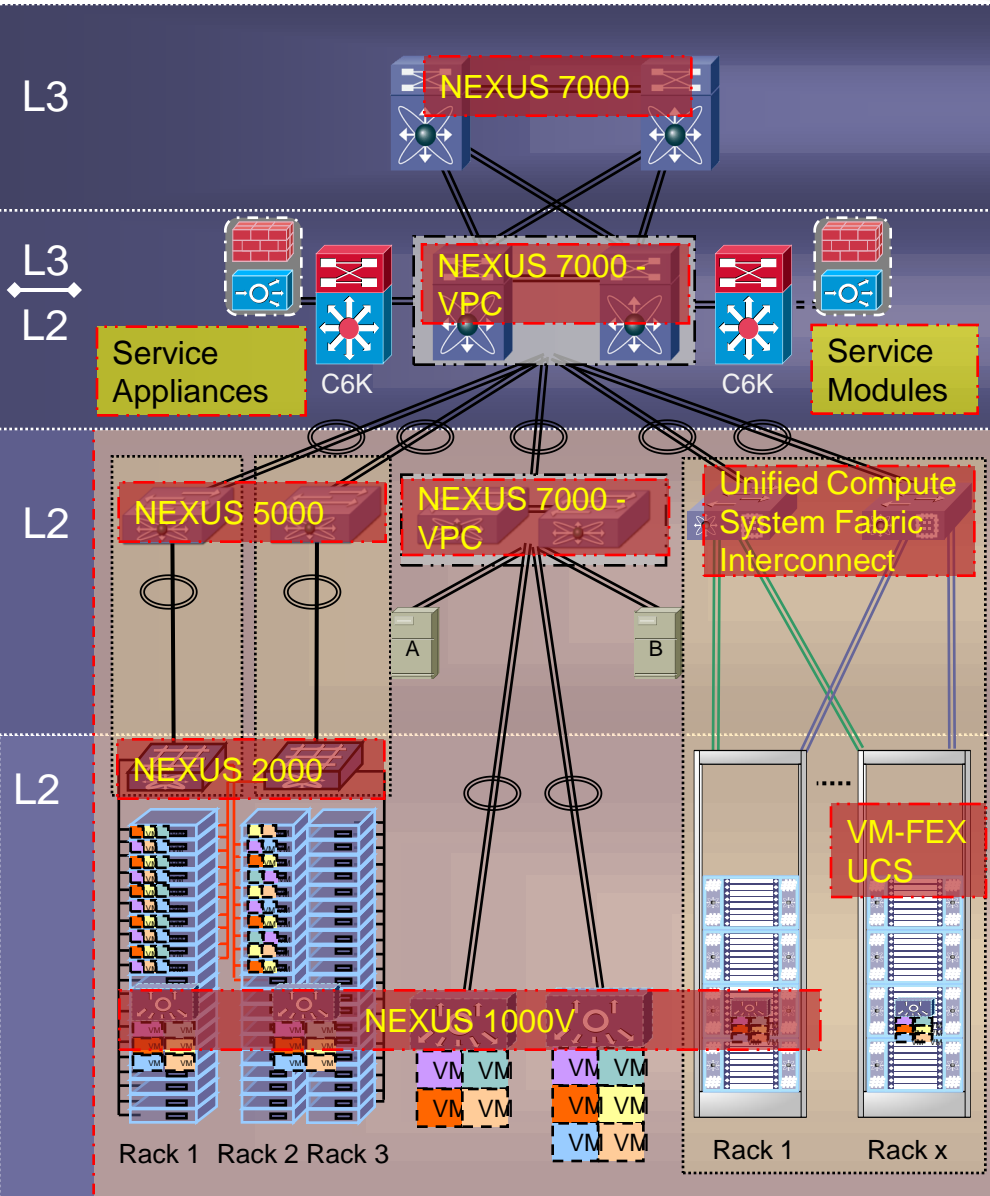
- Low CPU Utilization
- Heating/Cooling Challenges



Virtualized Model:

- Agile, Policy Driven, Multi-Tenant
- Forecasted to be 50% of all workloads in 2012
- Environment demands 10GbE and a new architectural framework

The Unified Data Center Architecture



Core: L3 boundary to the DC network. Functional point for route summarization, the injection of default routes and termination of segmented virtual transport networks

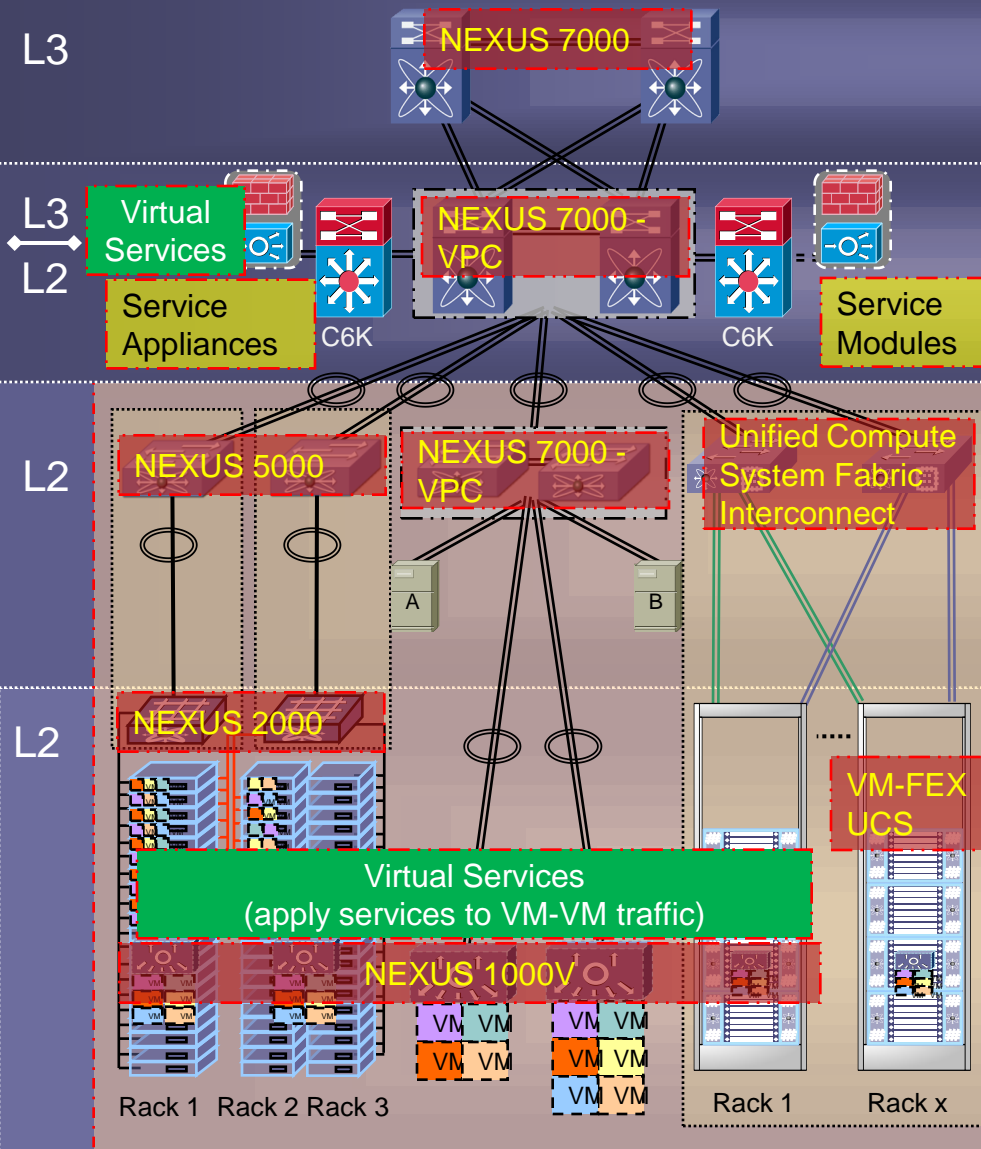
Aggregation: Typical L3/L2 boundary. DC aggregation point for uplink and DC services offering key features: VPC, VDC, 10GE density. Dedicated services are applied here

Access: Classic network layer providing non-blocking paths to servers & IP storage devices through VPC. It provides centralized config & mgmt and ease horizontal cabling demands related to 1G and 10GE server environments

Virtual Access: A virtual layer of network intelligence offering access layer-like controls to extend traditional visibility, flexibility and mgmt into virtual server environments. Virtual network switches bring access layer switching capabilities to virtual servers without burden of topology control plane protocols. Virtual Adapters provide granular control over virtual and physical server IO resources

The Unified Data Center Architecture

Deploying Virtual Services



Aggregation: Service Layer

- Virtual Services deployed as an alternative to dedicated services

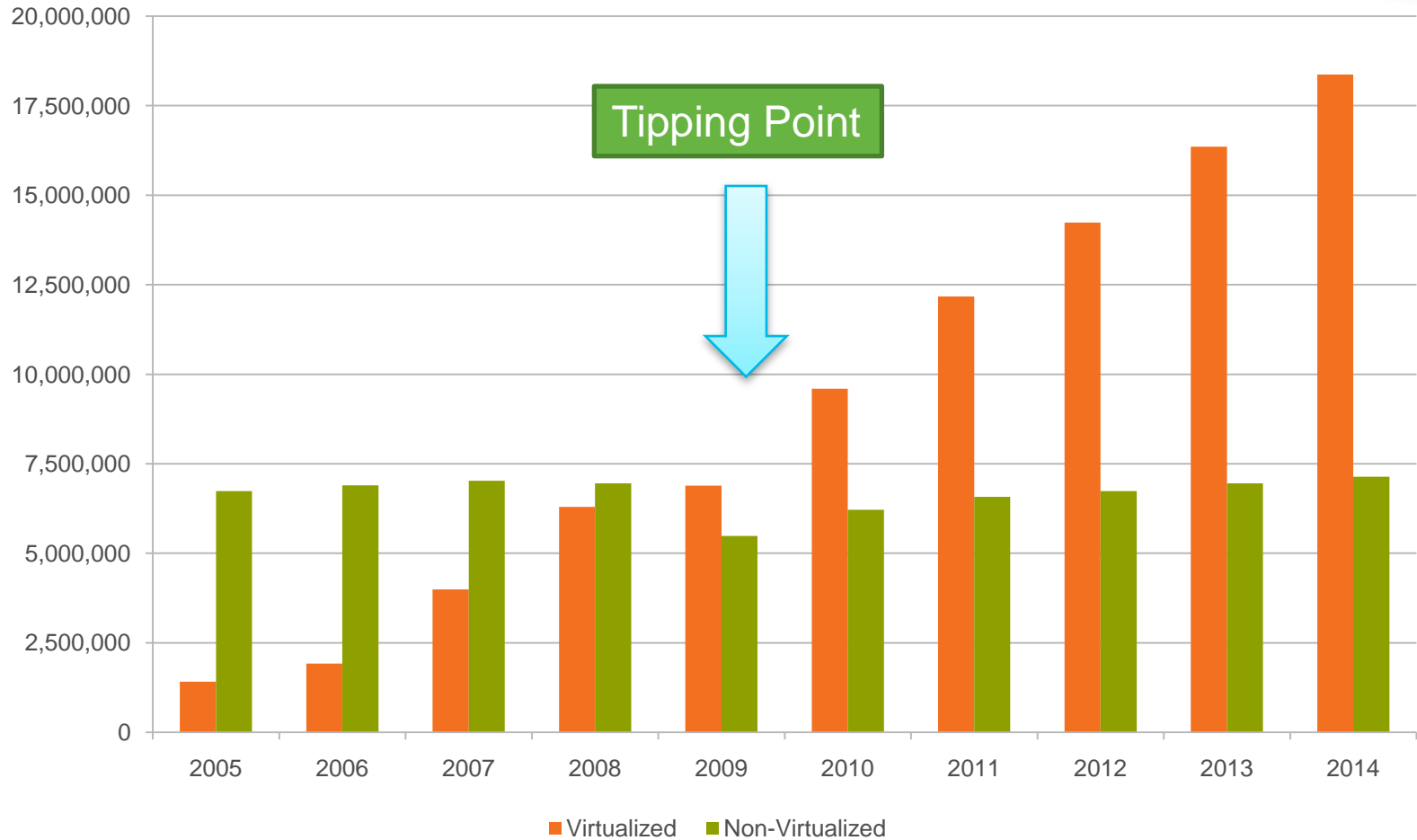
Virtual Access: Hypervisor-based Services

- Virtual Services applied to VM traffic
 - External-to-VM / VM-to-external
 - VM-to-VM
- Virtualization awareness
 - Dynamic policy-based provisioning
 - Support vMotion
 - Multi-tenant / Scale-out operation

Learn. Connect.
Collaborate. *together.*

Virtualization/Cloud Trends

More Servers are Virtualized



Source: IDC, Nov 2010

Benefits of Virtualization



Denton County: Before & After Virtualization

Physical
125 Physical Servers
325 tons of annual CO ₂ emissions
NO server clustering
Limited Network Capacity
Limited Data Protection

Virtual
9 Physical Virtualization Hosts
38 tons of annual CO ₂ emissions
HA for all servers
10 GB DCE Network (eventually)
Backups @ VM & File Levels DR foundation for all servers

Benefits of Virtualization



5-Year Savings for 96 Servers

	Unit Cost	Physical	Virtual	Savings
Servers (Existing)	\$10,000	\$1,200,000	\$136,170	\$1,063,830
New Servers (5/yr)	\$10,000	\$250,000	-	\$250,000
Power/Cooling Servers	\$75	\$432,000	\$27,000	\$405,000
Power/Cool New Servers	\$75	\$ 56,250	-	\$ 56,250
Maintenance	-	-	\$32,648	<\$32,648>
Windows Svr (74 Std)	\$ 789	\$ 125,183	-	\$125,183
Windows Svr (10 Ent)	\$ 2,559	\$ 54,850	\$75,000	<\$20,150>
SQL Svr (16 Std)	\$ 6,285	\$ 215,493	-	\$215,493
SQL Svr (0 Ent-8 CPU)	\$23,910	-	\$159,400	<\$159,400>
Total		\$2,360,633	\$430,218	\$1,930,415

Journey to 100% Virtualization

Recent Forbes Insights survey: 235 CIOs and IT executives:

- ▶ **48%** have virtualized at least a quarter of their organization's servers in order to reduce infrastructure costs and deliver applications more rapidly
- ▶ **43%** of the survey respondents identified security as their top concern about adopting virtualization as the foundation for cloud computing

A Common Definition—Cloud Computing

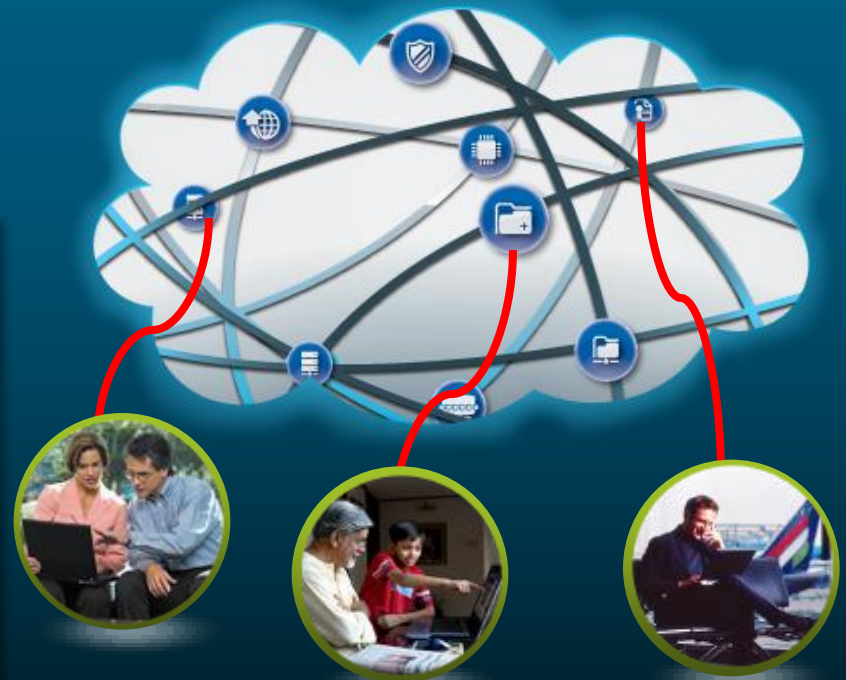
IT Resources and Services that Are **Abstracted** from the Underlying Infrastructure and Provided “**On Demand**” and “**At Scale**” in a **Multitenant and Elastic** Environment

A Style of Computing Where Massively Scalable IT-Enabled Capabilities Are Delivered “As a Service” to Multiple External Customers Using Internet Technologies

Source: Gartner “Defining and Describing an Emerging Phenomenon”
June 2008

Public Cloud

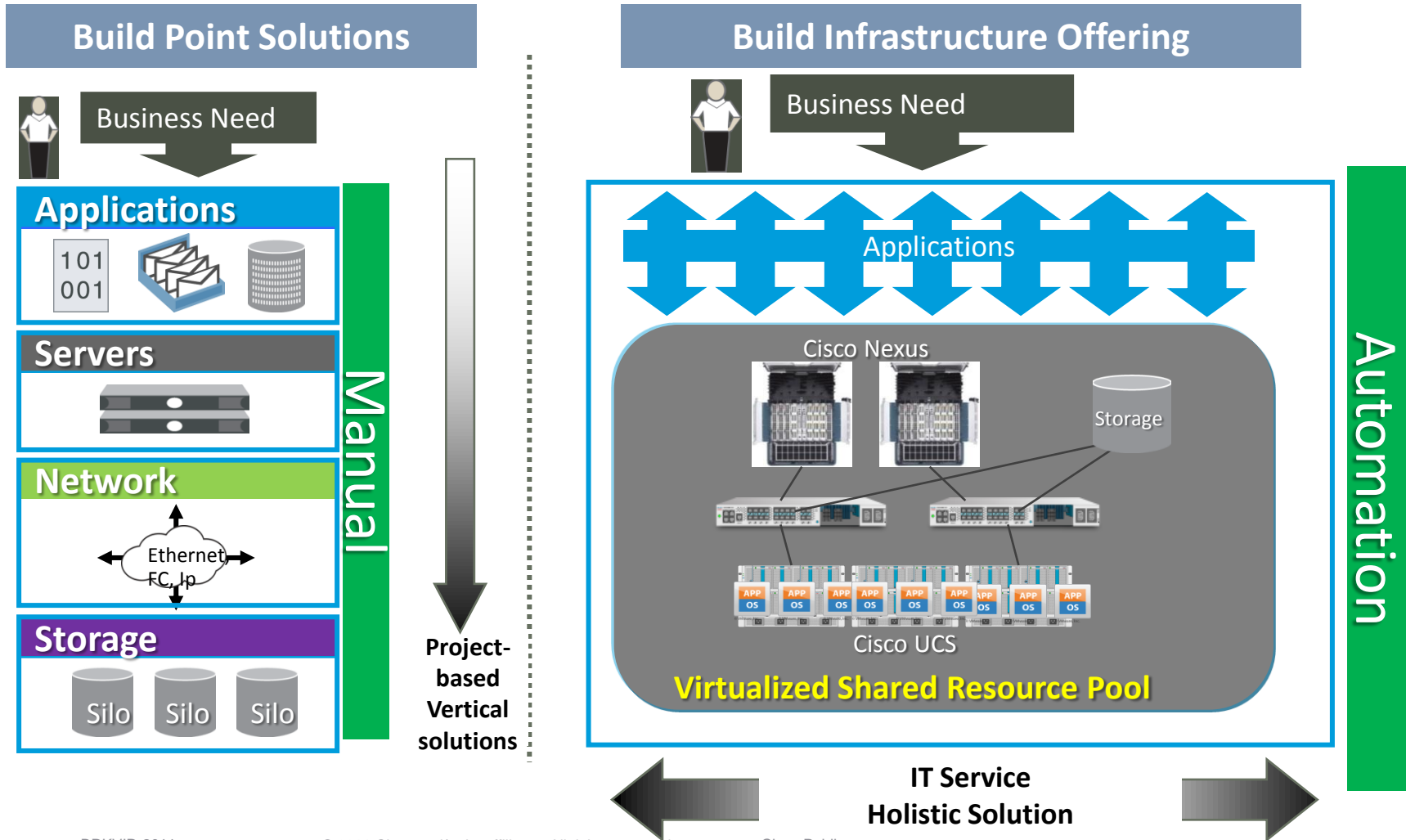
Private Cloud



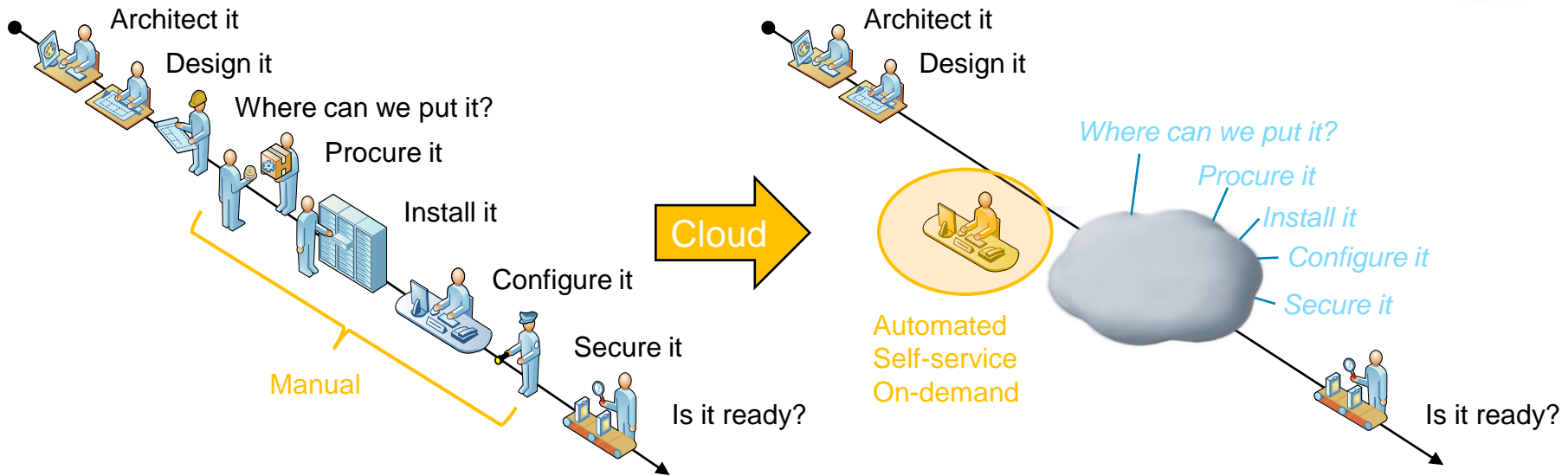
**Anywhere,
Anyone,
Any Service**

Enterprise Private Cloud Datacenter

IT as a Service Model



Delivering a (complex) service – faster (with full end-to-end automation)



Before

- Machine-oriented
- Manual provisioning
- Hard to control utilization

- High provisioning & ops cost
- Extended provisioning time
- Configuration risk

After

- Service-oriented
- Self-service; automated provisioning
- Elasticity (capacity-on-demand)

- Optimized provisioning & ops cost
- Rapid provisioning
- Increased Resiliency and Availability

The Evolution of Data Center *Vision presented in 2006-2007*

Consolidation

Virtualization

Automation

Utility

Market

Hybrid Cloud
Inter-Cloud

Private Clouds
Public Clouds

Unified Computing

Unified Fabric

Data Center Networking

Product Innovations Delivered 2008 – 2011

Consolidation

Virtualization

Automation

Utility

Market

Hybrid Cloud
Inter-Cloud

Private Clouds
Public Clouds

Nexus 1000V: 3000+ Cust
VM-FEX, VSG, vWAAS, NAM

Unified Computing

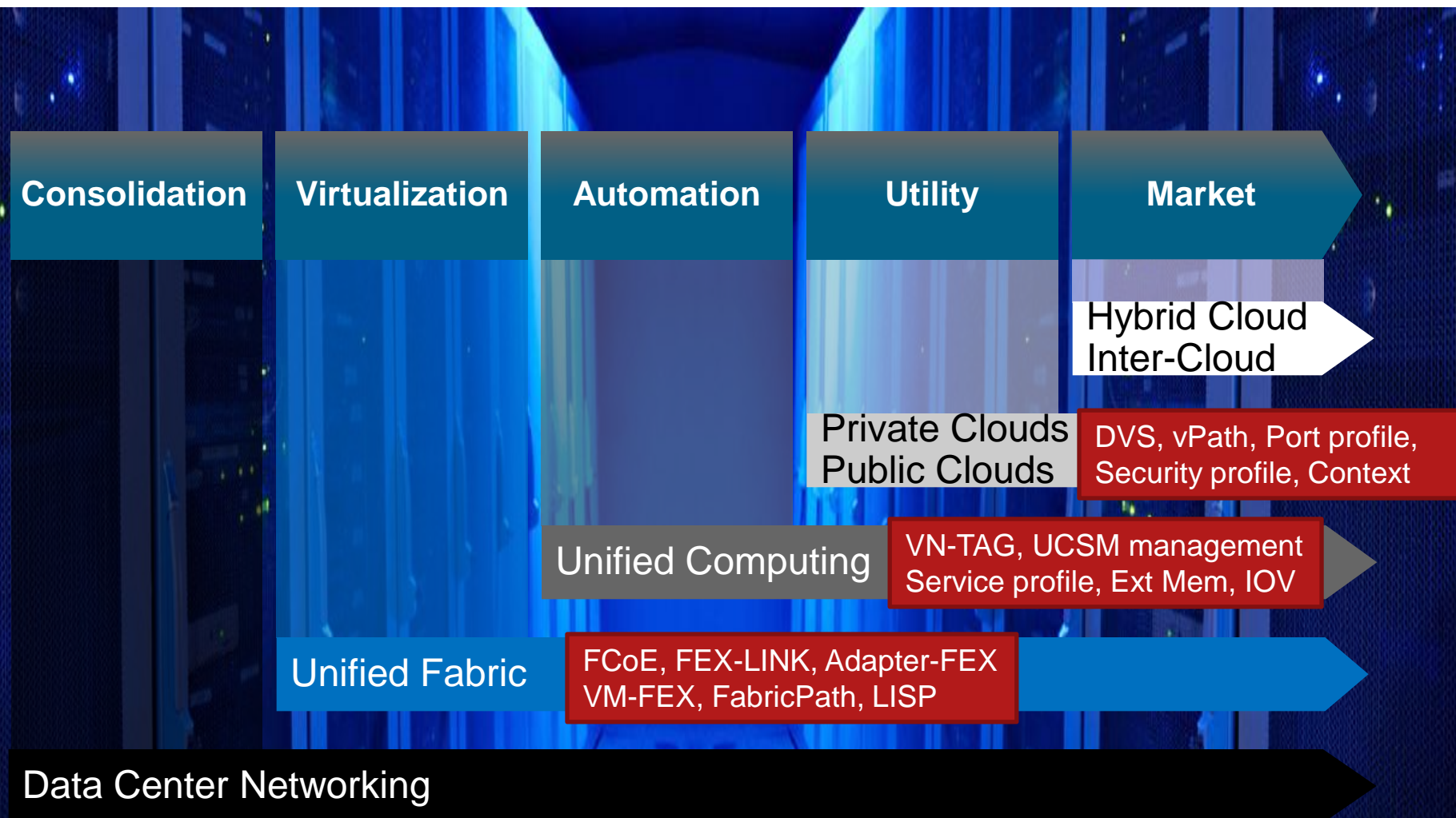
UCS (blade & rack); 5400+ customers;
Blade \$ market share: #2 in US, #3 WW

Unified Fabric

Nexus Switches; Shipping for 3 yrs;
10,000+ customers; #1 in 10G switching

Data Center Networking

Technology Innovations Delivered 2008 – 2011



Virtual Networking Vision

Accelerate Data Center Virtualization



Virtualized
Agile
Policy-Driven
Multitenant

Virtual Machine (VM) Networking

Extend networking to virtualized environments:

- Hypervisor Switch (SW): **Nexus 1000V** – IEEE 802.1Q standard based, feature rich
- External switch (HW): **UCS6100/N5K + VM-FEX** (IEEE 802.1Qbh pre-standard)

Virtual Network Services

Extend network services to virtualized environments

- Virtual Security Gateway (for Nexus 1000V)
- Virtual WAAS
- NAM virtual service blade on Nexus 1010

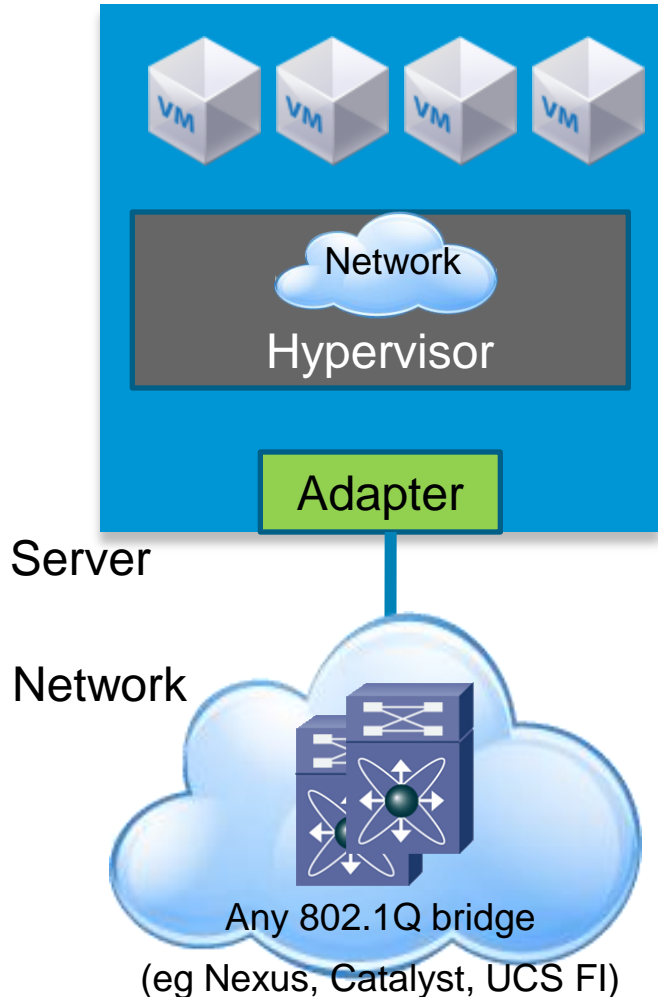
Virtual Network Management (UCSM, VNMC)
Policy-Driven, Programmatic, Multi-Device, Multi-tenant

Virtual Machine Networking – Two Approaches

Comprehensive support for all Use Cases

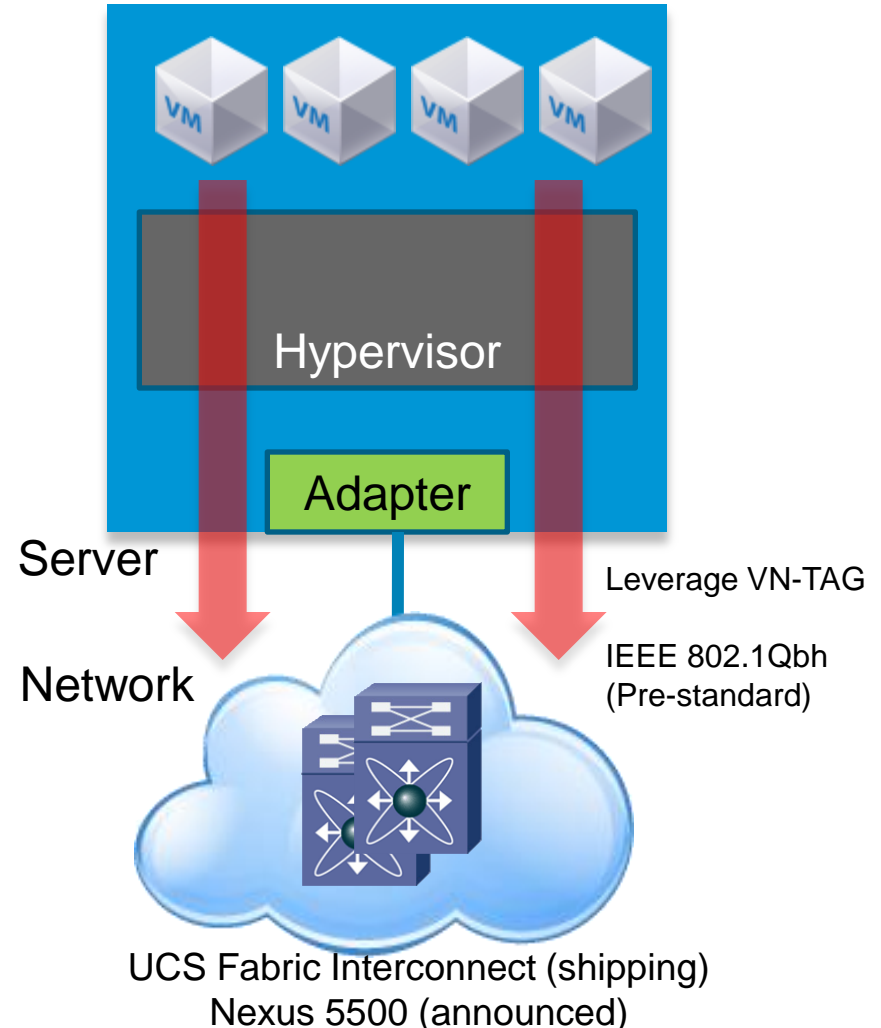
Approach 1: Nexus 1000V

Bring networking into hypervisor



Approach 2: VM-FEX

Relay VM traffic to external network

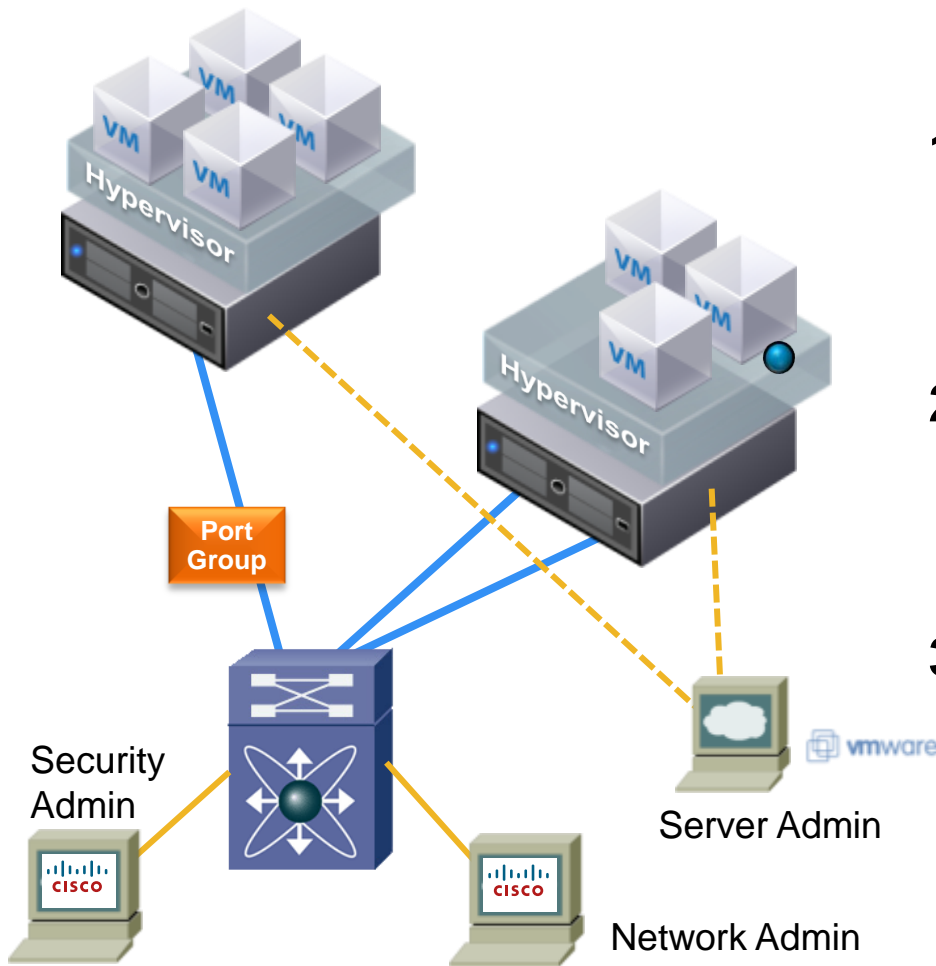


Learn. Connect.
Collaborate. *together.*

Virtual Networking

Architecting the Nexus 1000V

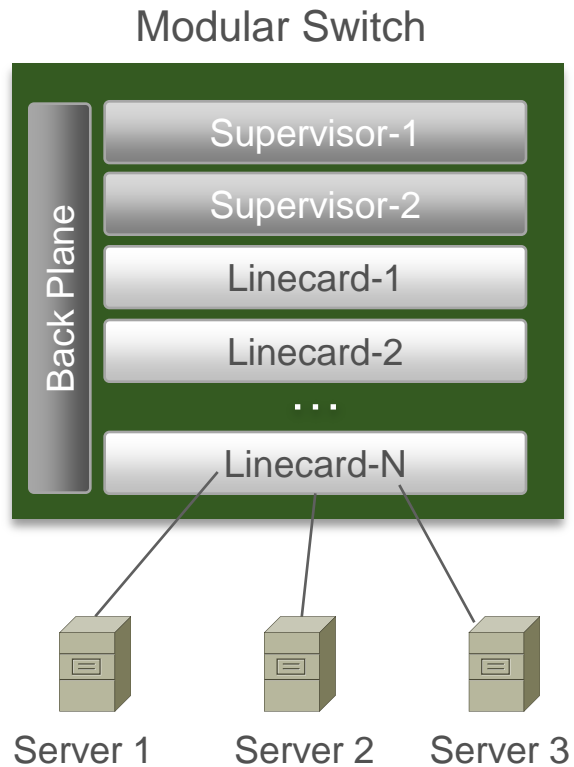
Server Virtualization Issues



1. vMotion moves VMs across physical ports—the network **policy must follow vMotion**
2. Must view or apply network/security policy to **locally switched** traffic
3. Need to maintain **segregation of duties** while ensuring **non-disruptive operations**

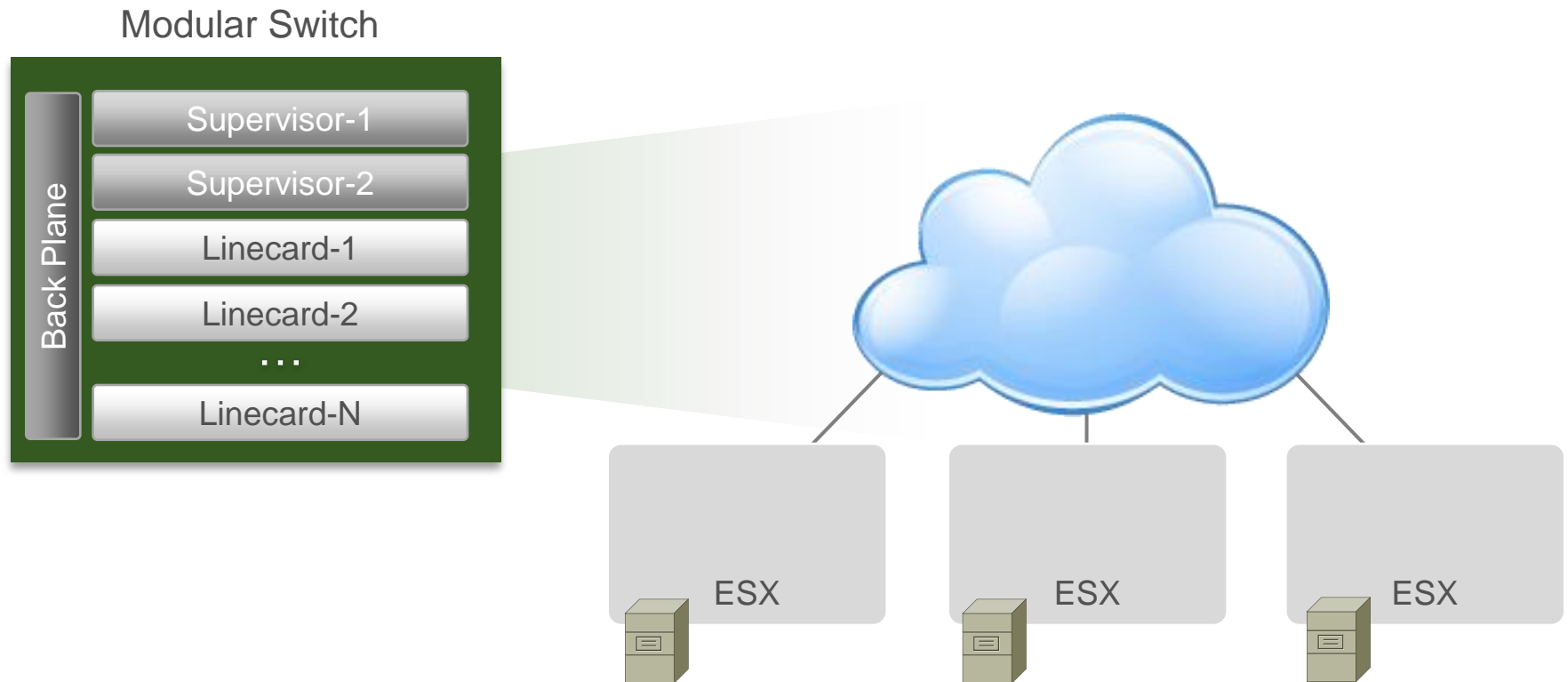
Nexus 1000V Architecture

Comparison to a Physical Switch



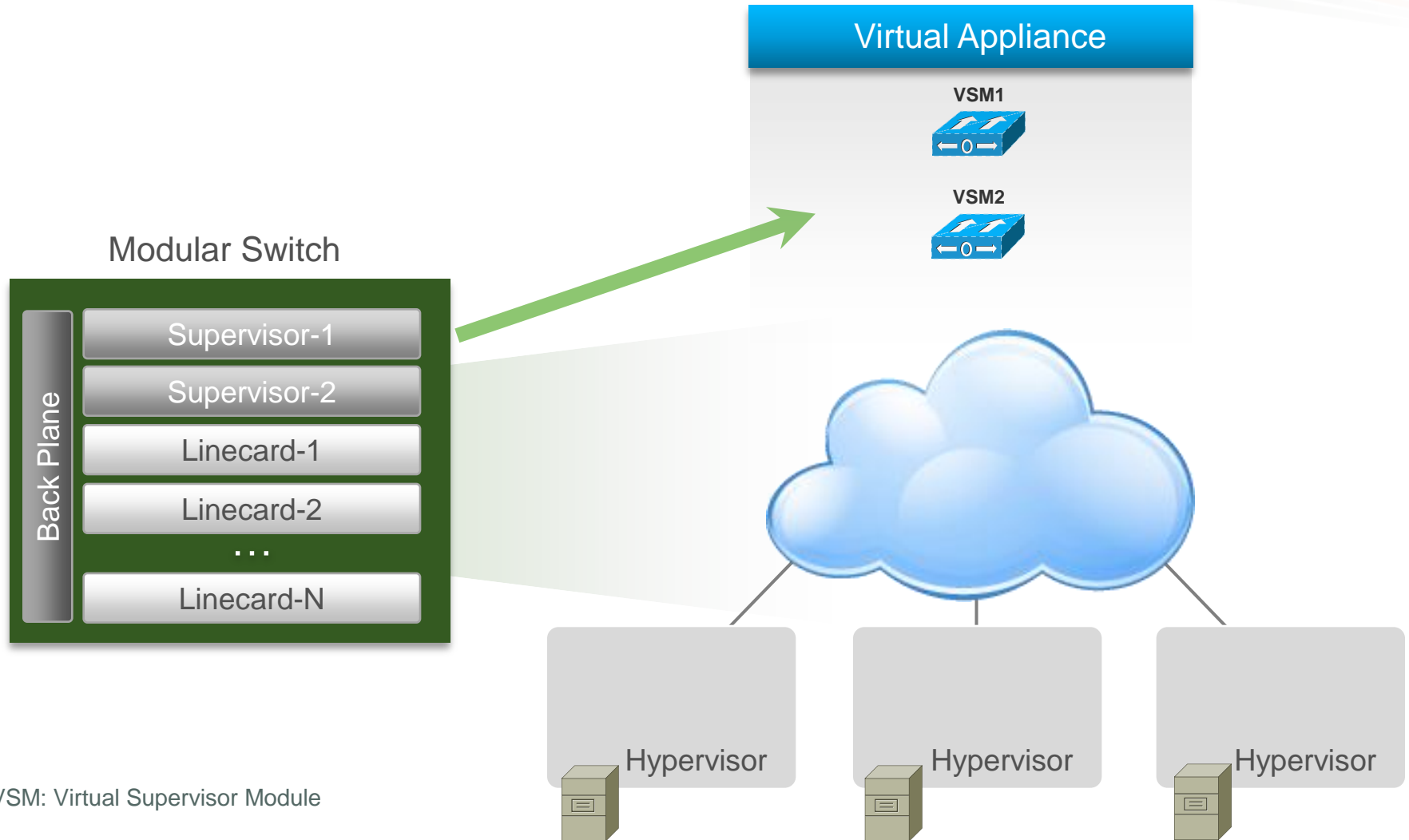
Nexus 1000V Architecture

Moving to a Virtual Environment



Nexus 1000 Architecture

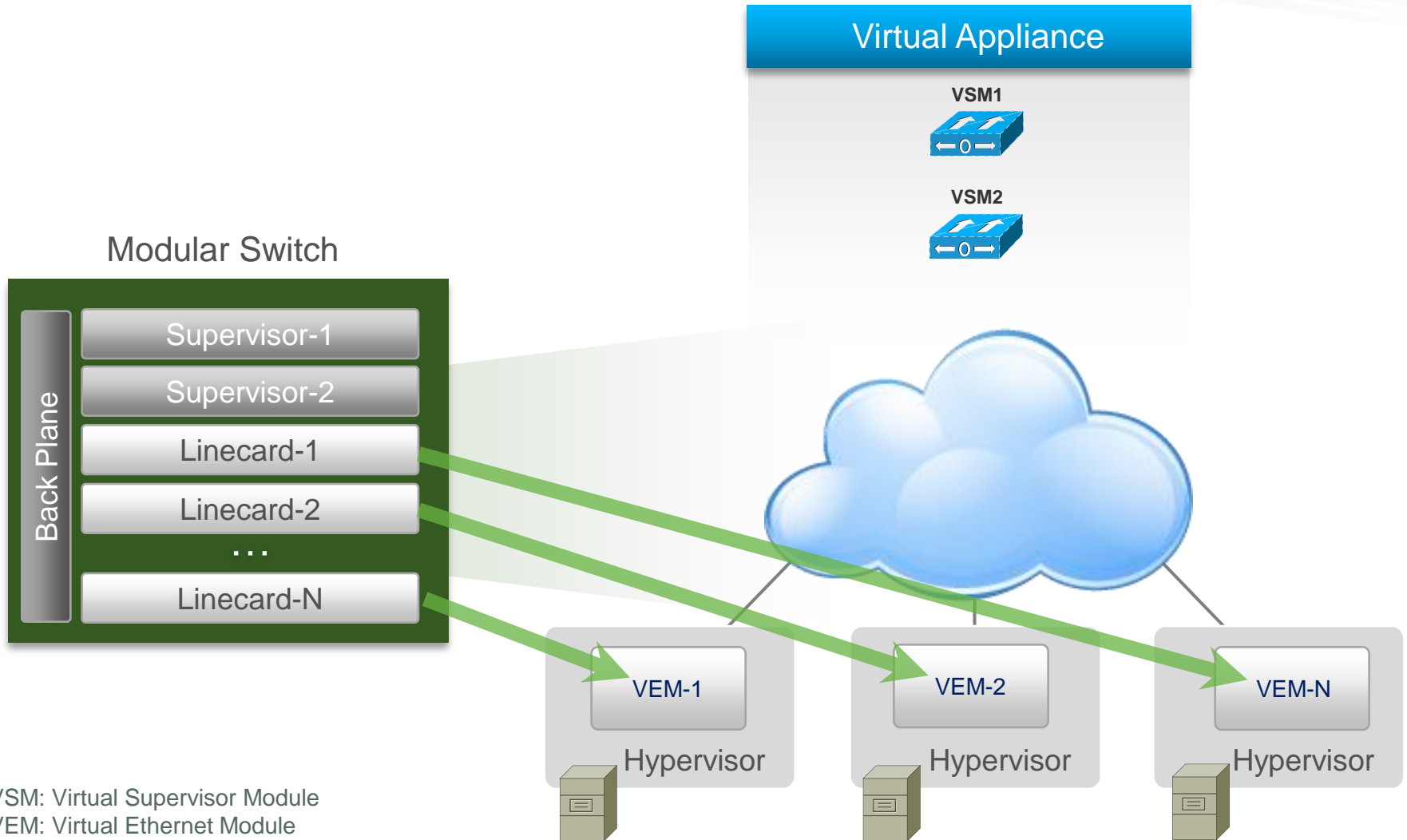
Supervisors → Virtual Supervisor Modules (VSMs)



VSM: Virtual Supervisor Module

Nexus 1000 Architecture

Linecards → Virtual Ethernet Modules (VEMs)

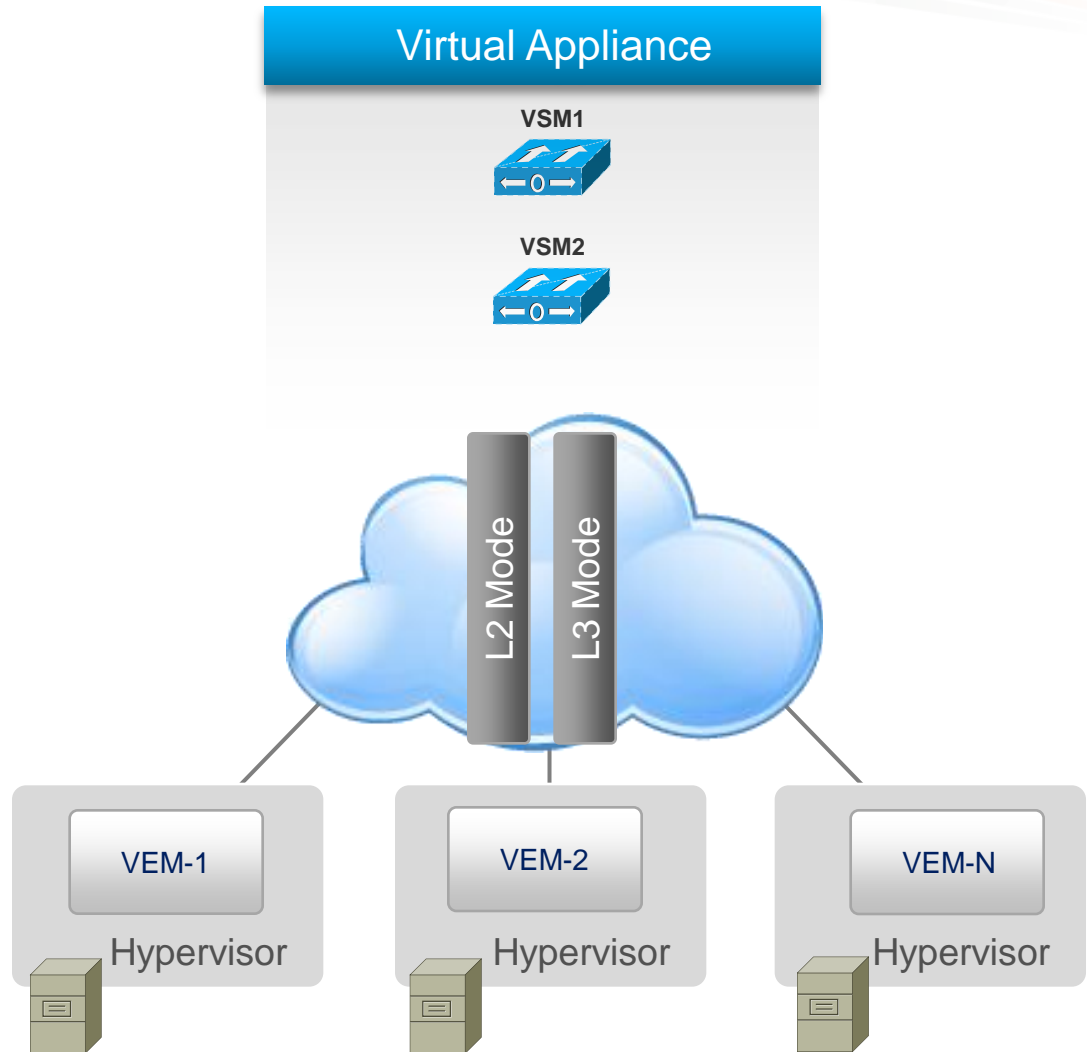


VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Nexus 1000 Architecture

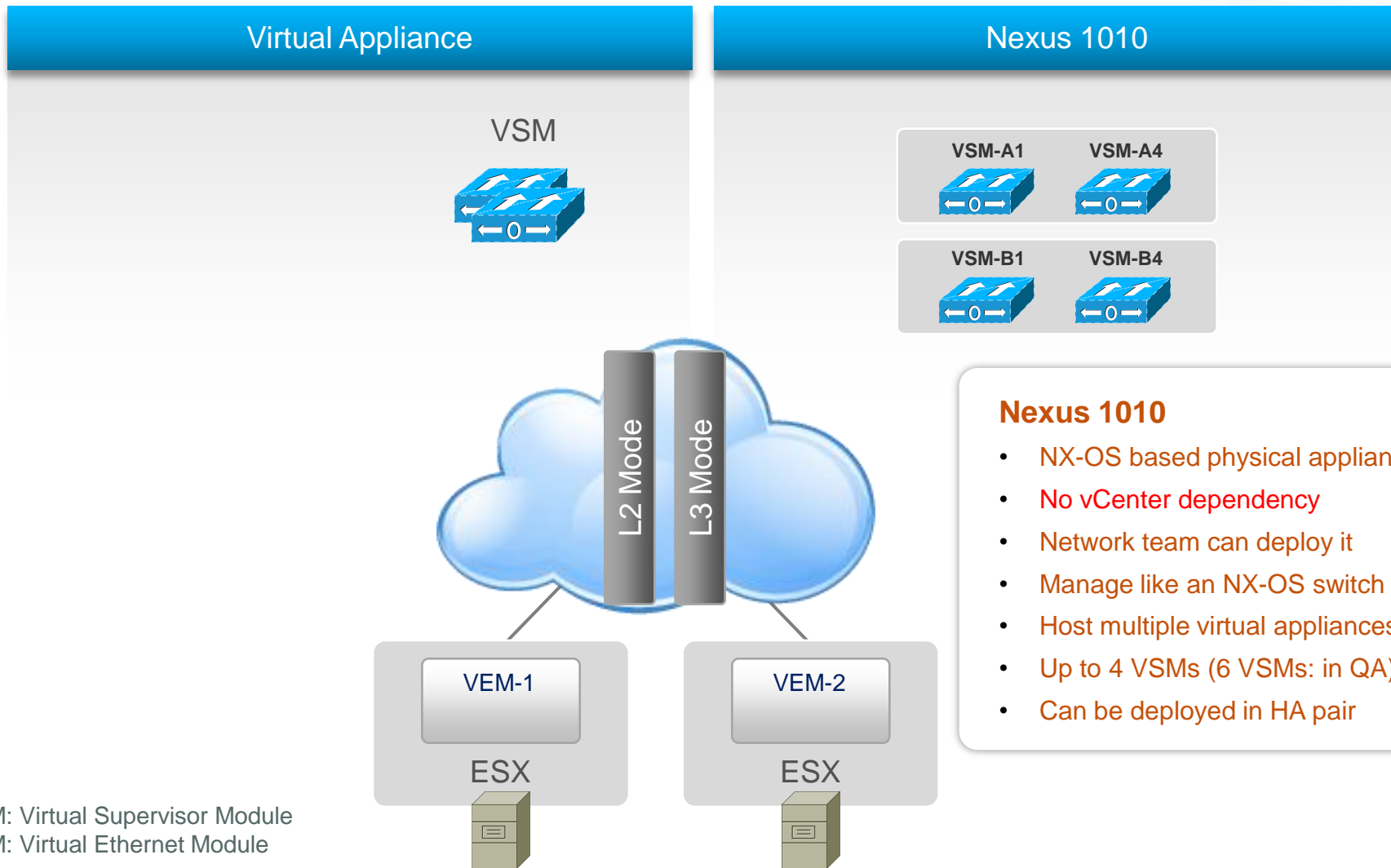
VSM + VEMs = Nexus 1000 Virtual Chassis

- 200+ vEth ports per VEM
- 2K vEths per N1K
- 64 VEMs per N1K (connected by L2 or L3)
- Multiple N1Ks can be created (under single hypervisor management center)



VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Nexus 1010 – Virtual Services Appliance Hosting Platform for VSM

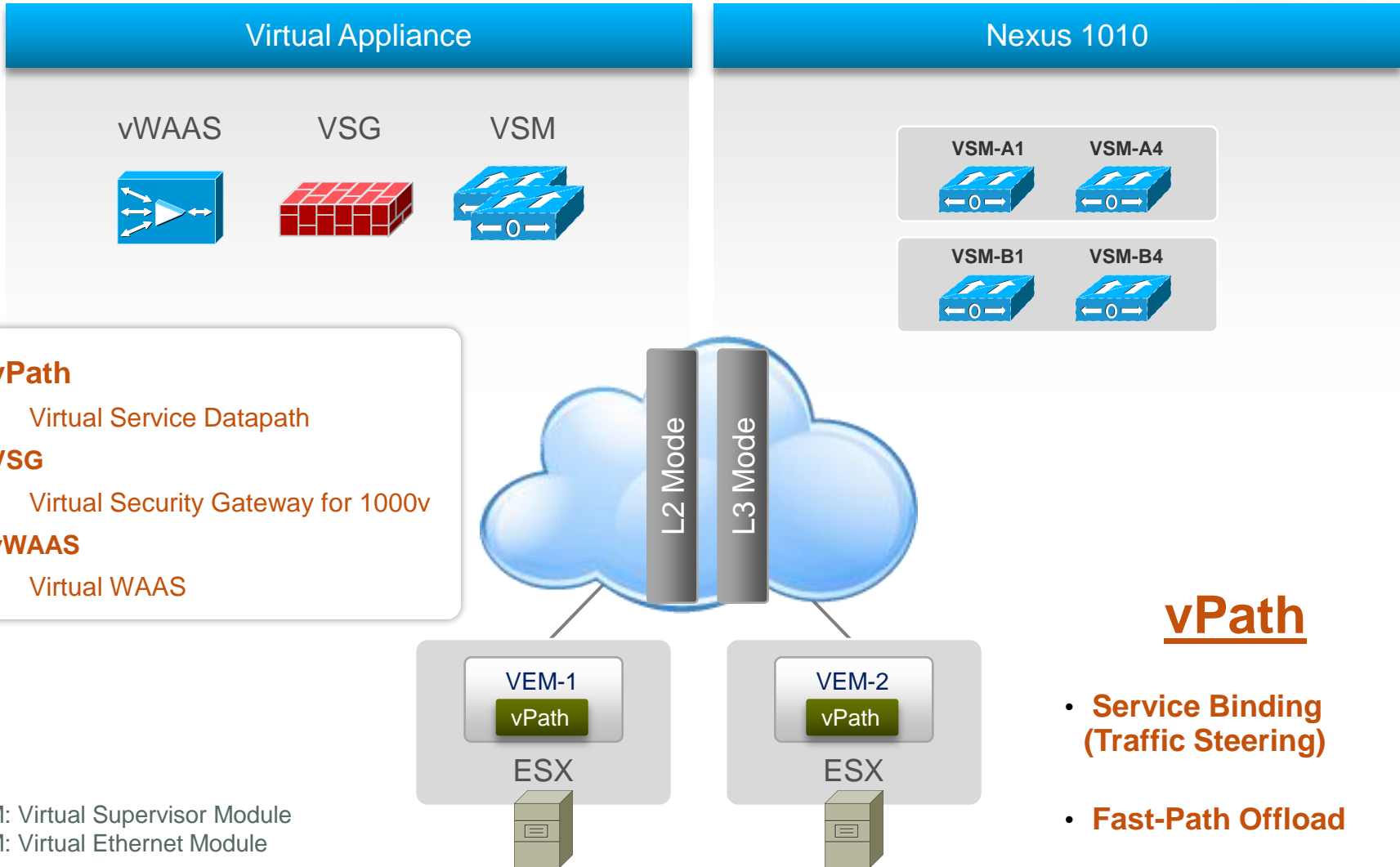


Nexus 1010

- NX-OS based physical appliance
- No vCenter dependency
- Network team can deploy it
- Manage like an NX-OS switch
- Host multiple virtual appliances
- Up to 4 VSMs (6 VSMs: in QA)
- Can be deployed in HA pair

VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Virtual Network Services



vPath

- Virtual Service Datapath

VSG

- Virtual Security Gateway for 1000v

vWAAS

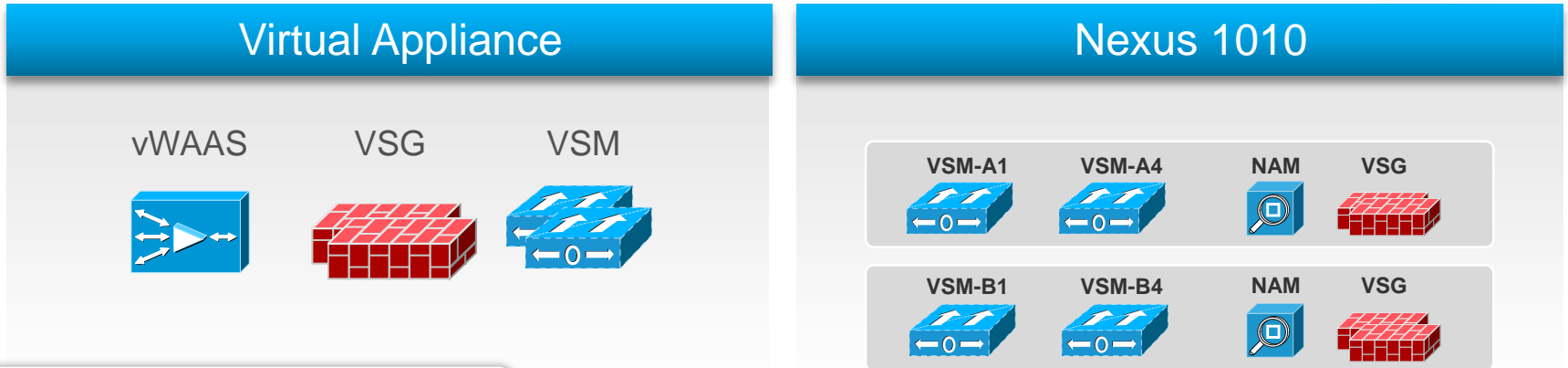
- Virtual WAAS

vPath

- **Service Binding (Traffic Steering)**
- **Fast-Path Offload**

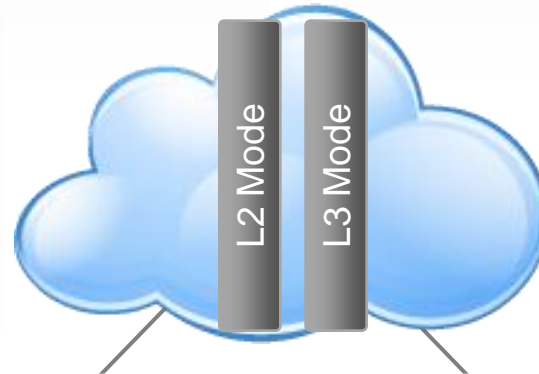
VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Nexus 1010 – Virtual Services Appliance Hosting Platform for Virtual Services



vPath

- Virtual Service Datapath
- ## VSG
- Virtual Security Gateway for 1000v
- ## vWAAS
- Virtual WAAS



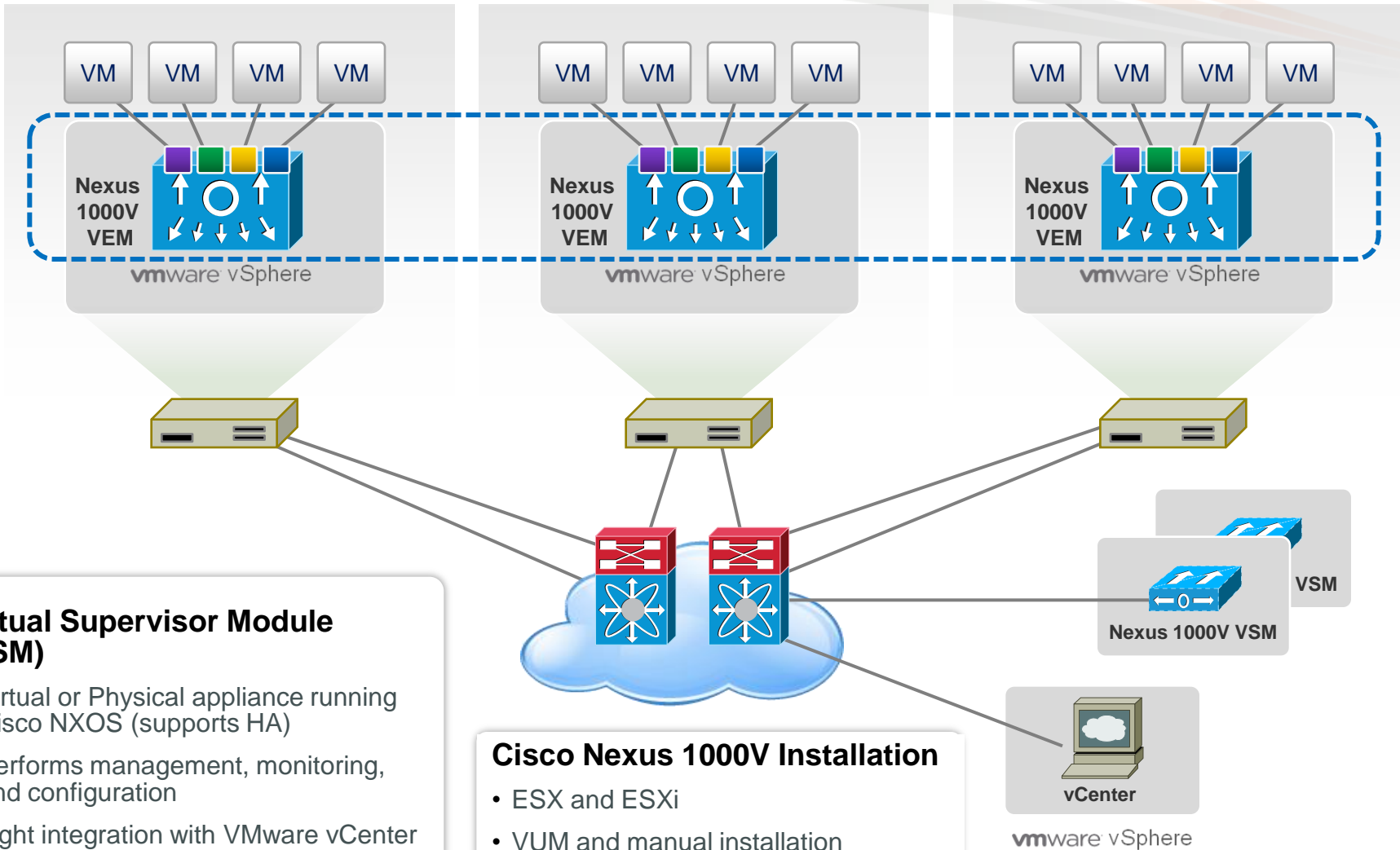
VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

vPath

- **Service Binding (Traffic Steering)**
- **Fast-Path Offload**

*VSG on 1010
Availability: In QA

Cisco Nexus 1000V Architecture



Virtual Supervisor Module (VSM)

- Virtual or Physical appliance running Cisco NXOS (supports HA)
- Performs management, monitoring, and configuration
- Tight integration with VMware vCenter

Cisco Nexus 1000V Installation

- ESX and ESXi
- VUM and manual installation
- VEM is installed/upgraded like an ESX patch

Cisco Nexus 1000V

Faster VM Deployment

Cisco Virtual Machine Networking

Policy-Based VM Connectivity

Port Profile

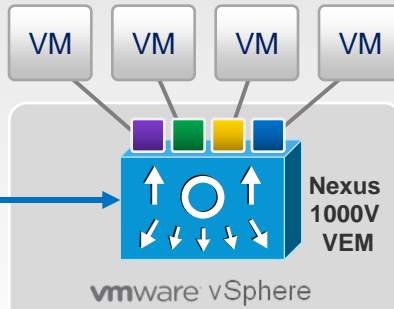
Defined Policies

- WEB Apps ■
- HR ■
- DB ■
- DMZ ■

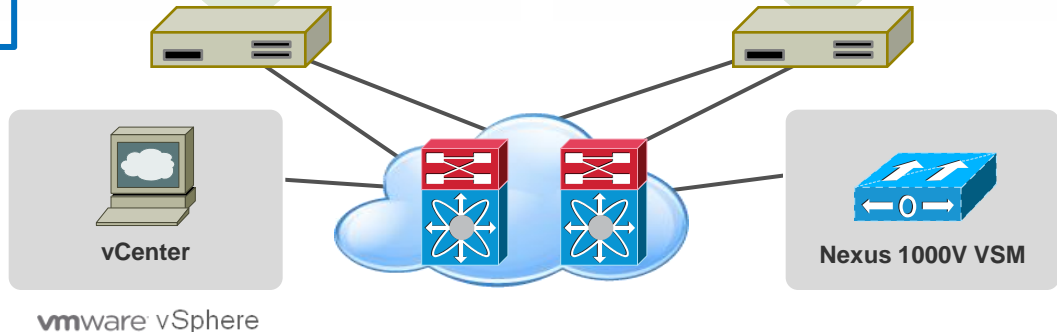
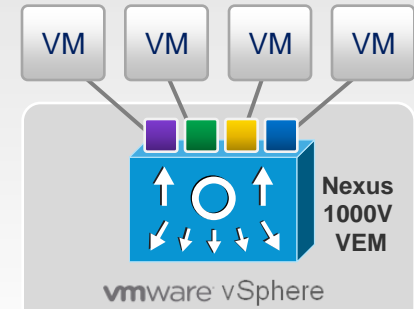
VM Connection Policy

- Defined in the network
- Applied in Virtual Center
- Linked to VM UUID

Mobility of Network and Security Properties



Non-Disruptive Operational Model



Cisco Nexus 1000V

Richer Network Services

Cisco Virtual Machine Networking

Policy-Based VM Connectivity

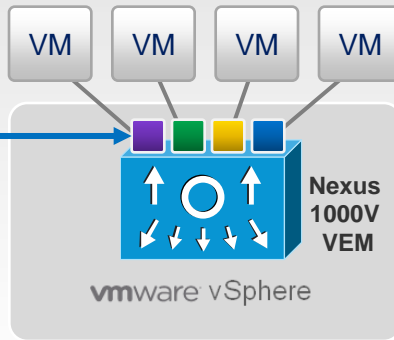
VMs Need to Move

- VMotion
- DRS
- SW upgrade/patch
- Hardware failure

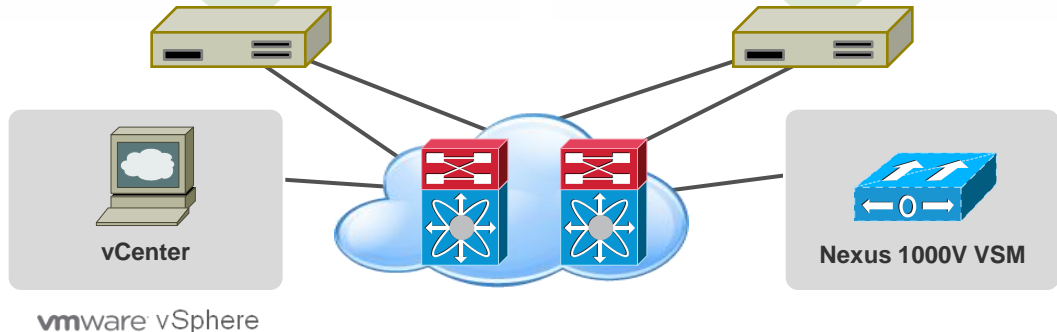
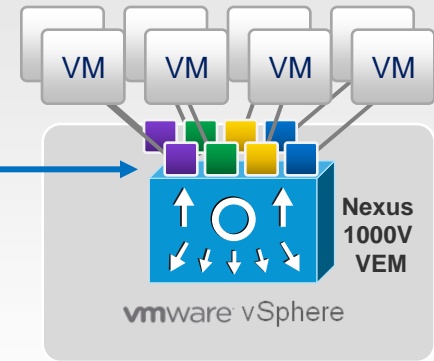
N1KV Property Mobility

- VMotion for the network
- Ensures VM security
- Maintains connection state

Mobility of Network and Security Properties



Non-Disruptive Operational Model



Cisco Nexus 1000V

Increased Operational Efficiency

Cisco Virtual Machine Networking

Policy-Based VM Connectivity

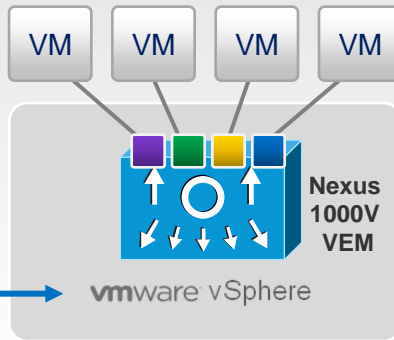
VI Admin Benefits

- Maintains existing VM mgmt
- Reduces deployment time
- Improves scalability
- Reduces operational workload
- Enables VM-level visibility

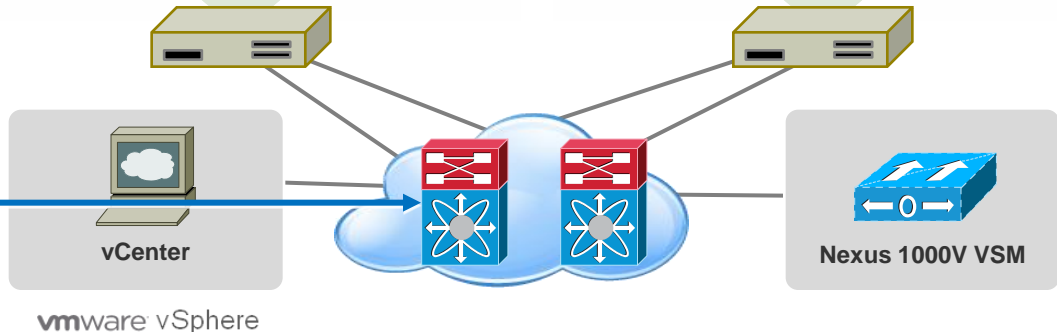
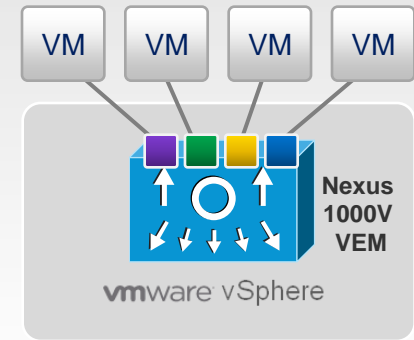
Network Admin Benefits

- Unifies network management and operations
- Improves operational security
- Enhances VM network features
- Ensures policy persistence
- Enables VM-level visibility

Mobility of Network and Security Properties



Non-Disruptive Operational Model



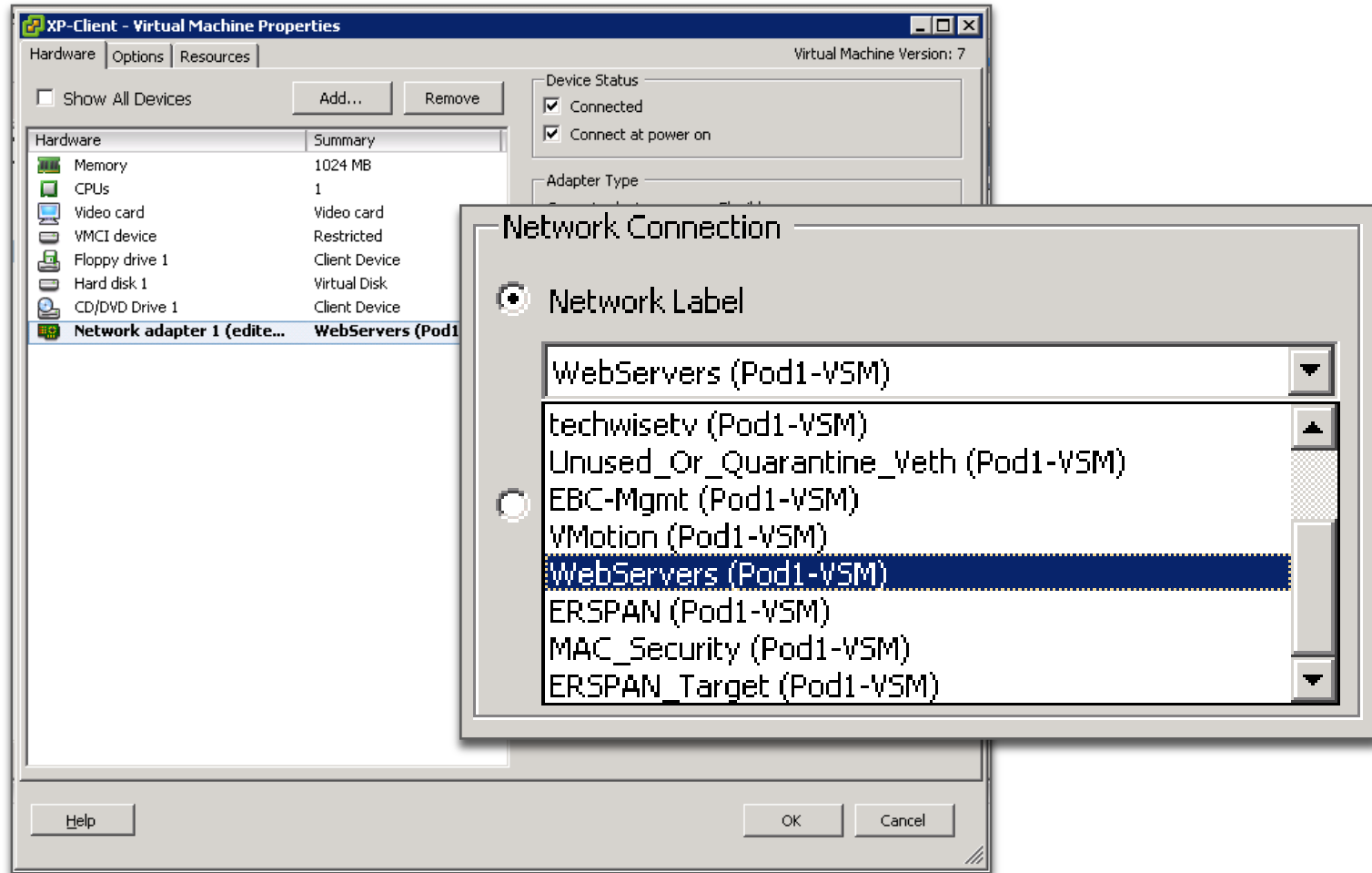
Port Profile Configuration

```
n1000v# show port-profile name WebProfile
port-profile WebServers
  description:
  status: enabled
  capability uplink: no
  system vlans:
  port-group: WebServers
  config attributes:
    switchport mode access
    switchport access vlan 110
    no shutdown
  evaluated config attributes:
    switchport mode access
    switchport access vlan 110
    no shutdown
  assigned interfaces:
    Veth10
```

Support Commands Include:

- ✓ Port management
- ✓ VLAN
- ✓ PVLAN
- ✓ Port-Channel
- ✓ ACL
- ✓ Netflow
- ✓ Port security
- ✓ QoS

Port Groups: VI Admin View



Advanced Features of the Nexus 1000V

Switching

- L2 Switching, 802.1Q Tagging, VLAN Segmentation, Rate Limiting (TX)
- IGMP Snooping, QoS Marking (COS & DSCP), Class-based WFQ

Security

- Policy Mobility, Private VLANs w/ local PVLAN Enforcement
- Access Control Lists (L2–4 w/ Redirect), Port Security
- Dynamic ARP inspection, IP Source Guard, DHCP Snooping

Network Services

- Virtual Services Datapath (vPath) support for traffic steering & fast-path off-load [leveraged by Virtual Security Gateway (VSG) and vWAAS]

Provisioning

- Automated vSwitch Config, Port Profiles, Virtual Center Integration
- Optimized NIC Teaming with Virtual Port Channel – Host Mode

Visibility

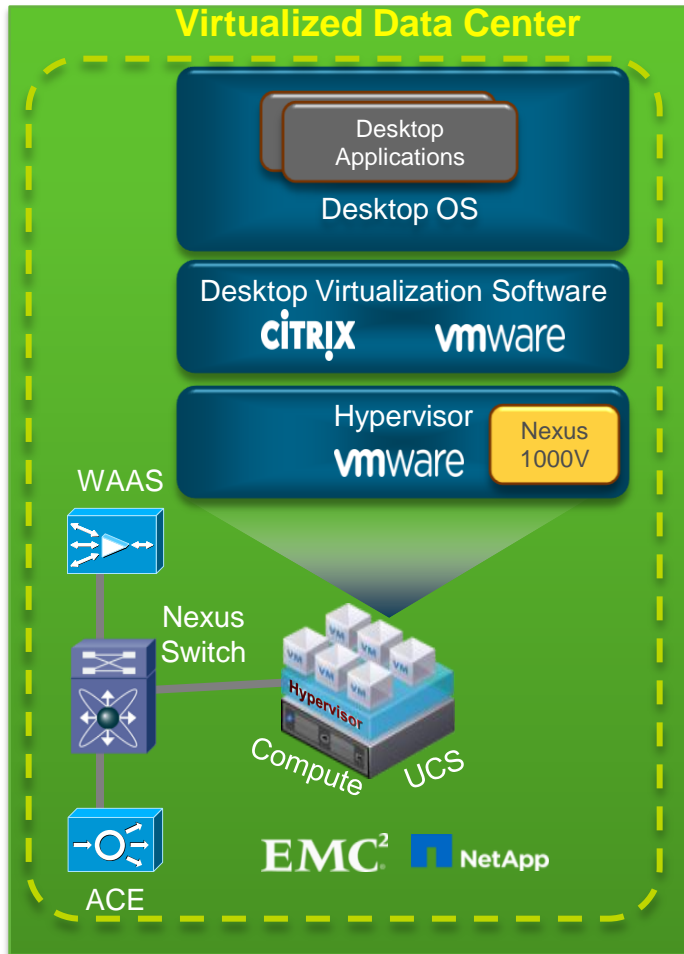
- VMotion Tracking, NetFlow v.9 w/ NDE, CDP v.2
- VM-Level Interface Statistics
- SPAN & ERSPAN (policy-based)

Management

- Virtual Center VM Provisioning, Cisco Network Provisioning, CiscoWorks
- Cisco CLI, Radius, TACACs, Syslog, SNMP (v.1, 2, 3)
- Hitless upgrade, SW Installer

IPv6 Support: As a Layer-2 switch, Nexus 1000V supports forwarding of IPv6 packets as well as Layer-2 features such as PVLAN and Port Security. Also, management interface can be assigned an IPv6 address.

Securing Virtual Desktops (VDI)



WAAS: Wide Area Application Service
ACE: Application Control Engine

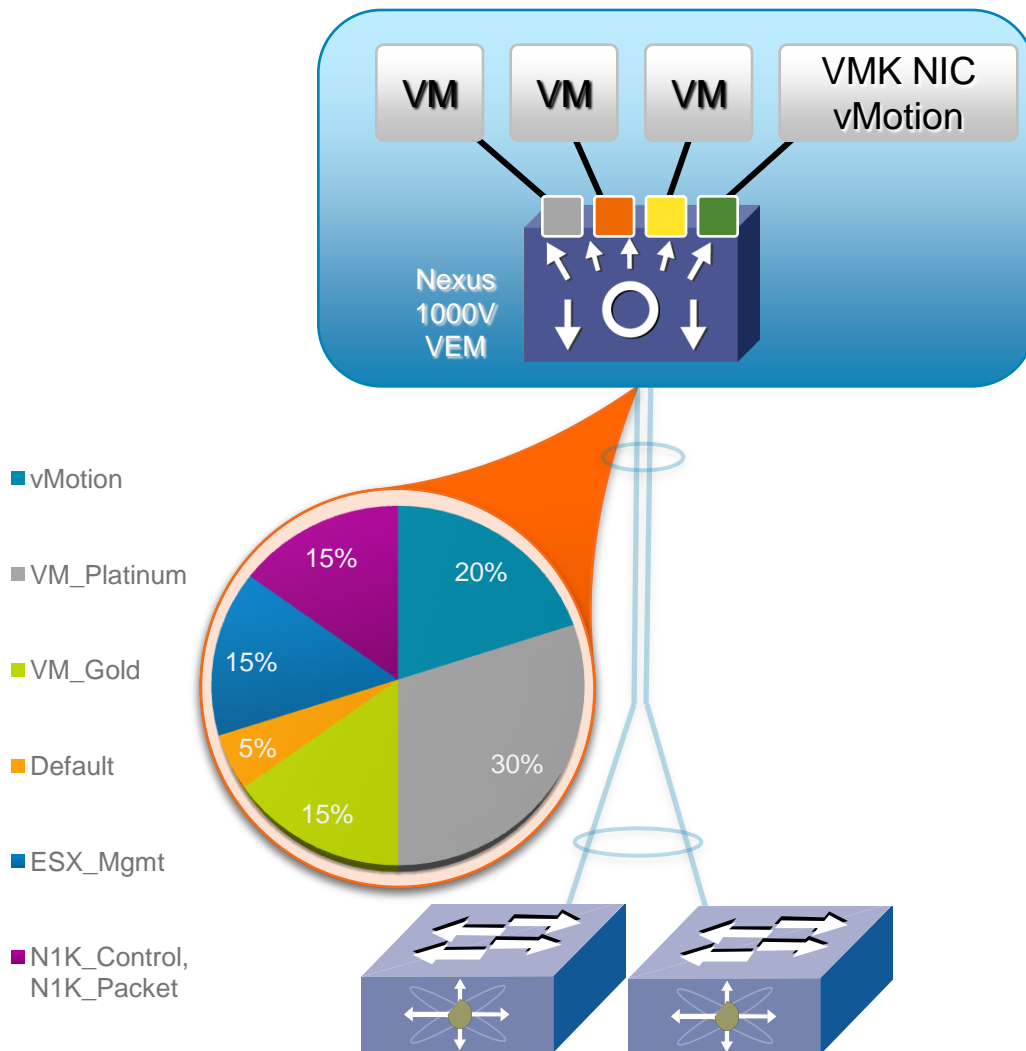
1000V Security Features for VDI

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

Reference Architectures:

- [1000V for VMware View](#)
- [1000V for Citrix XenDesktop](#)
- [1000V and VSG for VXI Reference Architecture](#)

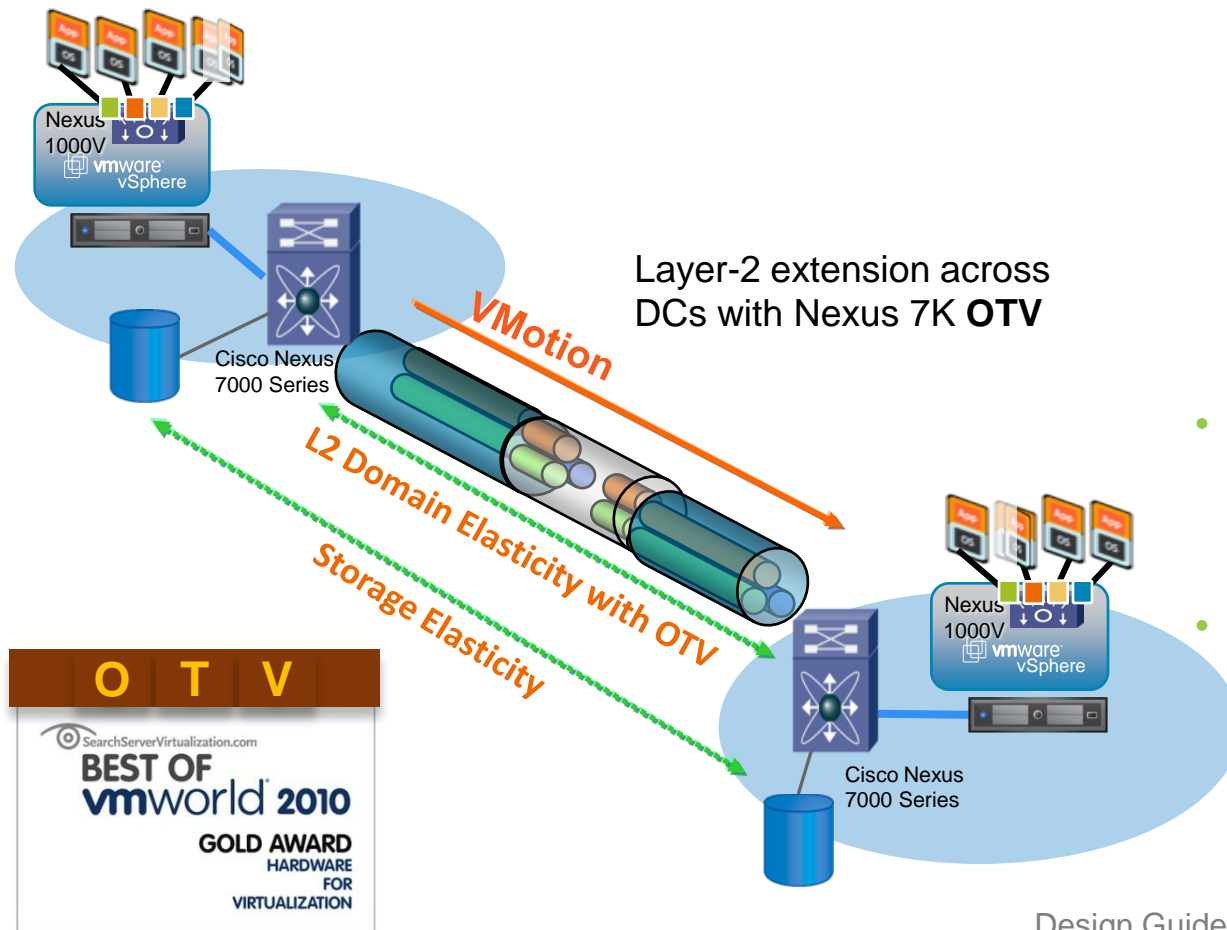
Quality of Service



- Class-based Weighted Fair Queuing (CB-WFQ)
- Provide bandwidth guarantee for up to 16 queues on uplinks
- User defined Queues
- 8 Predefined traffic classes
For VMware and 1000V protocol traffic
- Queuing configured via modular QoS CLI (MQC)

Long Distance vMotion across 2 DCs

Nexus innovations – virtual to physical



- 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
- VSG firewall enforcement continues to be applied

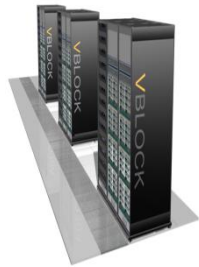
OTV: Overlay Transport Virtualization

Design Guides: Virtual Workload Mobility
(aka Long-distance vMotion)

[Cisco, VMware and EMC \(with 1000V and VSG\)](#)
[Cisco, VMware and NetApp \(with 1000V and VSG\)](#)

Nexus 1000V in Cisco Validated Solutions

Cisco's network-centric virtualized data center is best positioned to enable the journey to the networked cloud

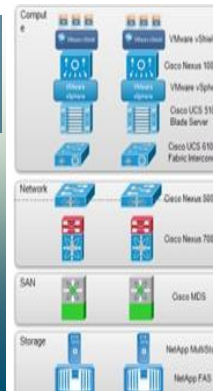


vBlocks

1000V
✓

Imagine:

30 racks reduced down to 3 racks
Provisioning applications in hours
instead of weeks



Virtual Multi-tenant DC (VMDC)

1000V
✓

Imagine:

Securely sharing servers between
multiple users/groups without
having to add another server



FlexPOD

1000V
1010
✓

Imagine:

Predesigned, validated, Flexible
infrastructure that can grow and
scale to meet cloud computing
requirements



Virtual Desktop

1000V
VSG
✓

Imagine:

Over 4000 desktops in a single rack!
Savings up to 60+% per PC per year
Significant savings in operations

Reference Solutions

Solution	Nexus 1000V	Nexus 1010	Virtual Security Gateway
vBlock	✓		
FlexPOD	✓	✓	
Virtual Desktop	✓	Implicit Support	✓
Virtual Multi-tenant DC (VMDC)	✓	Implicit support	
Long-distance vMotion	✓	Implicit support	✓
PCI 2.0	✓	Implicit support	✓

Nexus 1000V Interoperability with VMware

VMware Product	Nexus 1000V support
vSphere 4	☑
vSphere 5 (with stateless ESX)	☑*
VMware View	☑
VMware vCloud Director 1.0 (Port-group backed pools)	☑
VMware vCloud Director 1.5	☑**

* Release Available: July 2011

*** Extended support for
scalable network isolation
(beta: September 2011)

Integration with vCloud Director

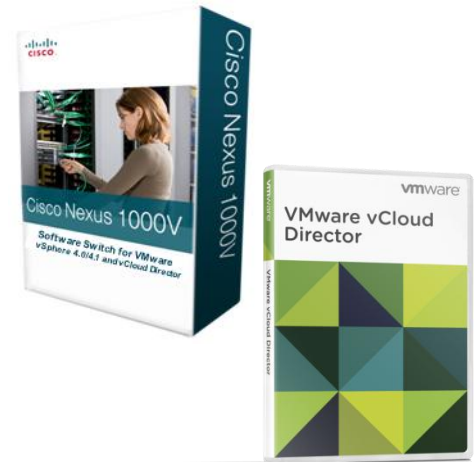
Joint Cisco/VMware Statement

■ Nexus 1000V

Currently integrated in vCloud Director

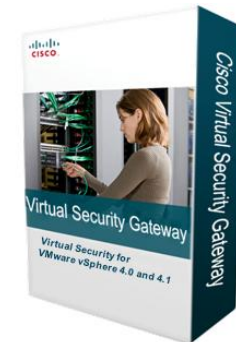
- Provides VLAN isolation with Portgroup-backed network pools

Cisco and VMWare consider Cisco Nexus 1000V an integral component of VMware's vSphere and vCloud product lines and are committed to delivering interoperable solutions for current and future versions of these products, including scalable network segmentation technologies.



■ Virtual Security Gateway

Cisco and VMware are partnering to integrate Cisco Virtual Security Gateway into VMware vCloud Director, leveraging the points of integration that vShield Manager provides.



Cisco Nexus 1000V

Software-Based NX-OS switch

Market Momentum

Introduced in 2009; now shipping Release 1.4

3000+ customers world-wide

Customers purchasing 1000+ CPU licenses

Built on Cisco NX-OS

IEEE 802.1Q standards based

Network team manages virtual and physical networks

Feature and operational consistency

Advanced switching features

vPath intelligence for virtual network services

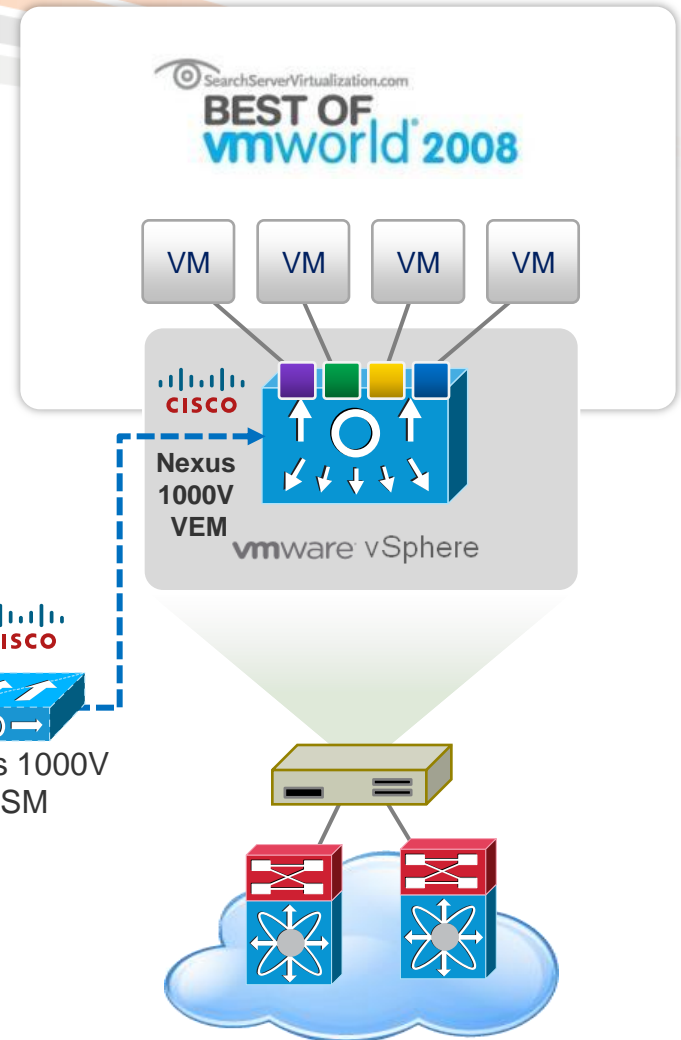
Maximum compatibility

Interoperates with any upstream .1Q Ethernet switch

Deployable on all servers running VMware vSphere

Supports VMware HW Compatibility List (HCL)

Interoperates with VMware vCloud Director



Policy-Based
VM Connectivity

Mobility of Network and
Security Properties

Non-Disruptive
Operational Model

Learn. Connect.
Collaborate. *together.*

Virtual Network Services

Data Center Business Advantage

New Architectural Framework: Cisco Data Center Business Advantage



Unified Fabric

- Nexus 1000V
- Nexus 5K/2K
- Nexus 7K



Unified Network Services

- **Virtual Security Gateway**
- **Virtual WAAS**

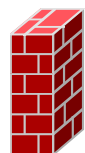


Unified Computing

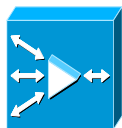
- Unified Compute System

Virtualization and Cloud Driving New Requirements in Data Center

Traditional Data Center



FW



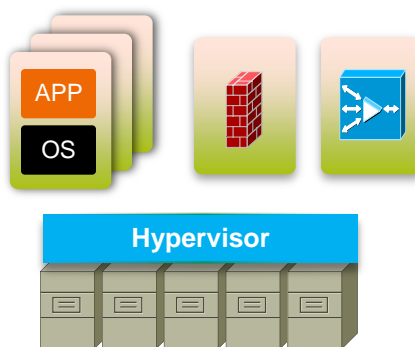
WAN
Opt



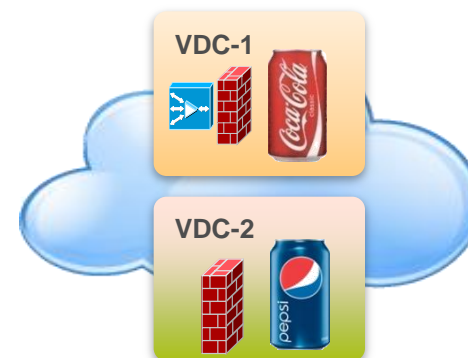
ADC/
SLB

- Application-specific services
- Form factors:
 - Appliance
 - Switch module

Virtual/Cloud Data Center



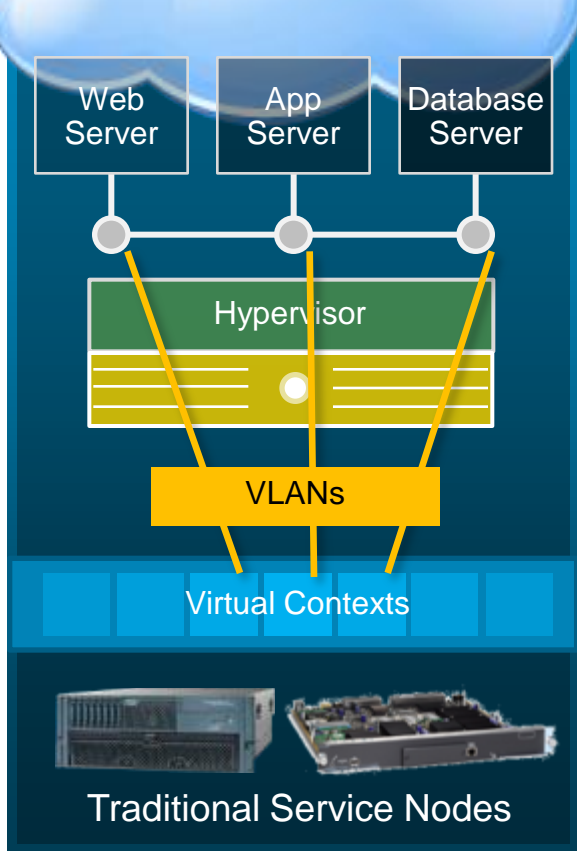
Virtual
Service
Node
(VSN)



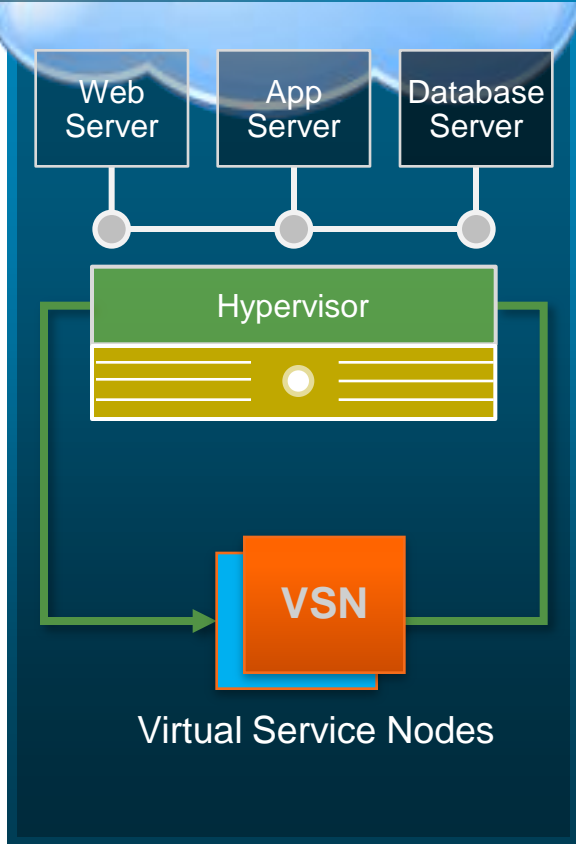
- Virtual appliance form factor
- Dynamic instantiation/provisioning
- Service transparent to VM mobility
- Support scale-out
- Large scale multitenant operation

Deployment options for Virtual Services

1 Redirect VM traffic via VLANs to external (dedicated) service node




2 Apply hypervisor-based Virtual Service Node (VSN)



Virtual Services: Products

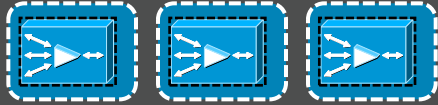
Virtual Security Gateway (VSG)
On Nexus 1000V



Virtual Network Management Center (VNMC)




Virtual WAAS



ESX ESXi Hypervisor
w/ Nexus 1000V

UCS /x86 Servers



vPath
Nexus 1000V

vPath: Fabric Intelligence for Virtual services

- Traffic interception/redirection, Fast-path off-load

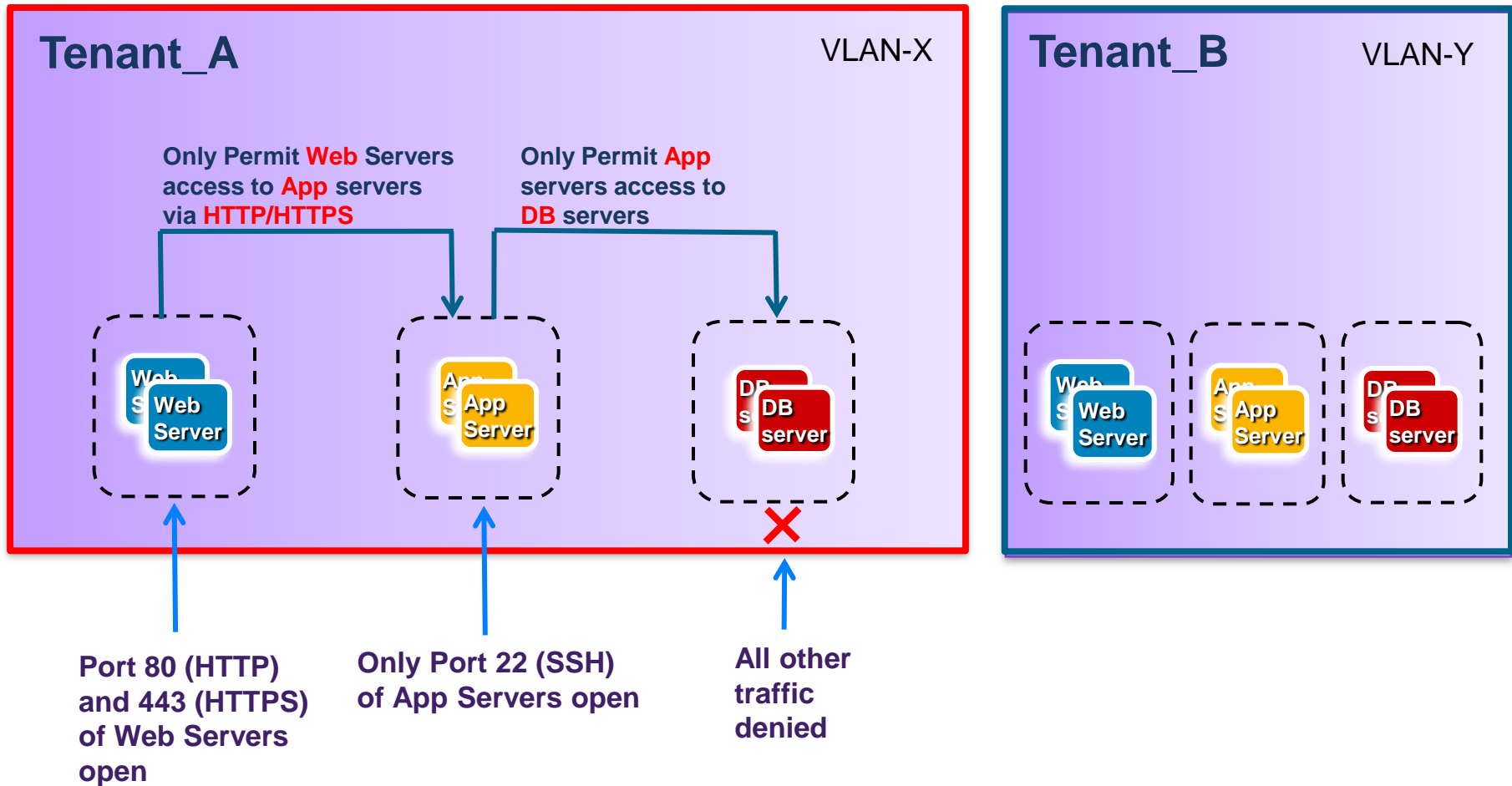
Learn. Connect.
Collaborate. *together.*

Virtual Security Gateway (VSG)

Virtualization & Security

- Broad based DC virtualization & workloads moving to cloud
 - Lower cost, Agility, Scale-out
- Workloads of varied risk profiles share the same compute infrastructure
 - 3-tier applications, QA/Dev, HR, Finance
 - Unified Communications
 - Virtual Desktop
 - 3rd Party Administrative Access
 - DMZ, Extranet, ...
- Increasing interest in Virtual Private Clouds
- How to:
 - Meet regulatory compliance, Audit needs
 - Ensure non-disruptive administration

Example Use Case: 3-tier Server Zones



Introducing Virtual Security Gateway

Virtual Security Gateway (VSG)



Context aware Security

VM context aware rules

Zone based Controls

Establish zones of trust

Dynamic, Agile

Policies follow vMotion

Best-in-class Architecture

Efficient, Fast, Scale-out SW
(with Nexus 1000V vPath)

Virtual Network Management Center (VNMC)



Non-Disruptive Operations

Security team manages security

Policy Based Administration

Central mgmt, scalable deployment, multi-tenancy

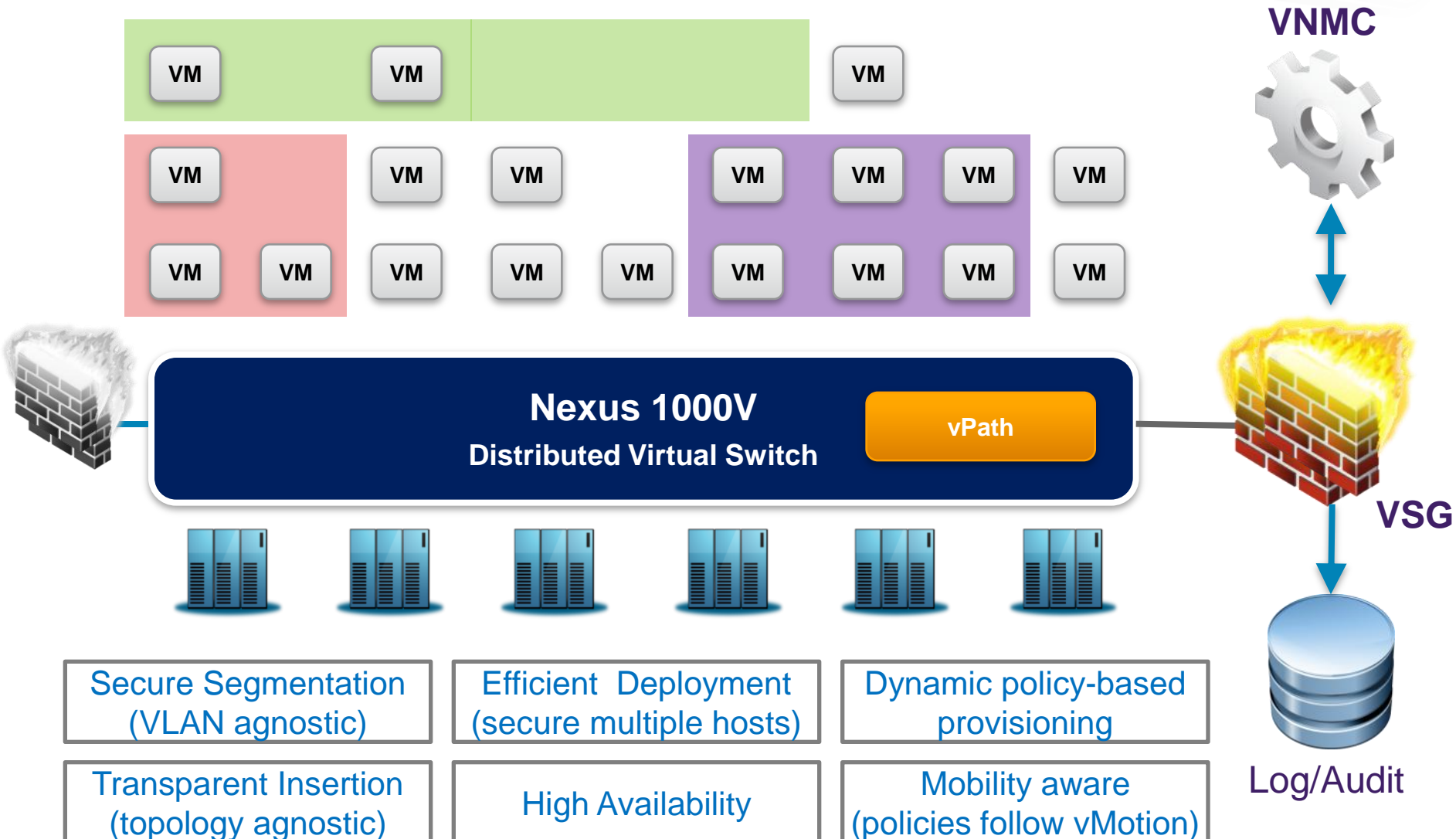
Designed for Automation

XML API, security profiles

IPv6 Support: VSG/VNMC support IPv4 packets in Phase 1. Security rules based on Ethertype can be deployed to permit or deny IPv6 packets.

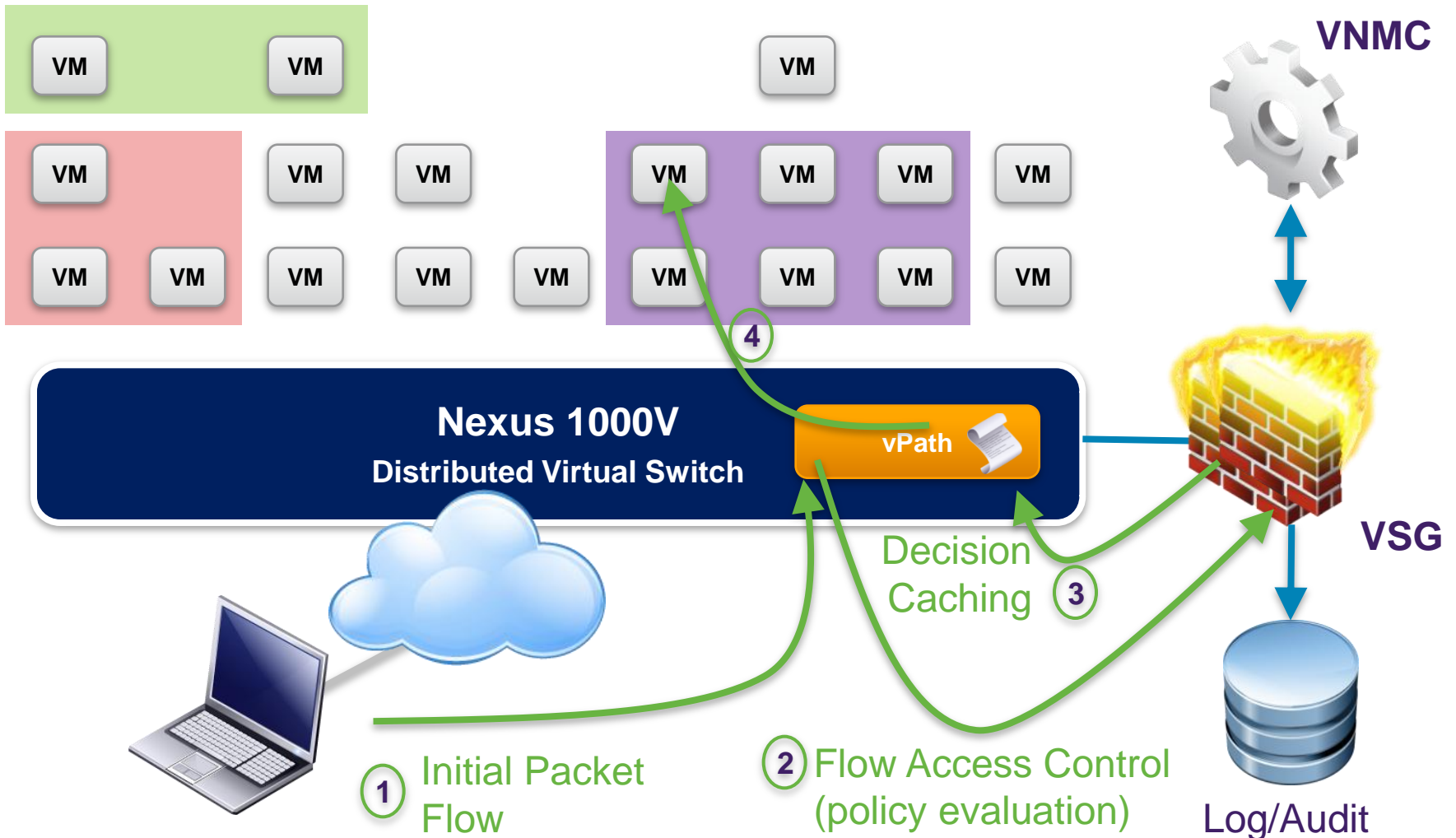
Virtual Security Gateway

Logical deployment like physical appliances

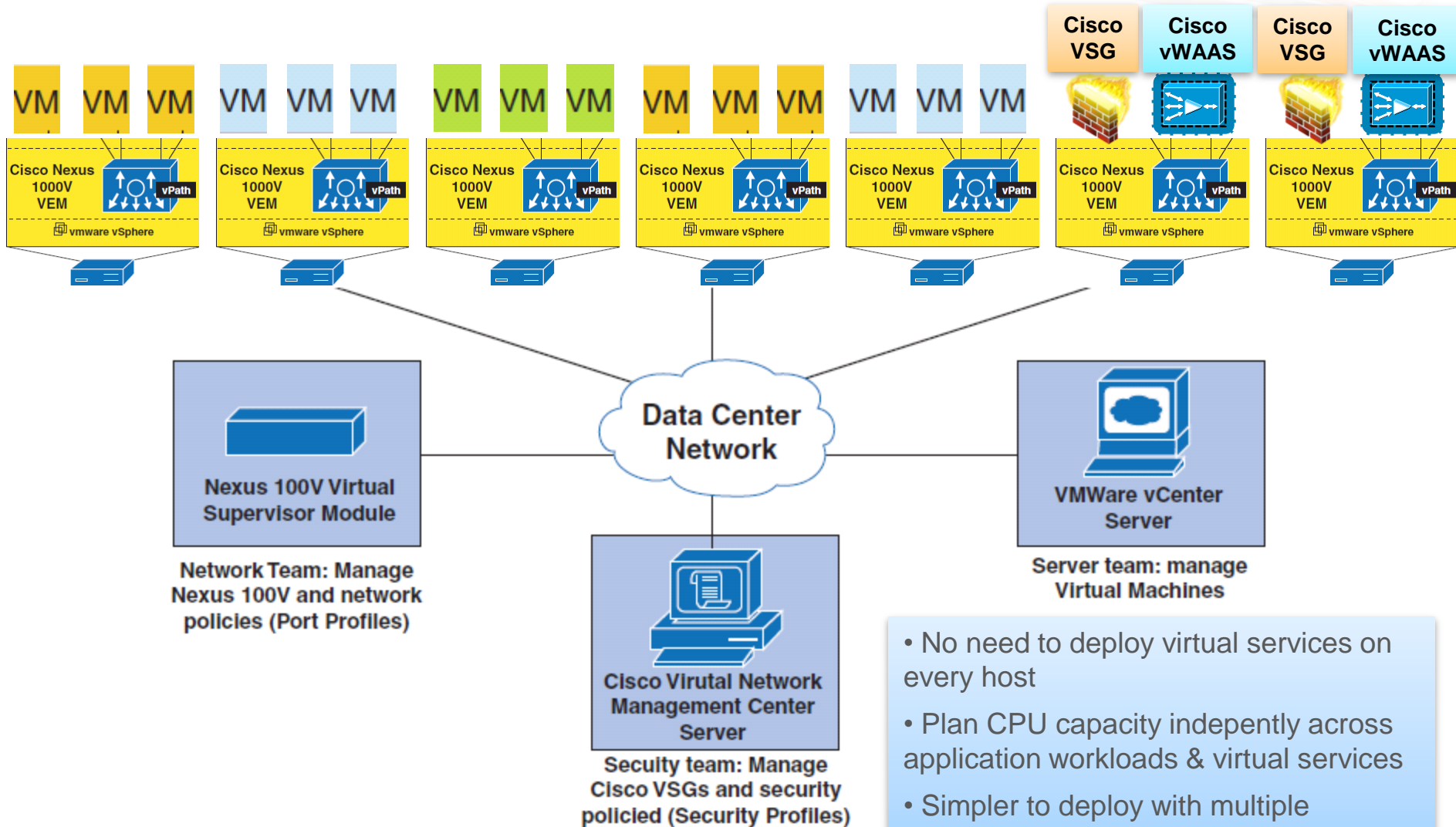


Virtual Security Gateway

Intelligent Traffic Steering with vPath



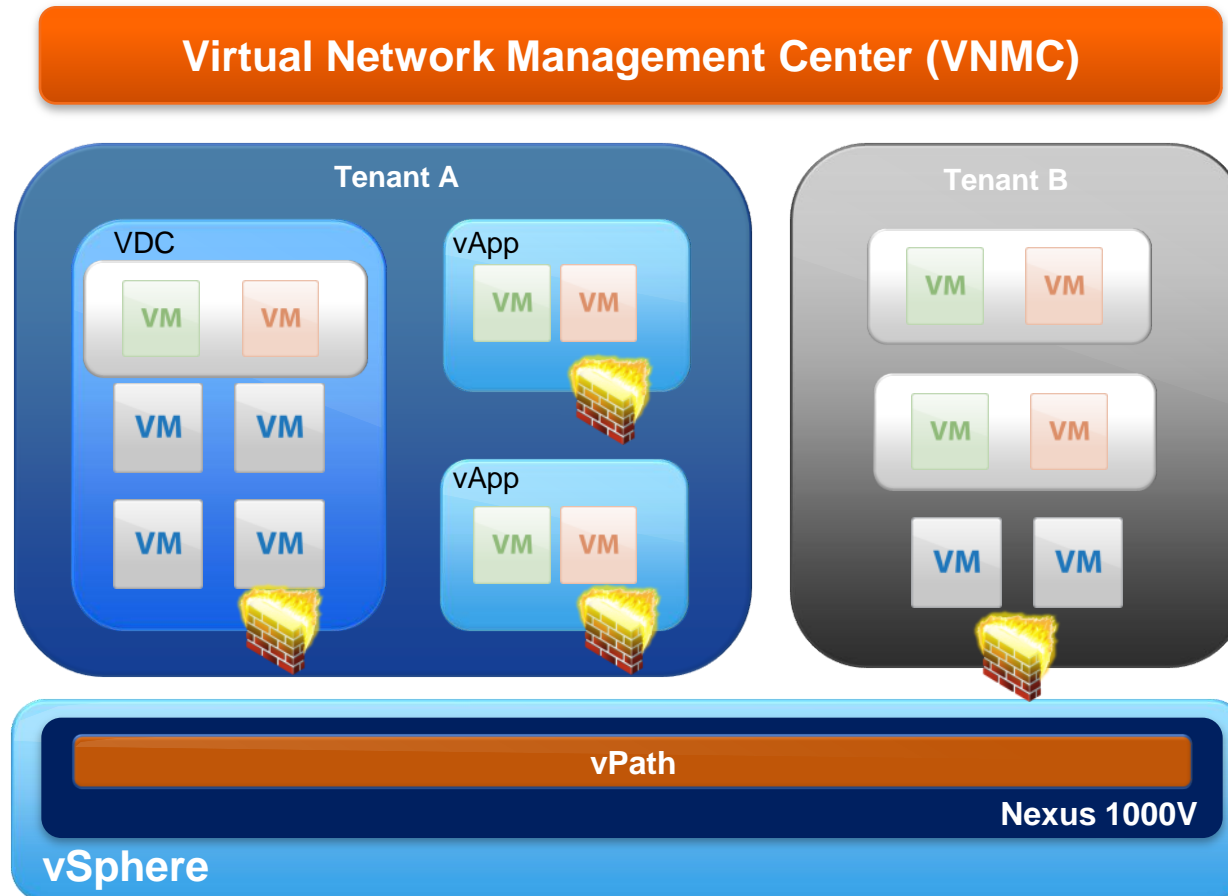
Decoupled Deployment across Applications & Virtual Services



- No need to deploy virtual services on every host
- Plan CPU capacity independently across application workloads & virtual services
- Simpler to deploy with multiple operations teams (server, network, security, etc.)

Apply Security at Multiple Levels

Enables multi-tenant scale-out deployment



Specify zoning policy with the appropriate granularity

- Tenant, VDC, vApp

Define Condition for Rules

Add Add Destination Condition

Attribute Type: **Attribute Type**

- Network
- VM
- Custom

Expression

Attribute Name: Operator: Attribute Value:

VM Attributes

- Instance Name
- Guest OS full name
- Zone Name
- Parent App Name
- Port Profile Name
- Cluster Name
- Hypervisor Name

Network Attributes

- IP Address
- Network Port

Operator

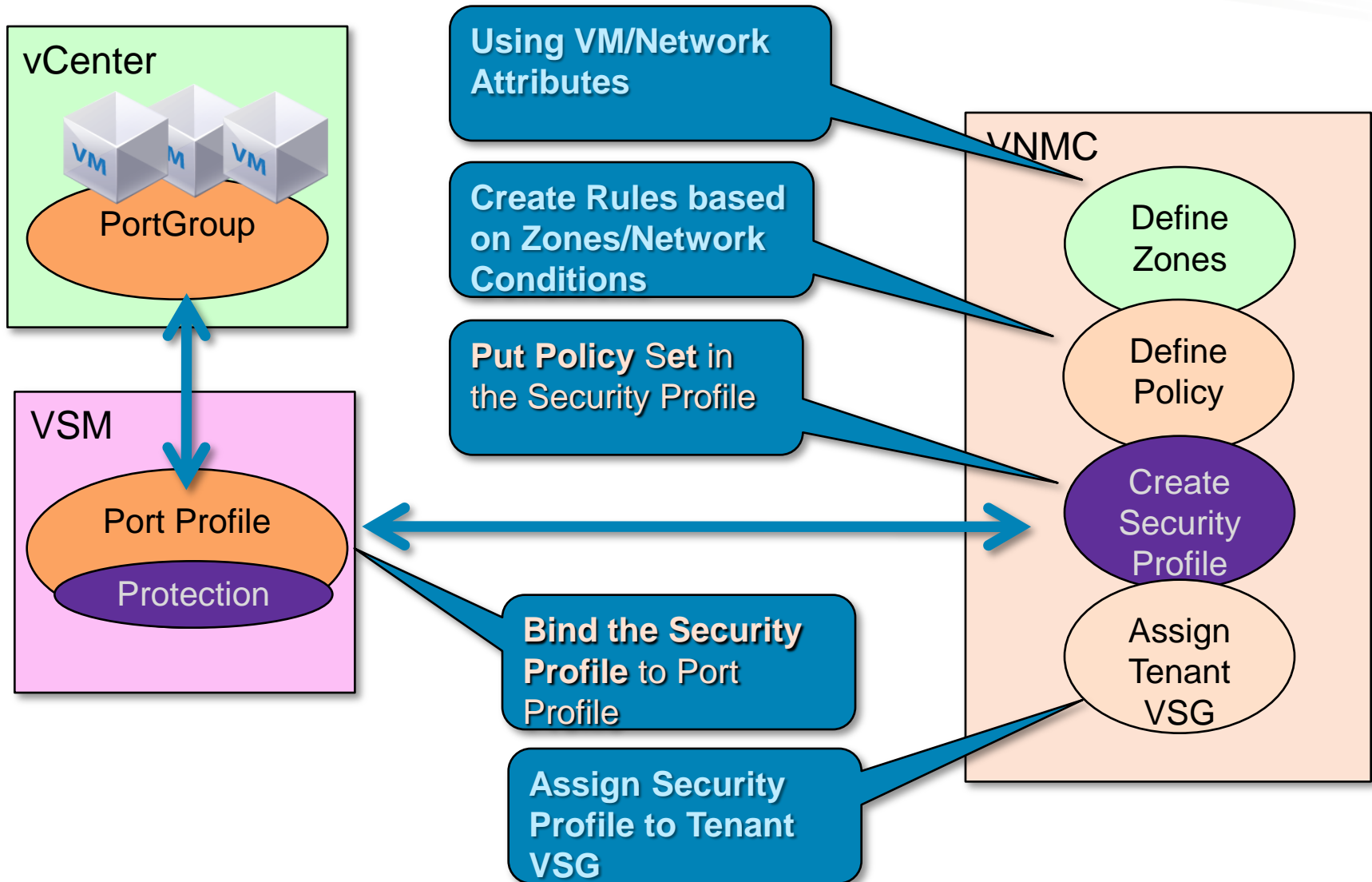
- eq
- neq
- gt
- lt
- range
- Not-in-range
- Prefix

Operator

- member
- Not-member
- Contains

OK Cancel

VSG Policy Provisioning Logical Flow



Binding VSG Security Profile with 1000V Port-Profile

The screenshot displays the Cisco Virtual Network Management Center (VNC) interface. On the left, a navigation tree shows the hierarchy: Firewall Policy > Security Profile > root > Security Profiles > Contractor > Security Profiles. The 'SecureContractors' profile is highlighted. The main panel shows the 'Security Profiles' configuration page with the 'General' tab selected. A table lists the profile 'SecureContractors'. A terminal window on the right shows the configuration of a vethernet contractor:

```
org root/Contractor
vn-service ip-address 192.168.173.42 vlan 20 security-profile SecureContractor
no shutdown
state enabled

N11# sh run port-profile contractor
!Command: show running-config port-profile contractor
!Time: Thu Jan 6 19:24:38 2011

version 4.2(1)SV1(4)
port-profile type vethernet contractor
vmware port-group
switchport access vlan 10
switchport mode access
org root/Contractor
vn-service ip-address 192.168.173.42 vlan 20 security-profile SecureContractors
no shutdown
state enabled

N11#
```

Yellow circles highlight 'SecureContractors' in the table and the terminal output. A green arrow points from the terminal output to the table entry.

Virtual Network Management Center (VNMC)

Simple yet powerful virtual security management

Virtual Network Management Center

Scalable

Multi Tenant

Different Customers, different needs

Stateless

Security Profiles

Simple, policy based security config

Expandable

XML API

3rd party integration ready

Partitionable

Integrated

Role Based Access Controls

Different users, different privileges, LDAP/AD AuthN

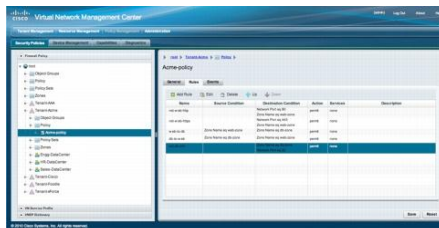
Automated

Nexus 1000V & vCenter

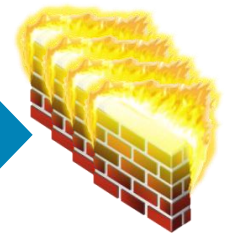
Port profiles refer to security profiles

Dynamic provisioning

One stop configuration of network & security

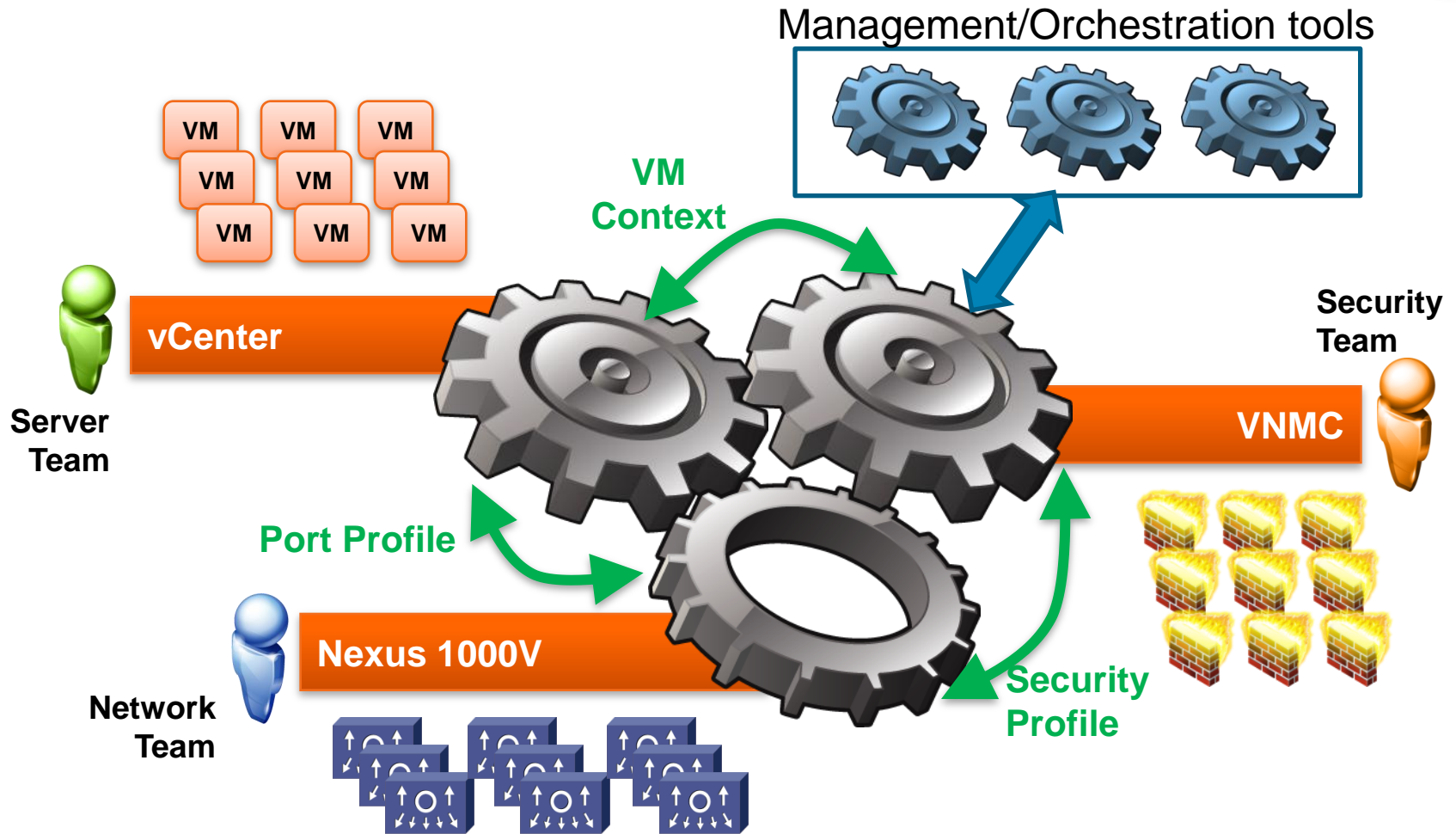


VNMC GUI

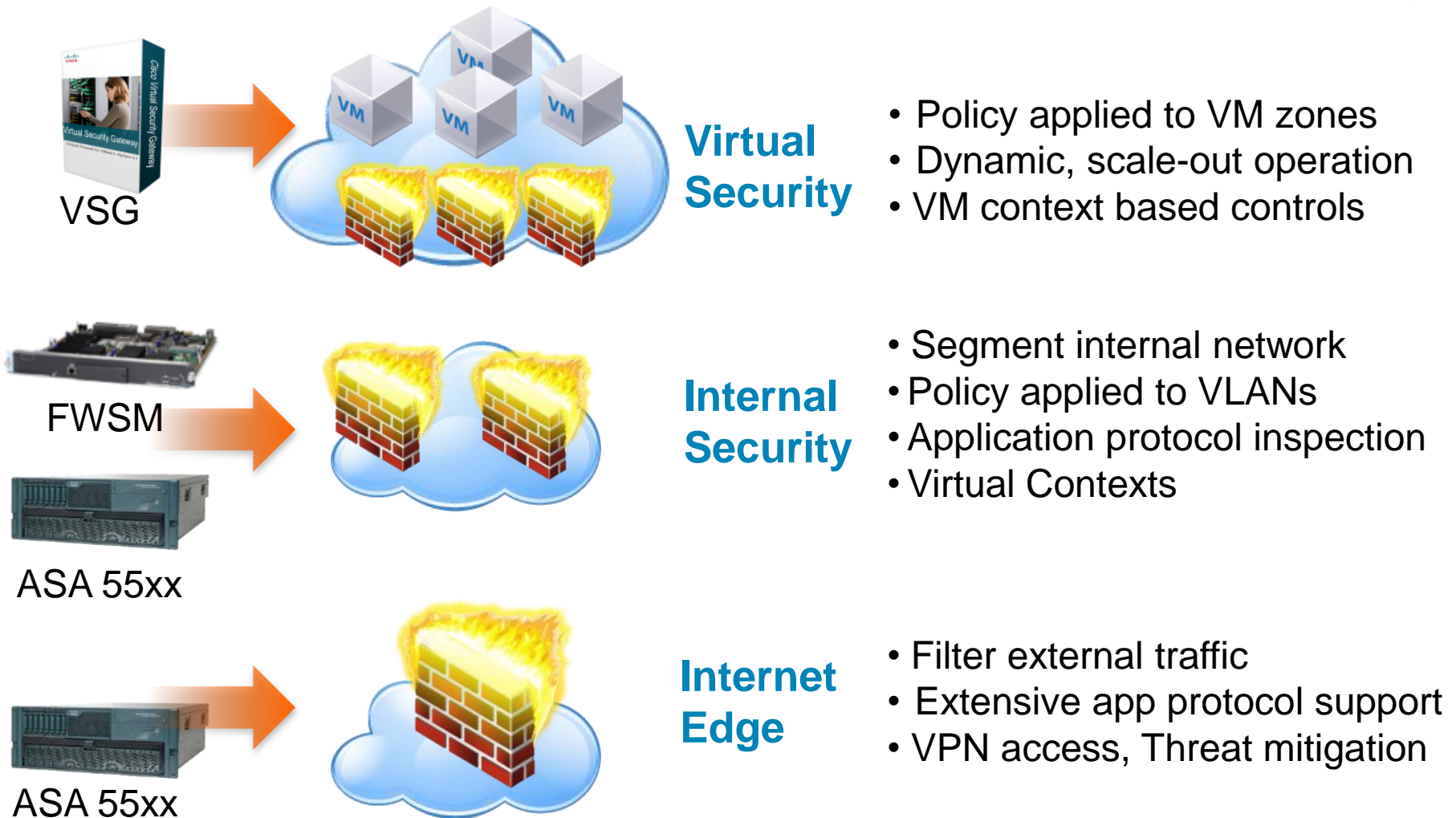


Virtual Security Gateway

VNMC – Architected for Integrated & Automated Management



Defense in Depth Security Model

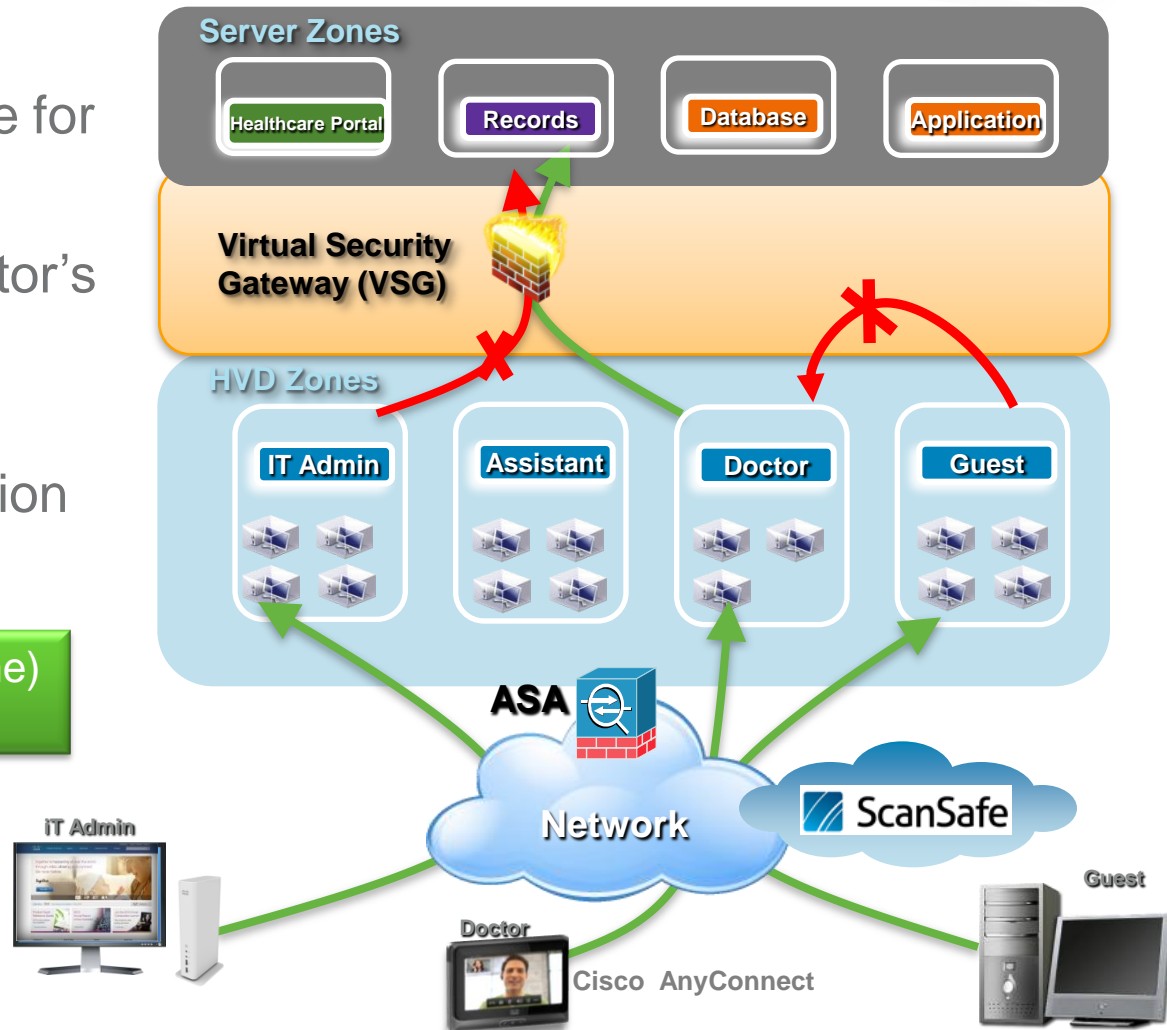


Use Case 1

Securing VDI with Cisco VSG

- Persistent virtual workspace for the doctor
- Flexible workspace for Doctor's assistant
- Maintain compliance while supporting IT consumerization

Leverage VM context (eg VM-name) to create VSG security policies

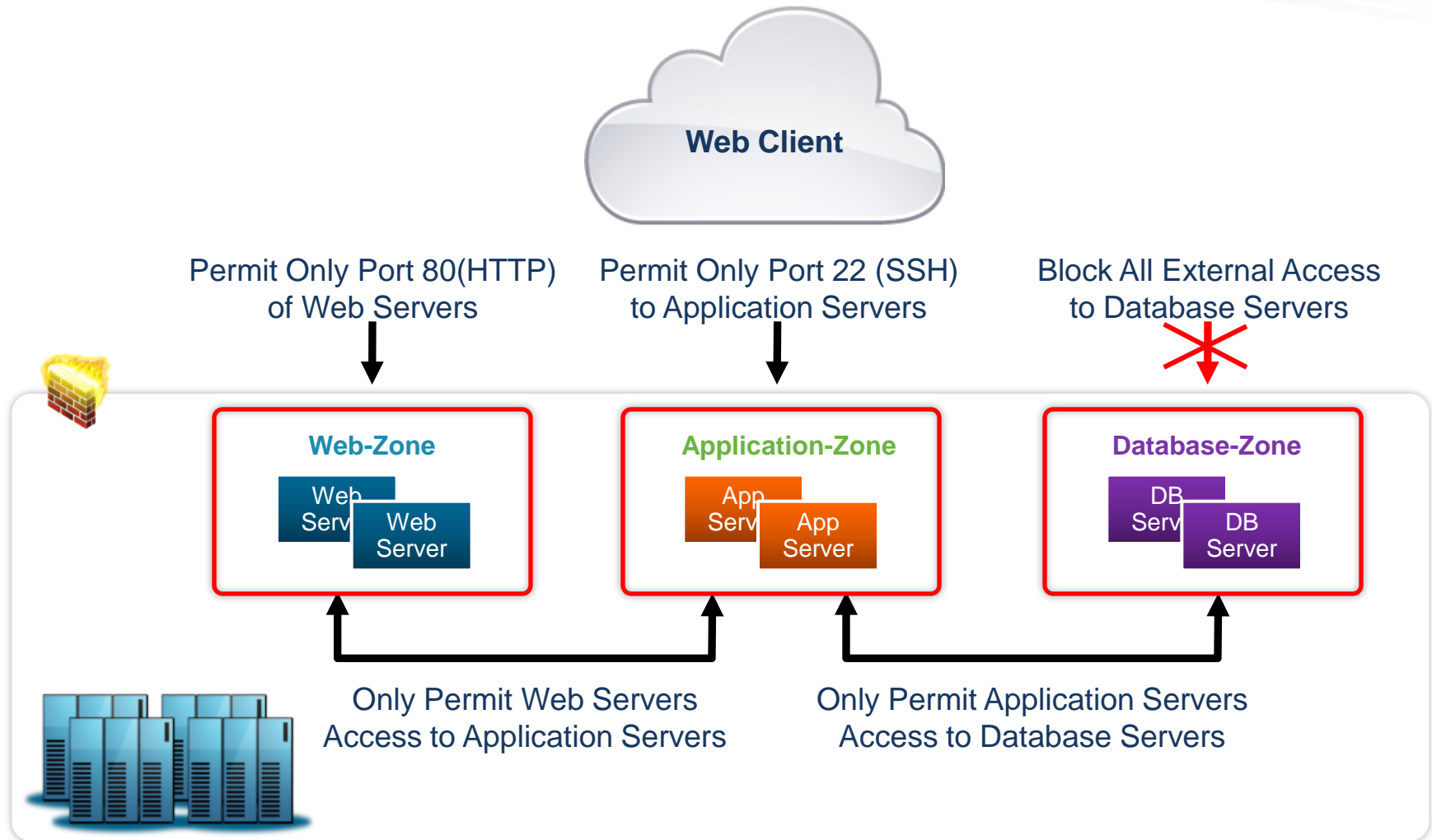


Reference Architecture:

- [1000V and VSG in VXI Reference Architecture](#)

Use Case 2

Securing a 3-tier Application Infrastructure



Use Case 3

CareCore National

Customer Challenge

- Secure traffic between different VM zones in a shared work-load environment
- Multi-tenant aware solution
- Maintain administrative responsibility with Security teams providing security policies

Cisco Solution

- Secure zones created using VM attributes (not VLANs)
- Cisco VSG installed to protect VMs across multiple physical servers
- Deployed in HA pair

Results & Impact

- Training Apps – isolated from other apps
- Enable secure zoning without VLAN configurations & VLAN proliferation



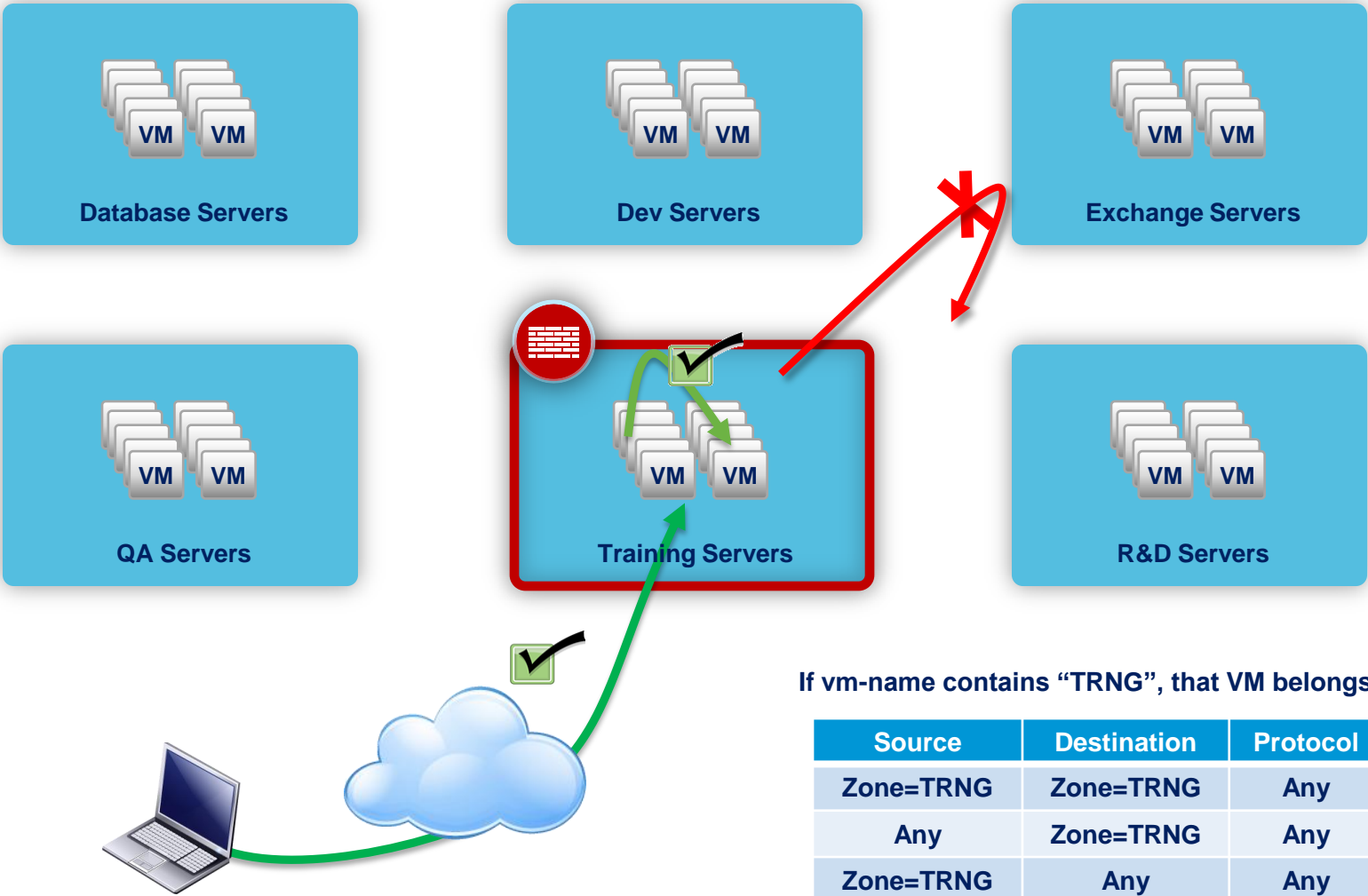
“Cisco’s Virtual Security Gateway not only met our virtual security needs, but with its VM-aware rule engine, allowed us to re-think the way we write security policies.”

William Moore,
EVP, CTO



Use case 3 (cont)

Secure zoning using VM attribute

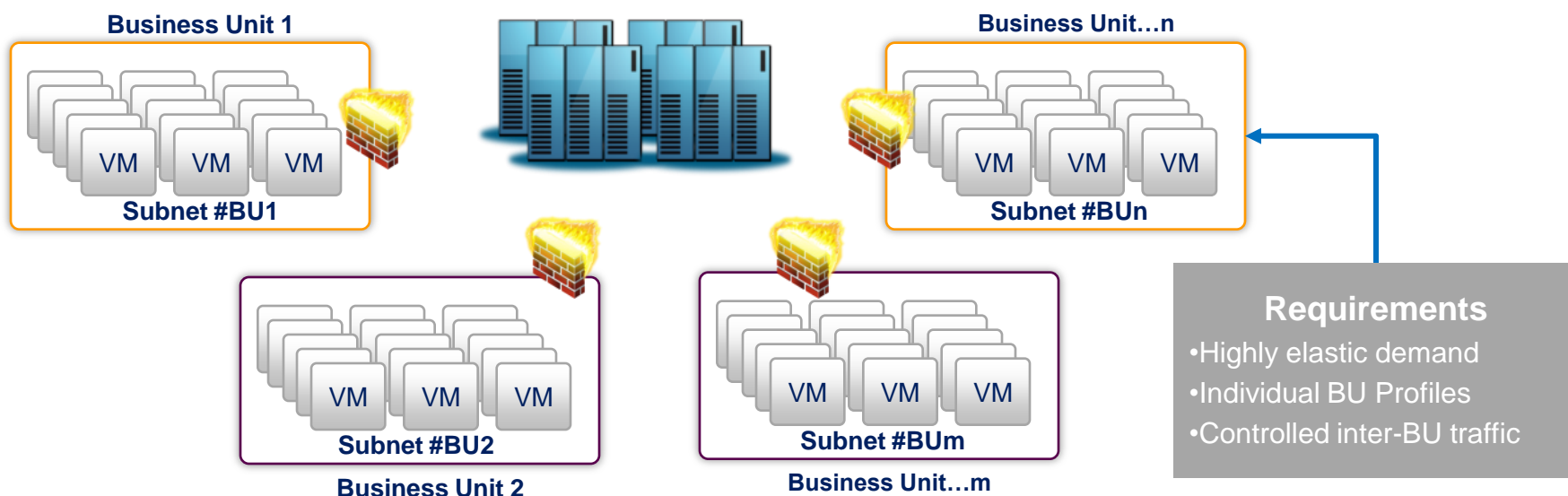


If vm-name contains "TRNG", that VM belongs to TRNG zone

Source	Destination	Protocol	Action
Zone=TRNG	Zone=TRNG	Any	Permit
Any	Zone=TRNG	Any	Permit
Zone=TRNG	Any	Any	Drop

Use Case 4

Secure Multi-tenant Environment



Prior to VSG

- Under-utilization of IP-subnets
- Thousands of ACL entries
- BUs don't have admin. control
- Centralized chg mgmt with lot of administrative over-head

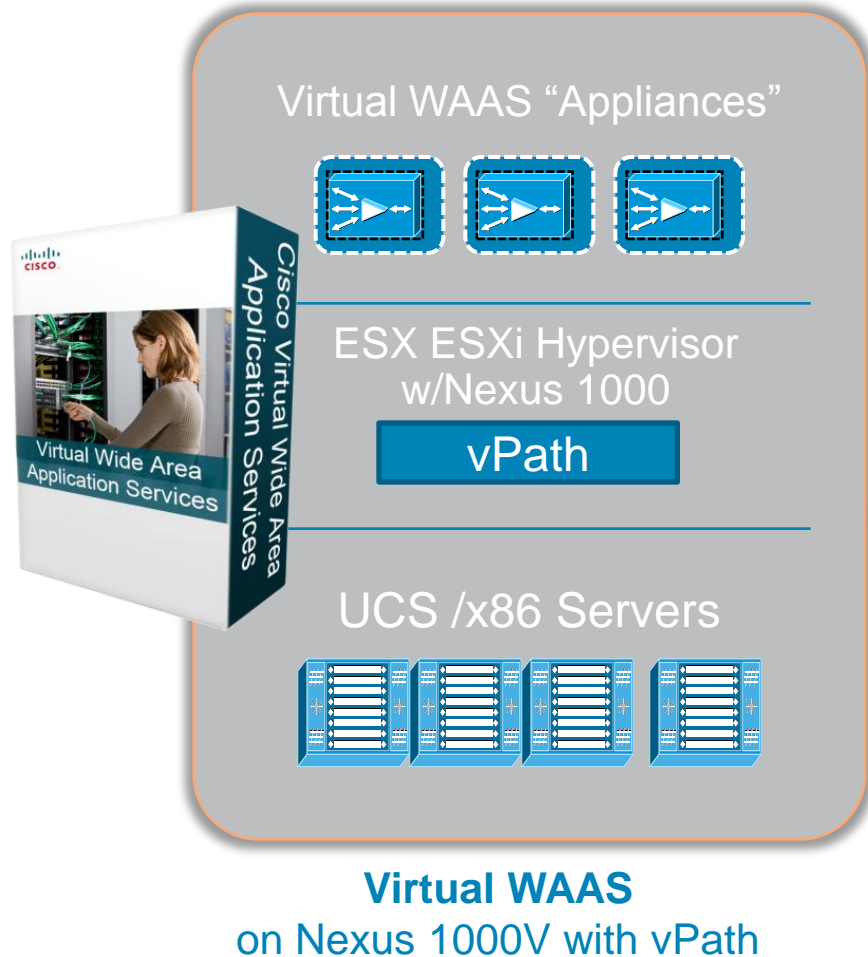
With VSG

- No need for ip-subnetting/VLANs
- Simple rules with zone attributes
- Each BU defines their policies
- Simplified change management process with reduced over-head

Virtual WAAS

Introducing: Cisco Virtual WAAS

Cloud-ready WAN Optimization



FEATURES

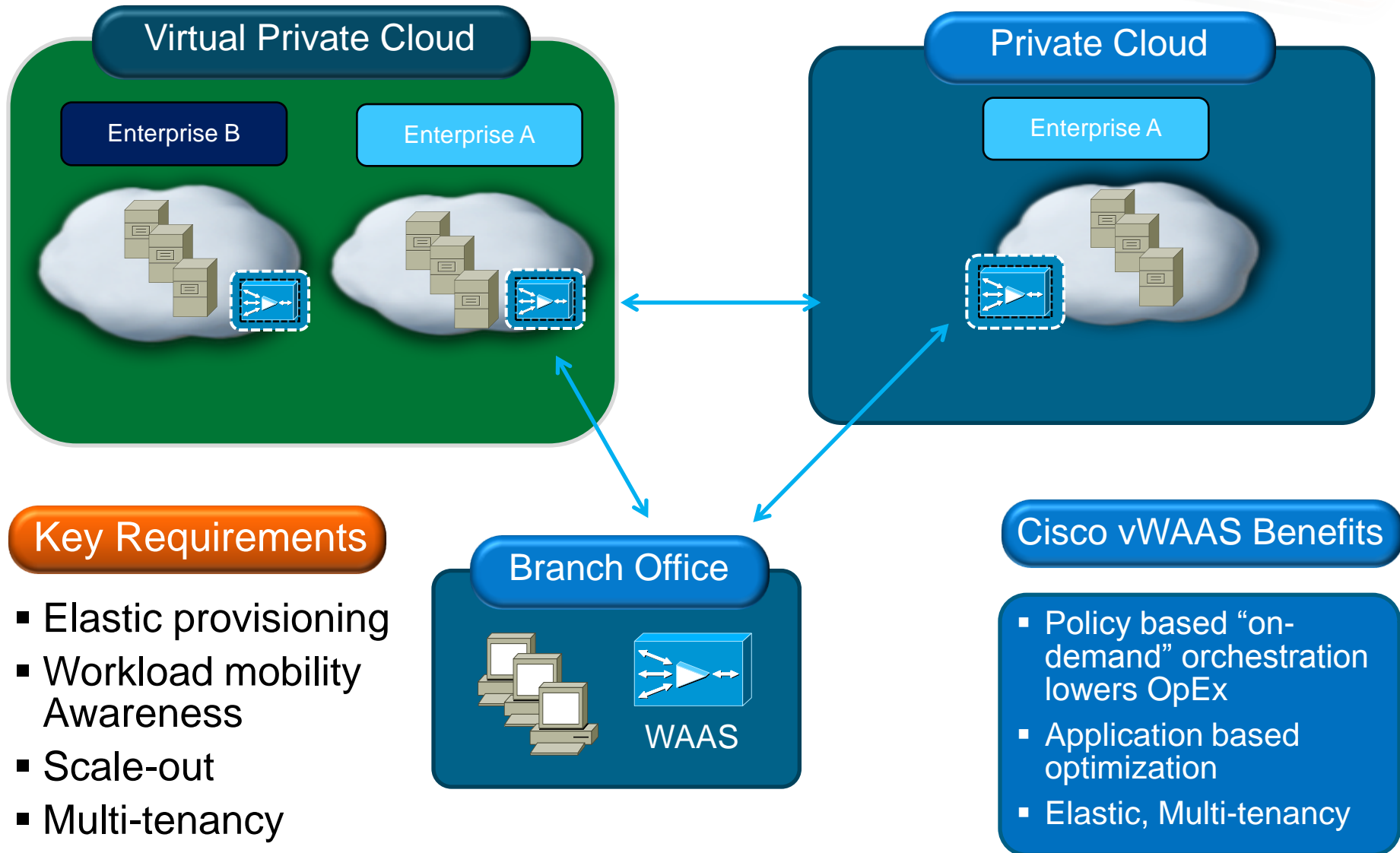
- Allows Agile, Elastic, & Multi Tenant Deployment
- Supports DRE Cache in SAN
- Policy-based Provisioning w/ Nexus 1000V
- Extends WAAS Solution Portfolio

BUSINESS BENEFITS

- Business Agility with on-demand orchestration
- Lower operational cost, reduced migration risk
- Fault-tolerance with VM mobility awareness

Cisco vWAAS Accelerates Cloud Deployment

Accelerate cloud-bursting, workload mobility, virtualized deployment



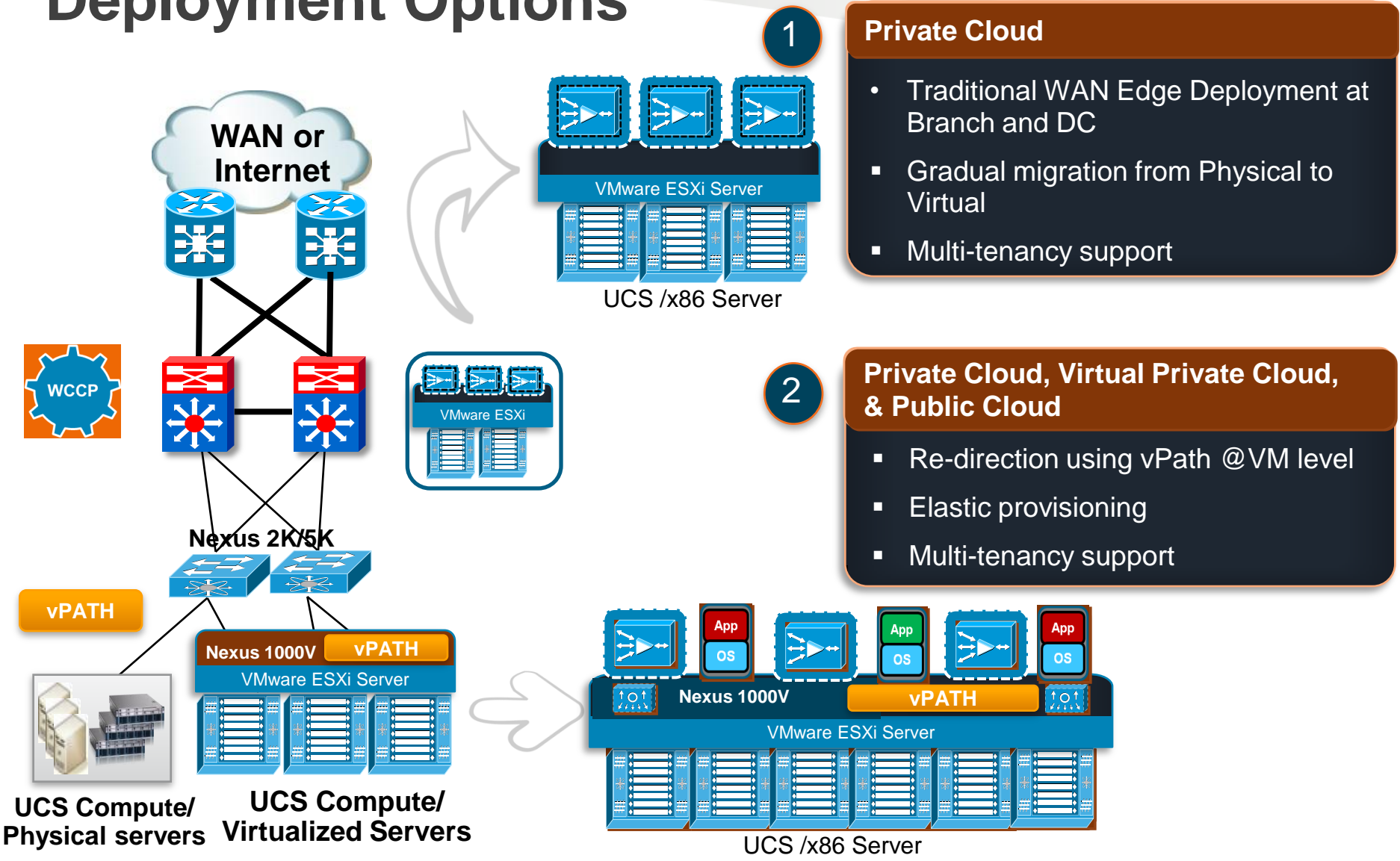
Key Requirements

- Elastic provisioning
- Workload mobility Awareness
- Scale-out
- Multi-tenancy

Cisco vWAAS Benefits

- Policy based "on-demand" orchestration lowers OpEx
- Application based optimization
- Elastic, Multi-tenancy

Cisco vWAAS Provides Flexible Cloud Deployment Options



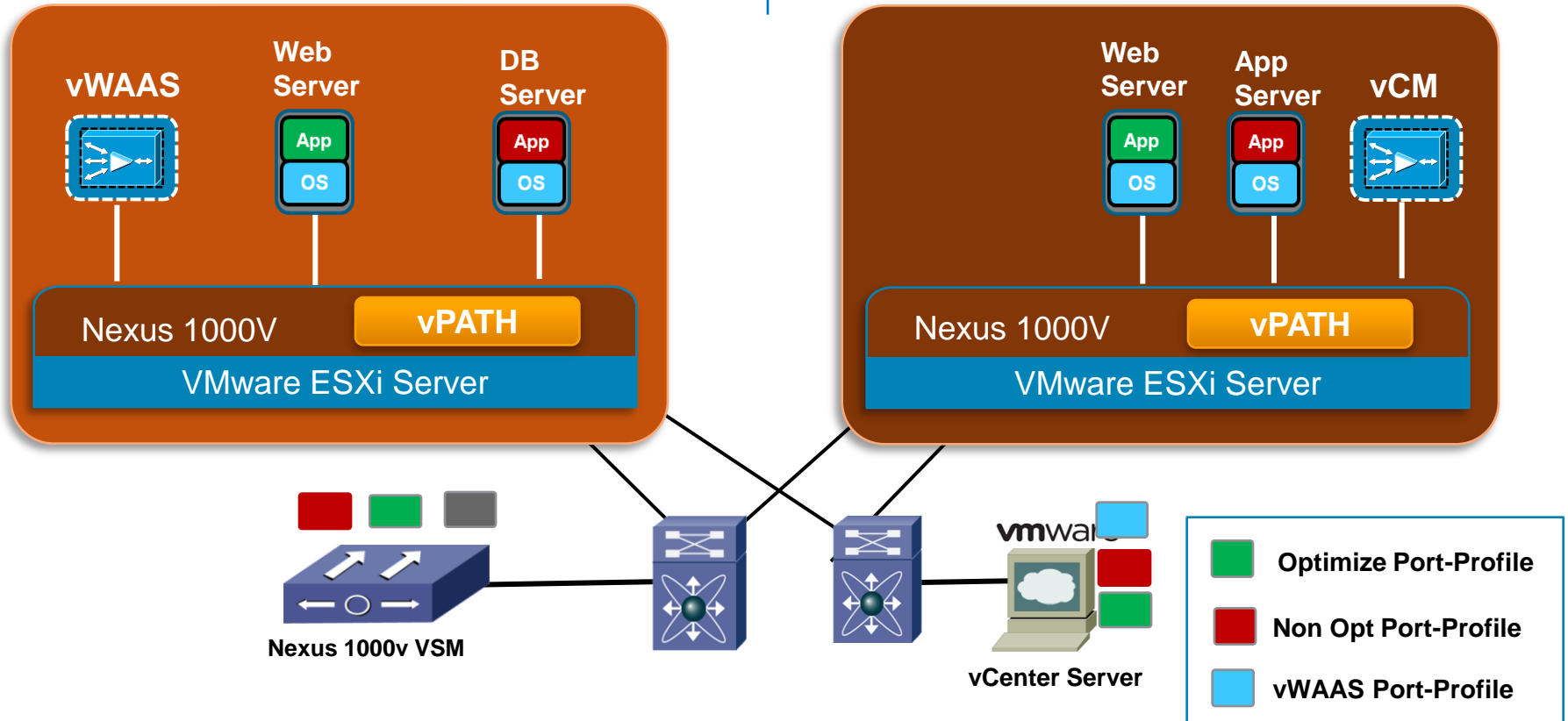
vWAAS – Policy Based configuration in N1000V

Feature

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

Benefit

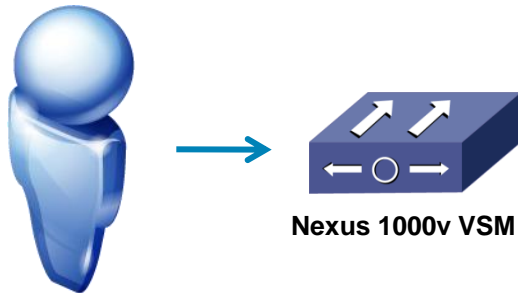
- 1. Provide on-demand service orchestration in the cloud without network disruption



vWAAS – Application based interception



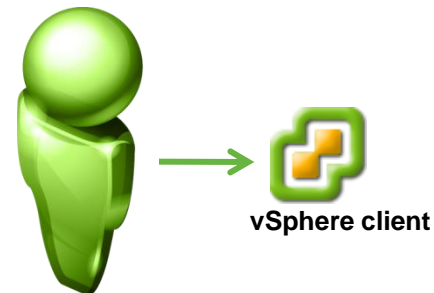
Network Admin view



```
port-profile type vethernet Opt-Exchange-Server
vmware port-group
switchport mode access
switchport access vlan 3185
vn-service ip-address 2.8.2.90 vlan 3002 mgmt-ip-address 2.8.2.90 fail open
no shutdown
state enabled
```

vPATH interception

Server Admin view



Attach Opt-port-profile to server VMs

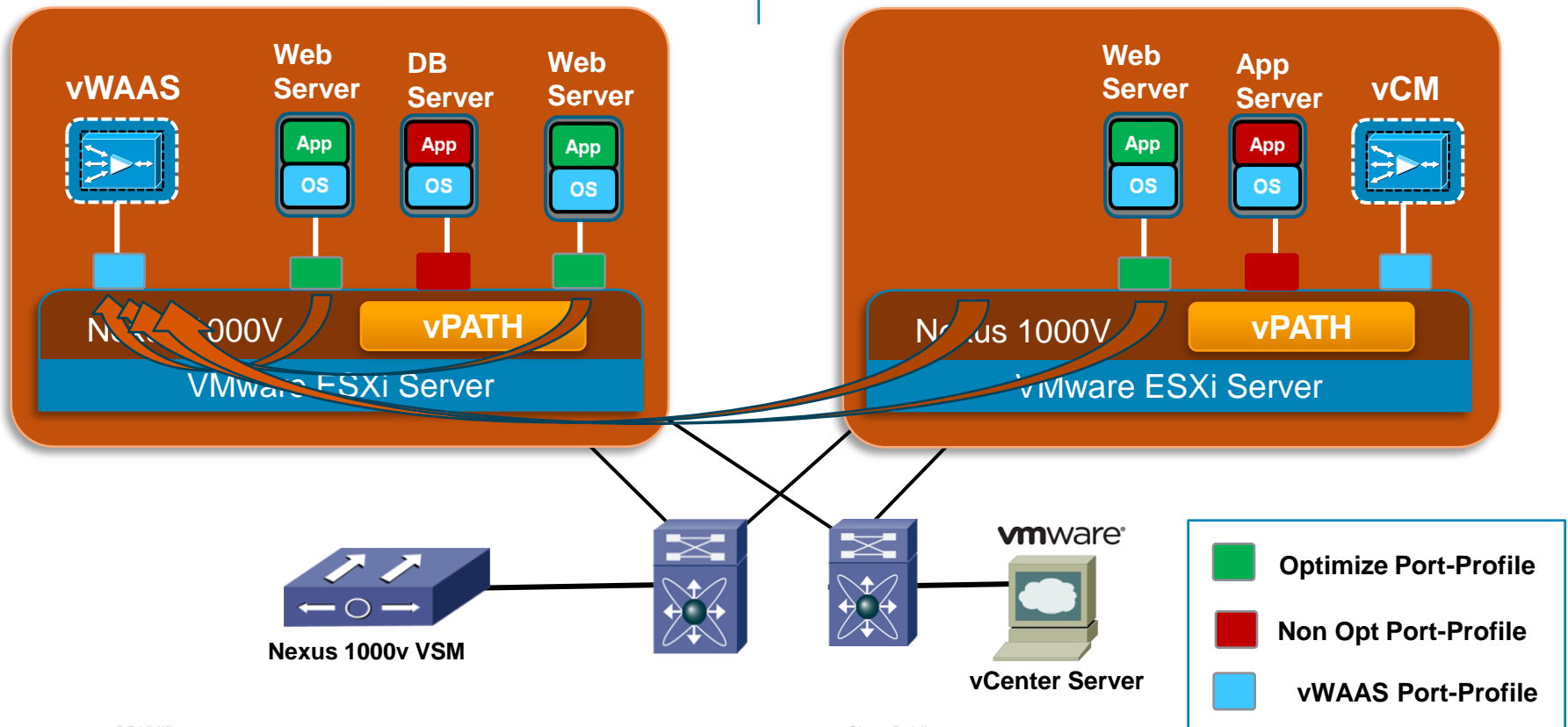
vWAAS – VM mobility awareness

Feature

1. vPATH aware of movement of VM from one host to another.
2. Traffic interception continue to work as-is without any disruption or changes required.

Benefit

1. No disruption in WAN optimization service if VM moves from one host to another.
2. Support VMware resources scheduling (DRS) and provides High availability



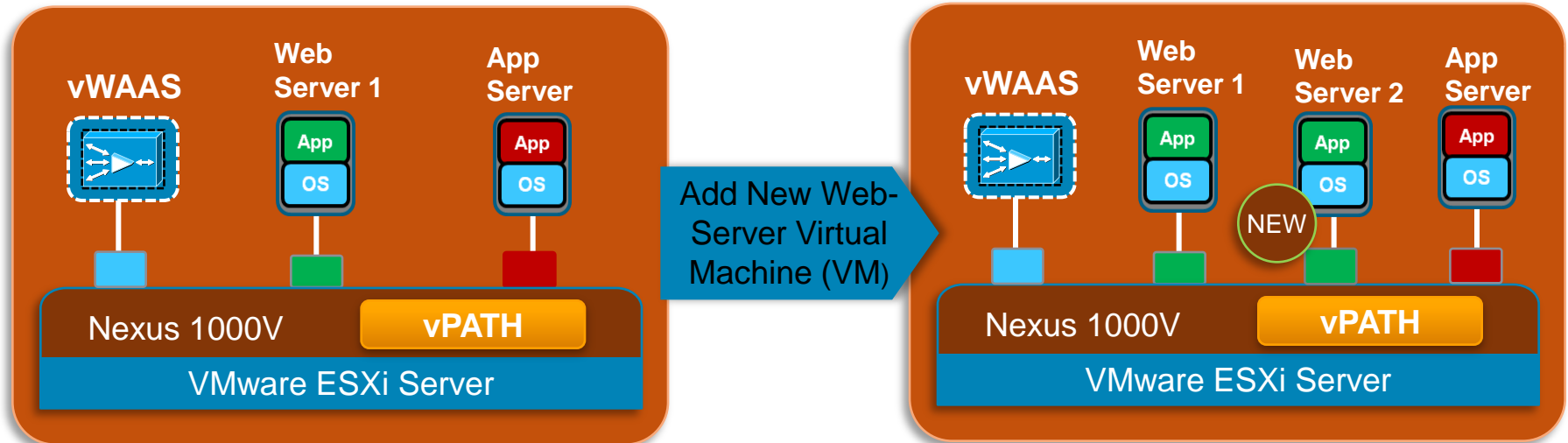
vWAAS – Architected for Elastic Workloads

Feature

1. Automatic application of vWAAS service when a new 'Web Server' VM gets provisioned
2. vWAAS services associated with 'Web server' VMs using Nexus 1000V policies.

Benefit

1. Elastic vWAAS deployment
2. Scale-out Virtual Web Server farm by provisioning additional VMs while applying WAN optimization



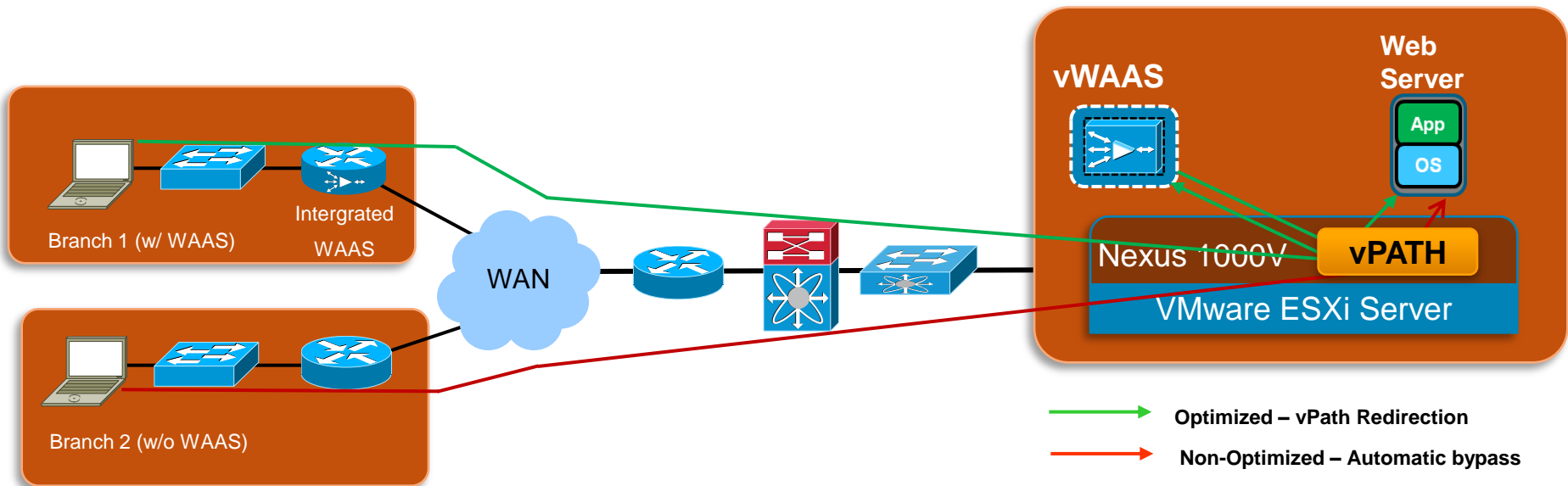
vWAAS – Optimized performance with vPath

Feature

1. vWAAS send “offload” to vPATH for non-interesting traffic (inter-server traffic or no-peer traffic)
2. vPATH provide automatic bypass of these traffic

Benefit

1. High scale with automatic application or port-profile based traffic filtering



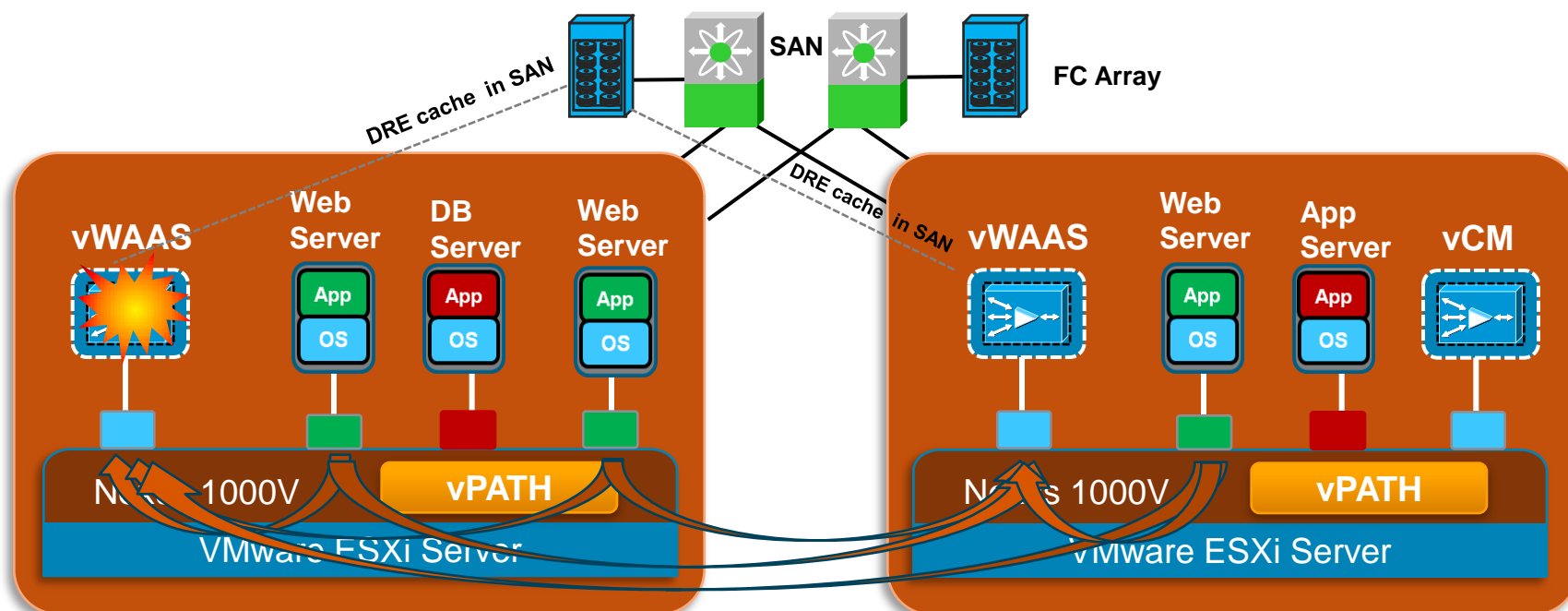
vWAAS – Fault tolerant persistent performance

Feature

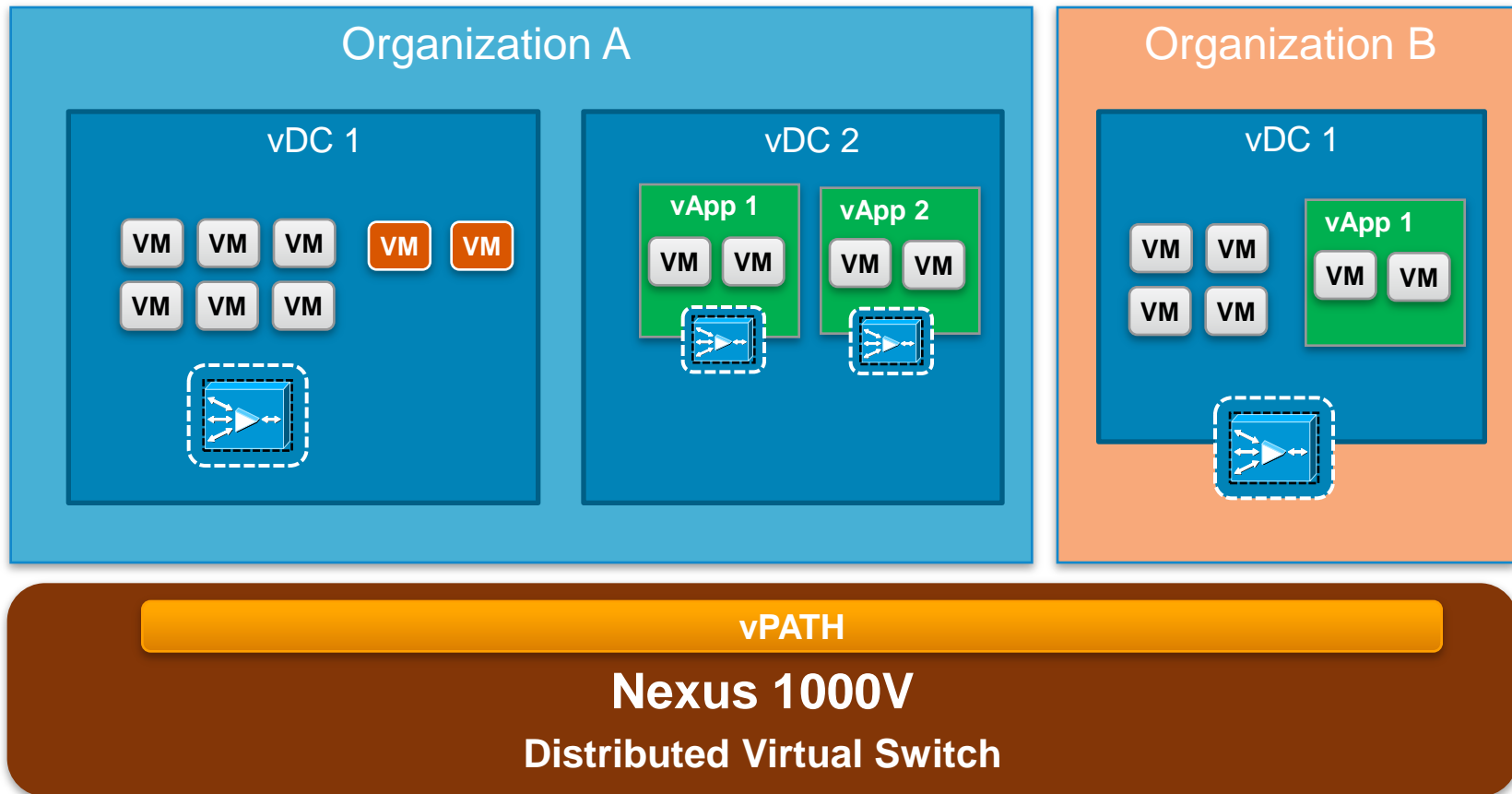
1. vWAAS DRE cache can be deployed in SAN
2. VMware HA creates new VM upon failure of vWAAS using same DRE cache storage.

Benefit

1. Ensures cache preservation and high persistent performance in the event of failure
2. Provide uninterrupted compression benefit of WAN optimization



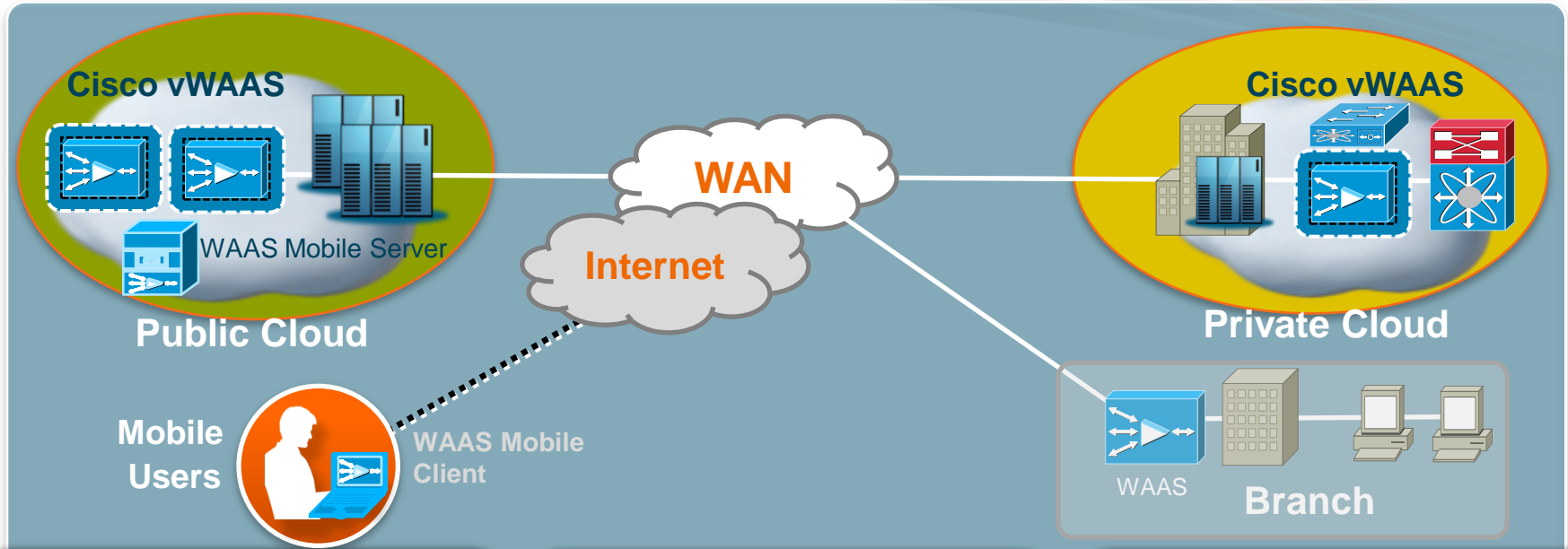
vWAAS – Multi-tenancy with flexible deployment



Cisco vWAAS can be deployed at:

- Organization level, vDC level, vApp level

Cisco vWAAS: Cloud Ready WAN Optimization



Key Requirements

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

Benefits

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

Simplification

- Close Integration with Cisco Nexus 1000V
- Rapid creation of WAN Optimization Service
- Transparent deployment w/ WCCP



Wrap-Up



Resources

- CCO Links

1000V: www.cisco.com/go/1000v

1010: www.cisco.com/go/1010

VSG: www.cisco.com/go/vsg

VNMC: www.cisco.com/go/vnmc

vWAAS: www.cisco.com/go/waas

- Deployment Guides

[Nexus 1000V Deployment Guide](#)

[Nexus 1000V on UCS – Best Practices](#)

[Nexus 1010 Deployment Guide](#)

[VSG Deployment Guide](#)

- White papers:

[Nexus 1000V and vCloud Director](#)

[N1K on UCS Best Practices](#)

[Nexus 1000V QoS White paper \(draft\)](#)

[VSG and vCloud Director \(draft\)](#)

[vWAAS Technical Overview](#)

[vWAAS for Cloud-ready WAN Optimization](#)

- [My Cisco Community](#)

Reference Guides

With Nexus 1000V, Nexus 1010 and VSG

- [vBlock with Nexus 1000V](#)
- [FlexPOD with Nexus 1000V and Nexus 1010](#)
- [Virtual Multi-tenant Data Center with Nexus 1000V](#)
- Virtual Desktop
 - [1000V and VMware View](#)
 - [1000V and Citrix XenDesktop](#)
 - [1000V and VSG in VXI Reference Architecture](#)
- Virtual Workload Mobility (aka Long-distance vMotion)
 - [Cisco, VMware and EMC \(with 1000V and VSG\)](#)
 - [Cisco, VMware and NetApp \(with 1000V and VSG\)](#)
- [PCI 2.0 with Nexus 1000V and VSG](#)

Additional Links

- N1K Download and 60-day Eval: www.cisco.com/go/1000vdownload
- N1K Product Page: www.cisco.com/go/1000v
- N1K Community: www.cisco.com/go/1000vcommunity
- N1K Twitter www.twitter.com/official_1000V
- N1K Webinars: www.tinyurl.com/1000v-webinar
- N1K Case Studies: www.tinyurl.com/n1k-casestudy
- N1K Whitepapers www.tinyurl.com/n1k-whitepaper
- N1K Deployment Guide: www.tinyurl.com/N1k-Deploy-Guide
- VXI Reference Implementation: www.tinyurl.com/vxiconfigguide
- N1K on UCS Best Practices: www.tinyurl.com/N1k-On-UCS-Deploy-Guide

Public Webinars

Date	Business Track Topics	Webinar	Preso	Q&A
3/22	Nexus 1000V/1010 Overview and Update	Play	PDF	PDF
4/05	Virtual Network Services: Virtual Service Datapath (vPath), Network Analysis Module (NAM), Virtual Application Acceleration (vWAAS)	Play	PDF	PDF
4/19	Virtual Security Gateway (VSG) Overview (Installation Videos: Link)	Play	PDF	PDF
5/03	Journey to the Cloud w/ N1KV: vCloud Director & Long Distance vMotion	Play	PDF	PDF
5/17	Secure Virtual Desktop with Nexus 1000V & VSG	Play	PDF	PDF

Date	Technical Track Topics	Webinar	Preso	Q&A
3/29	Nexus 1000V v1.4 Features & Install Overview (Installation Screencasts Link)	Play	PDF	PDF
4/12	Nexus 1010 Overview & Best Practices	Play	PDF	PDF
4/26	Virtual Security Gateway (VSG) Technical Overview	Play	PDF	PDF
5/10	Nexus 1000V Key Features Overview	Play	PDF	PDF
5/24	Nexus 1000V Troubleshooting	Play	PDF	PDF

BrightTalk Link: <http://mediazone.brighttalk.com/event/Cisco/0e4ceef65a-4907-intro>

Upcoming Webinars: [Long Distance vMotion](#), [PCI 2.0](#)

Cisco Cloud Lab

Hands On Training & Demos

- Hands on labs available for Nexus 1000V and VSG in Cloud Lab
<https://cloudlab.cisco.com>
- Open to all Cisco employees
- Customers/Partners require sponsorship from account team for access via CCO LoginID
- Extended duration lab licenses for 1000V and VSG are available upon request



Welcome to Cisco CloudLab

Please select one of the available labs, by clicking on its name. Hover over the lab name content.

Available labs:

- Cisco Nexus 1000V - Basic Introduction (N1K-000111)
- Cisco Nexus 1000V - Installation (N1K-000211)
- Cisco Nexus 1000V - Upgrade to 1.4 (N1K-000310)
- Cisco Virtual Security Gateway (VSG) - Introduction (VSG-000110)
- Cisco Nexus 7000 - Introduction to NX-OS (N7K-000110)
- Cisco Overlay Transport Virtualization (OTV) (N7K-000210)
- Demo: Cisco Nexus 1000V (Pre-Configured) (N1K-100111)
- Demo: Cisco Virtual Security Gateway (VSG)(Pre-Configured) (VSG-100110)

Concluding Remarks

- Virtual Services needs to be deployed with an architectural mind-set
 - Virtual Data Center, Private Cloud, Public Cloud
- Network intelligence for virtual services is critical for:
 - Simplified deployment
 - Optimized performance
 - Virtualization-aware operation
- Separation of duties and operational non-disruptiveness needs to be maintained

Cisco **VSG** and **vWAAS** with **Nexus 1000V/vPath** provide an excellent platform for building out virtual networking and virtual services infrastructure in data center and cloud computing environments



For Your
Reference

Other Related Sessions

At Cisco Live 2011

- BRKVIR-2931 End-to-End Data Center Virtualization.
- BRKVIR-2006 Deployment of VN-Link with the N1KV.
- BRKVIR-2008 UCS and Nexus1000V Virtualization for Cloud DC Services
- BRKSEC-2205: Security in the Data Center
- LABDCT-1901 Introduction to Nexus 1000V Hands-on Lab

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Thank you.

