

# Long Distance vMotion with Nexus 1000V and Virtual Security Gateway (VSG)



Jake Howering, Product Manager  
Systems Development Organization (SDO)

Sal Lopez, Technical Marketing Engineer  
Server Access Virtualization Technology Group (SAVTG)

Bob Vizza, Sales Business Development Manager for VMware [HOST]  
Strategic Partner Organization (SPO)



## Nexus 1000V Public Webinar Series

([www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity))

### Date Business Sessions

| Date   | Business Sessions   |
|--------|---|
| 22-Mar | Nexus 1000V Family Overview and Update                                |
| 5-Apr  | Virtual Network Services (vPath, NAM, vWAAS)                          |
| 19-Apr | Virtual Security Gateway Introduction                                 |
| 3-May  | Journey to the Cloud w/ N1KV: vCloud Director & Long Distance vMotion |
| 17-May | Secure VDI with Nexus1000V & VSG                                      |

### Date Technical Sessions

| Date   | Technical Sessions                                 |
|--------|--|
| 29-Mar | Nexus 1000V New Features and Installation Overview |
| 12-Apr | Nexus1010 Installation & Upgrade                   |
| 26-Apr | Virtual Security Gateway Overview                  |
| 10-May | Nexus 1000V Key Features                           |
| 24-May | Nexus 1000V Troubleshooting                        |

|        |  |
|--------|--|
| 27-Jul | Long Distance vMotion with Nexus 1000V and Virtual Security Gateway (VSG)      |
| 10-Aug | PCI Reference Architecture with Nexus 1000V and Virtual Security Gateway (VSG) |

# Long Distance vMotion

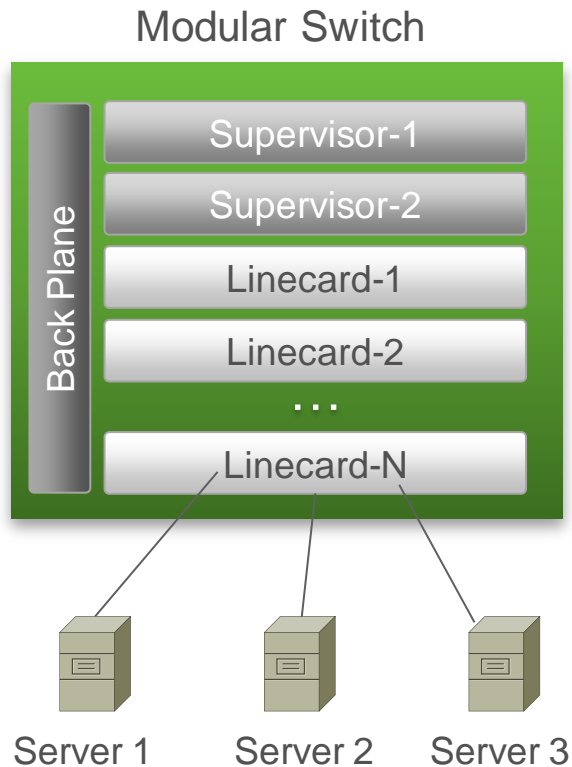
## Today's Agenda

- Nexus 1000V Architecture – Bob Vizza
  - Virtual Supervisors and Ethernet Modules
  - Virtual Service Datapath (vPath)
- Data Center Interconnect enables Virtualized Workload Mobility – Jake Howering
- Nexus 1000V Requisites for Virtualized Workload Mobility – Sal Lopez
- Resources
- Q & A as we go...

# Nexus 1000V Architecture Overview

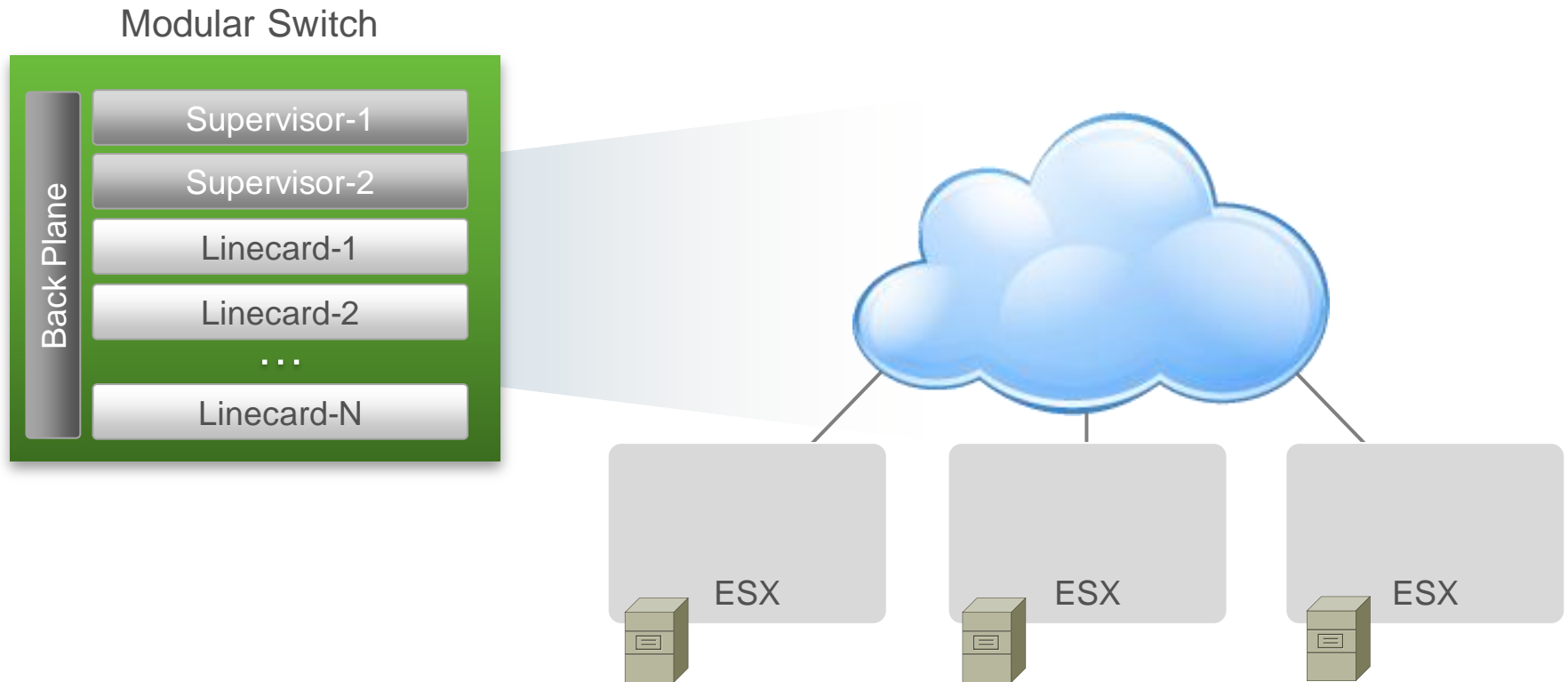
# Nexus 1000V Architecture

## Comparison to a Physical Switch



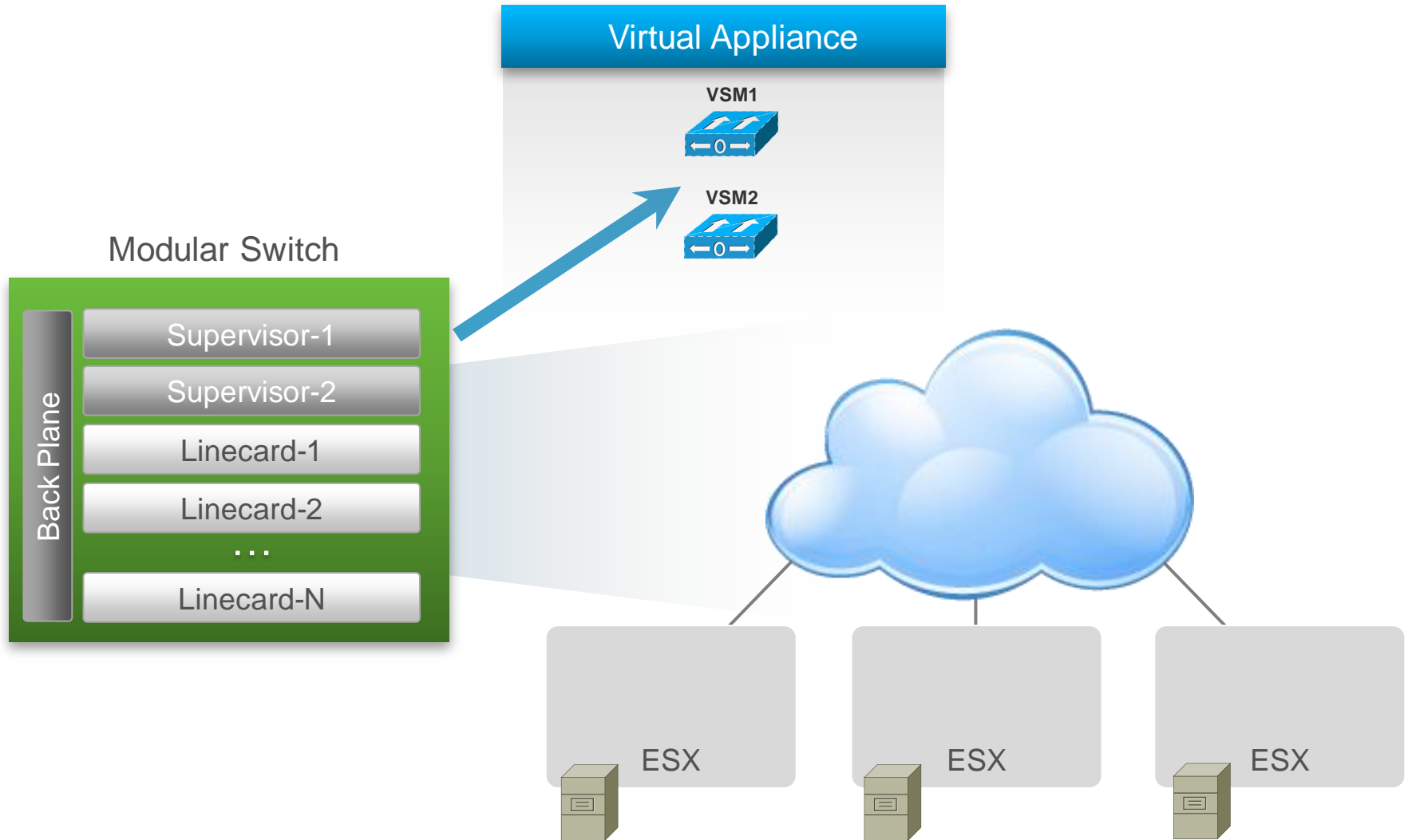
# Nexus 1000V Architecture

## Moving to a Virtual Environment



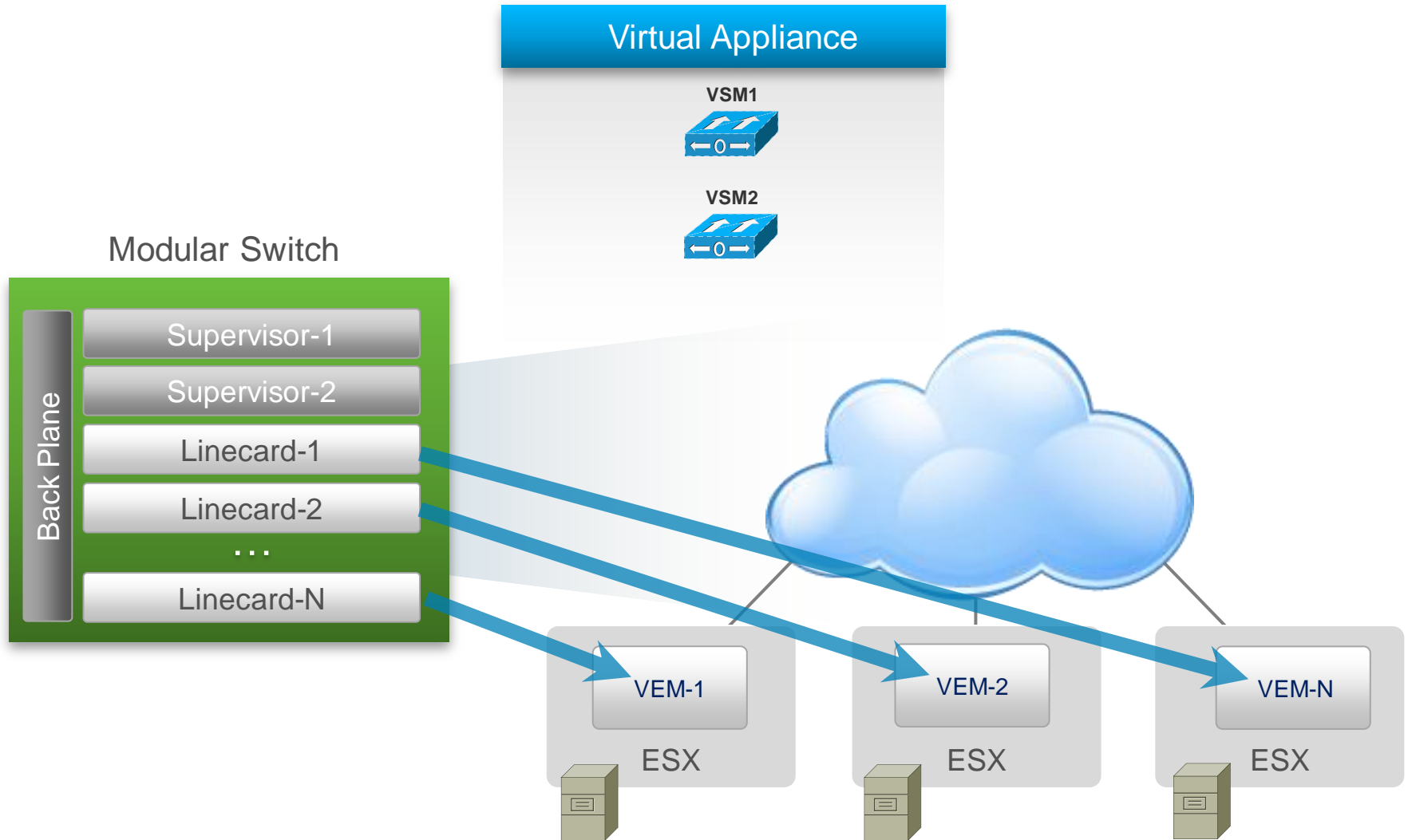
# Nexus 1000V Architecture

Supervisors → Virtual Supervisor Modules (VSMs)



# Nexus 1000V Architecture

Linecards → Virtual Ethernet Modules (VEMs)

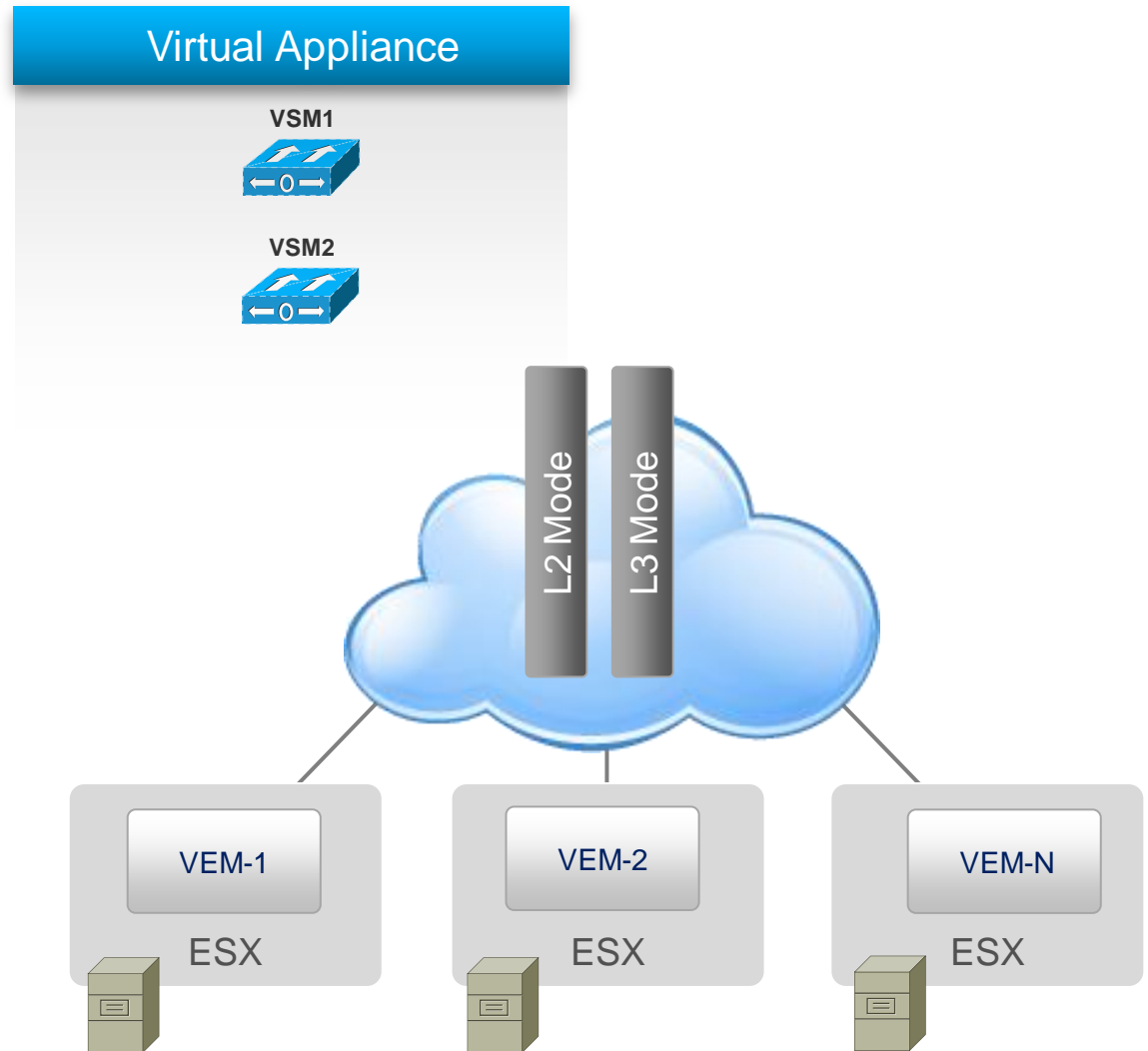




# Nexus 1000V Architecture

VSM + VEMs = Nexus 1000V Virtual Chassis

- 64 VEMs per 1000V (connected by L2 or L3)
- 200+ vEth ports per VEM
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter

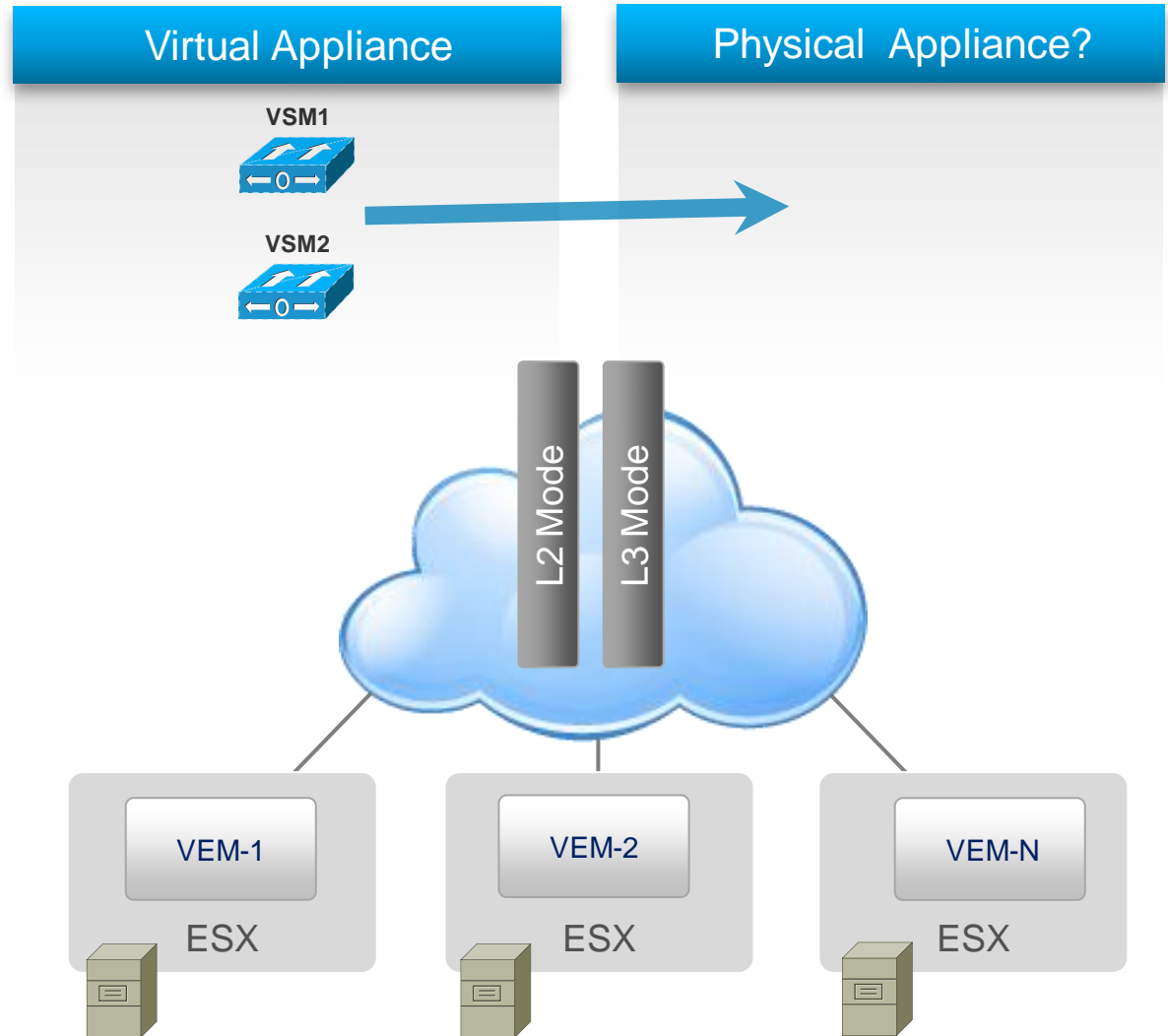


VSM: Virtual Supervisor Module  
VEM: Virtual Ethernet Module

# Nexus 1000V Architecture

## Customer Request: Host VSMs on a Physical Appliance

- Network team can deploy & manage like an NX-OS switch
- Access to vCenter not required to manage VSMs



VSM: Virtual Supervisor Module  
VEM: Virtual Ethernet Module

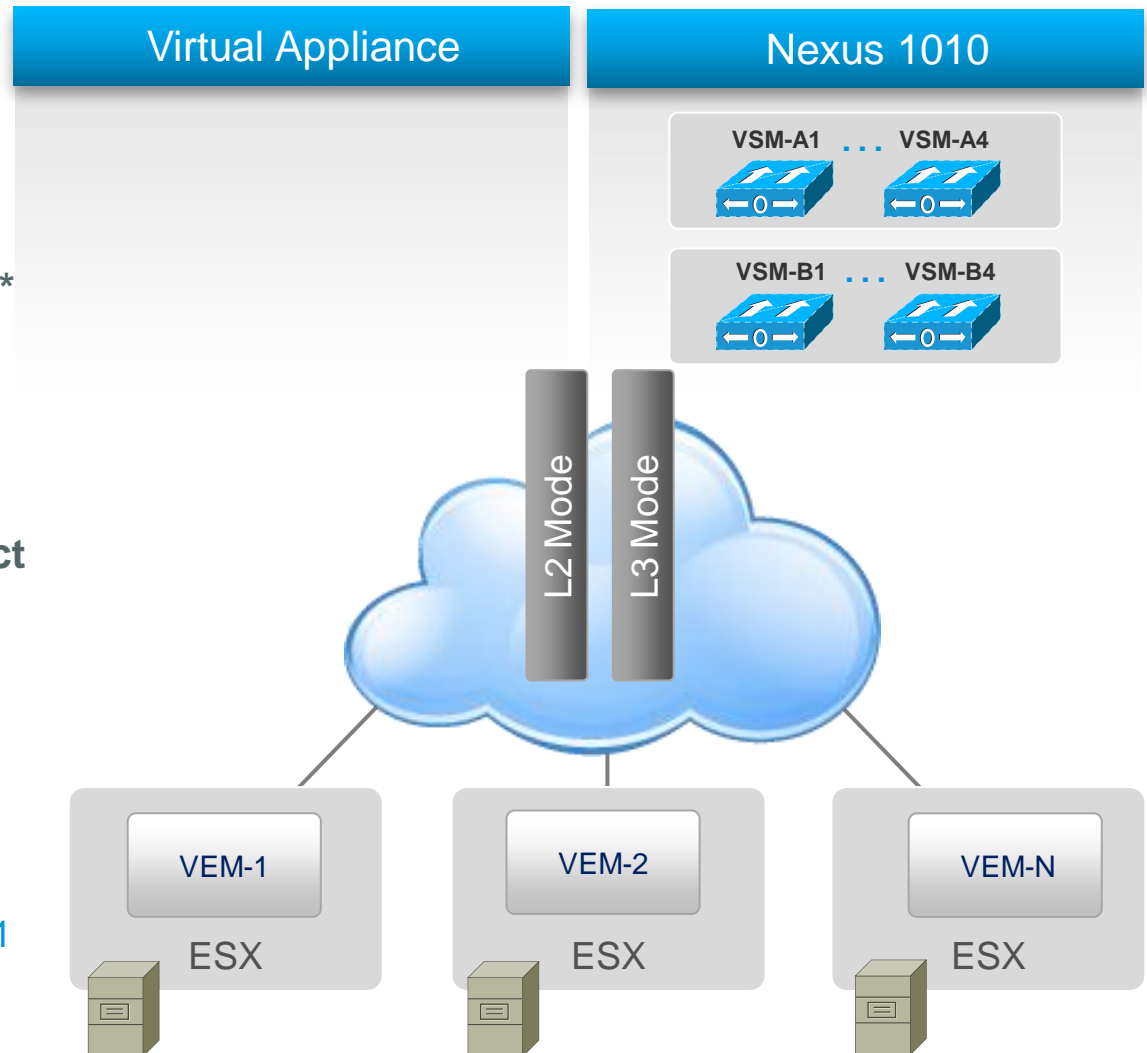
# Nexus 1000V Architecture

## VSMs hosted on a Physical Appliance: Nexus 1010

- Up to 4 VSMs per Nexus 1010\*
- Nexus 1010s deployed in redundant pair
- Leverage vPC/LACP to connect to the network

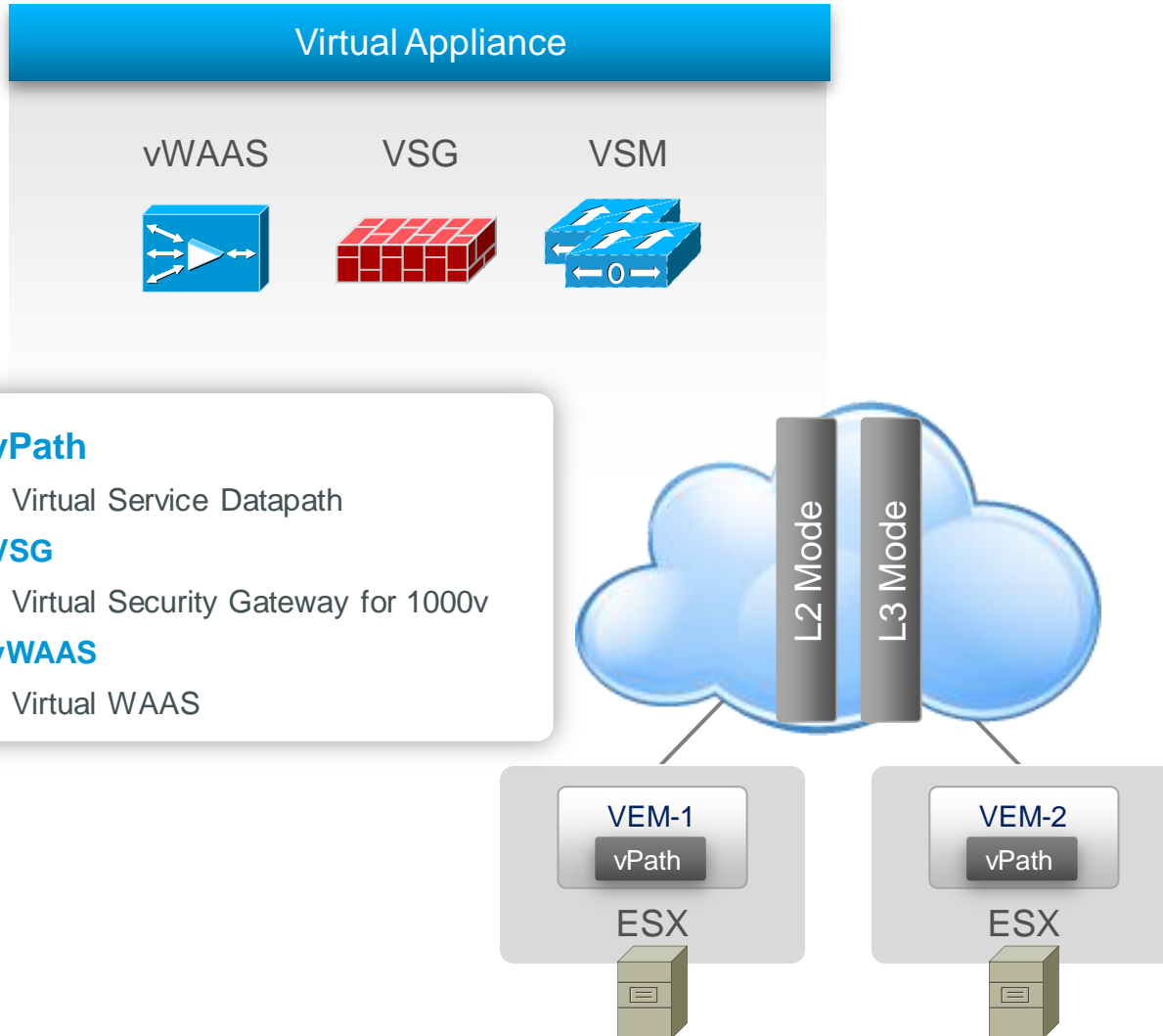
\* Up to 6 VSMs in upcoming release 4.2(1)SP1(3), available in August 2011

VSM: Virtual Supervisor Module  
VEM: Virtual Ethernet Module



# Embedding Intelligence for Virtual Services

## vPath – Virtual Service Datapath



### vPath

- Virtual Service Datapath

### VSG

- Virtual Security Gateway for 1000v

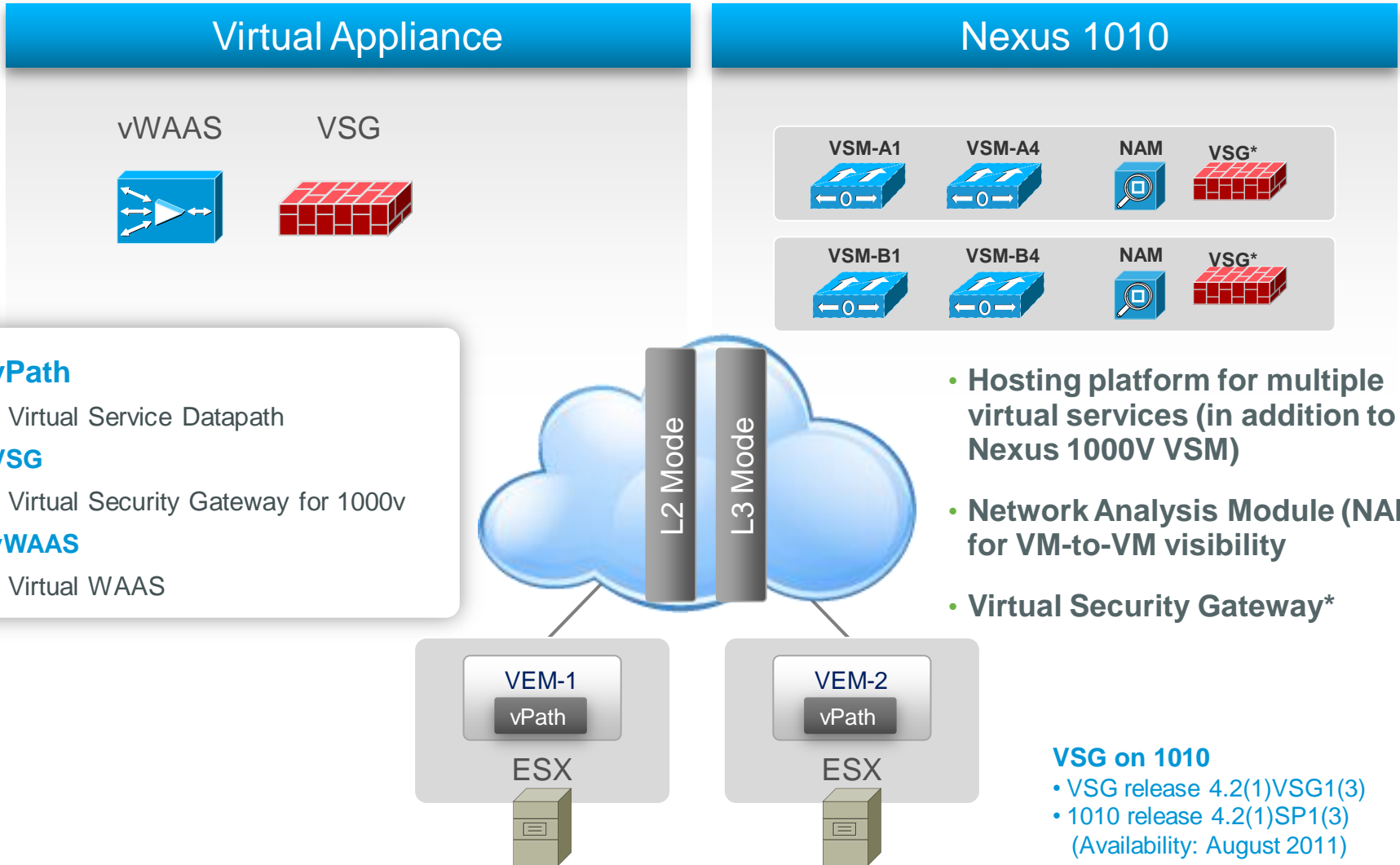
### vWAAS

- Virtual WAAS

## vPath

- Traffic Steering
- Fast -Path Offload
- **Nexus 1000V ver 1.4 & above**

# Nexus 1010 – Hosting Platform for Services



# N1K 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 | ✓                        |

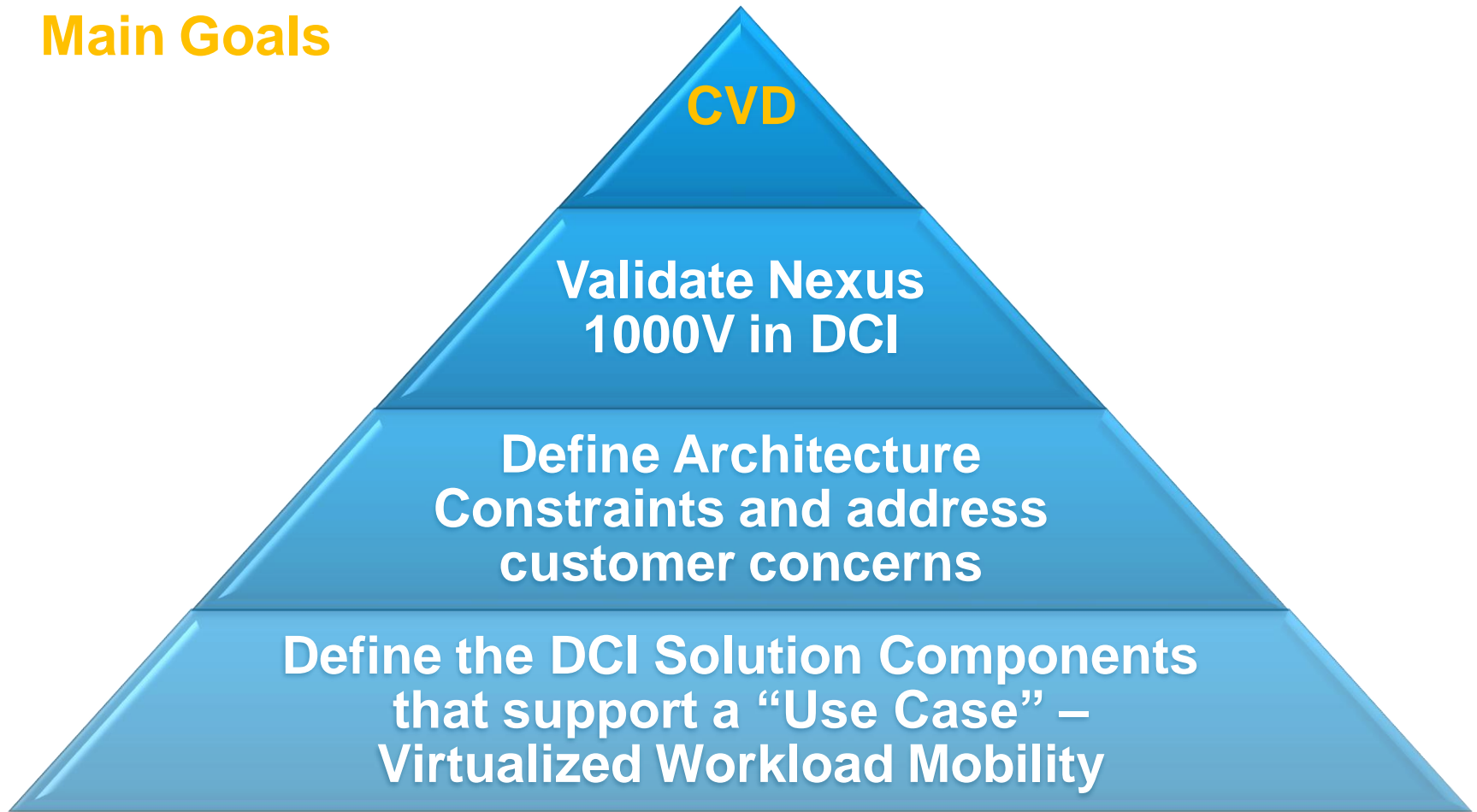
# Agenda

- Business Drivers
  - Systems Development Organization
  - DCI Use Case: Virtualized Workload Mobility
- Virtualized Workload Mobility Components
  - LAN Extensions
  - Path Optimization
  - Storage Elasticity
  - Workload Mobility – Nexus 1000v and VSG
- Q&A



# Developing a Solution: Virtualized Workload Mobility

## Main Goals



**CVD = Cisco Validated Design**



# Agenda

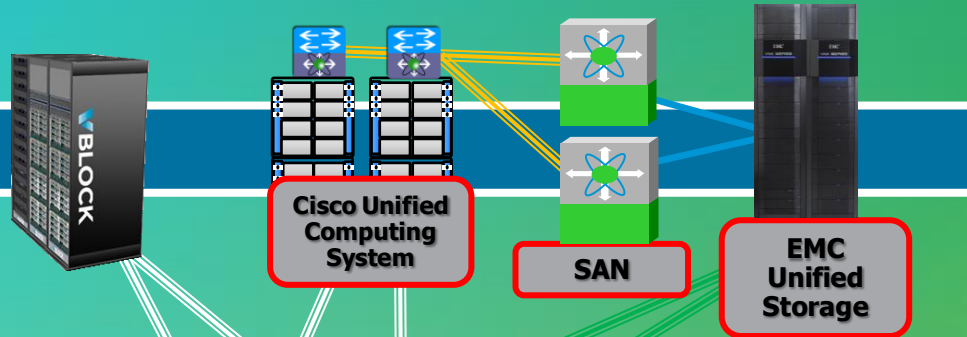
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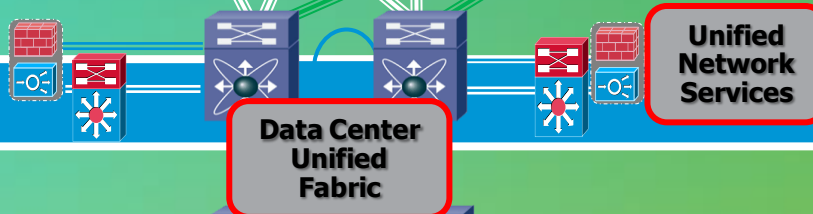
# Private Cloud – Building Blocks

## *Virtualized Multi-Tenant Data Center*

### Integrated Compute Stacks



### Unified Data Center Networking



### Data Center Interconnect



### Integrated Compute Stacks

- Reference Architectures
- Unified Compute Systems

### Unified Data Center Networking

- Converged LAN & SAN
- Network Services

### Data Center Interconnect

- Application Mobility
- Clustered Solutions

# Virtualized Workload Mobility: Solution Overview

## LAN Extension

- OTV
- vPC

## Path Optimization

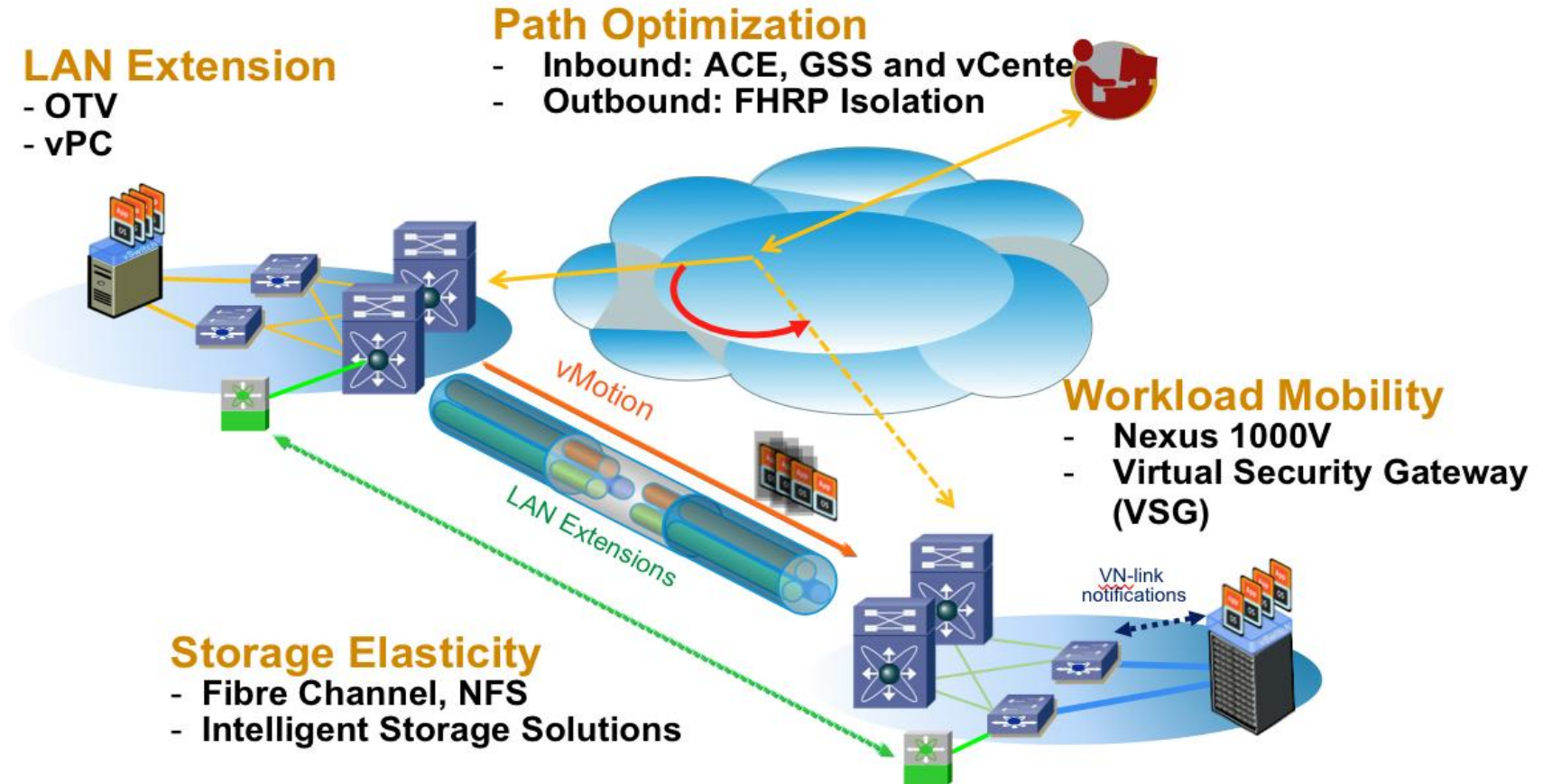
- Inbound: ACE, GSS and vCenter
- Outbound: FHRP Isolation

## Workload Mobility

- Nexus 1000V
- Virtual Security Gateway (VSG)

## Storage Elasticity

- Fibre Channel, NFS
- Intelligent Storage Solutions

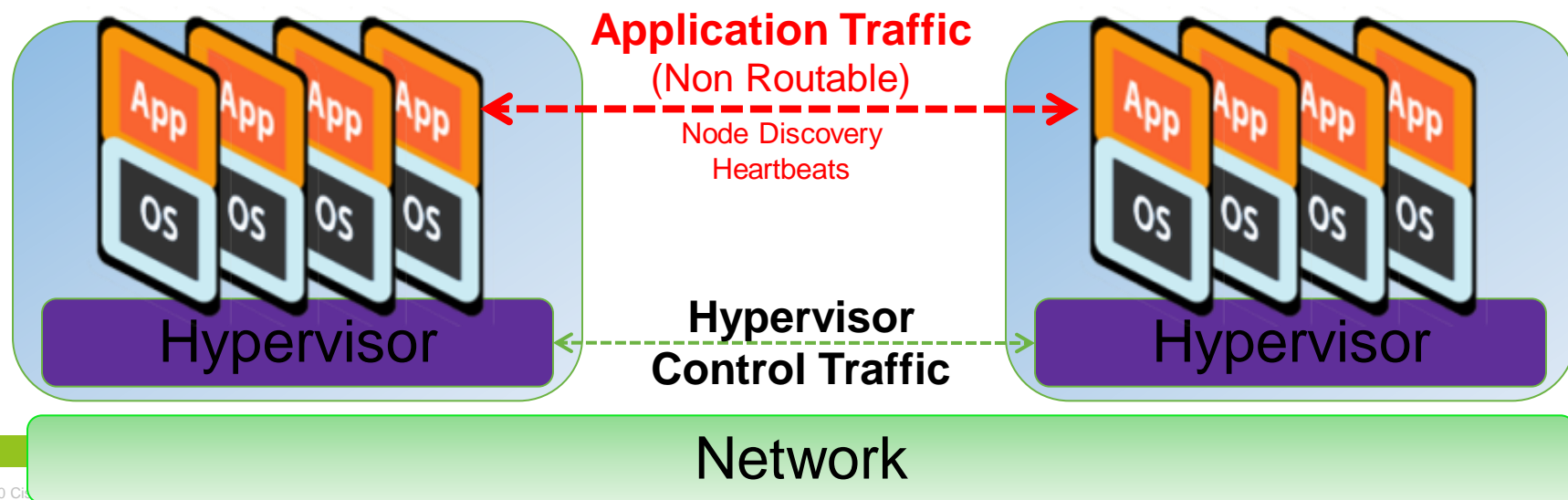


**CVD = Cisco Validated Design**

# LAN Extensions – Foundation Component

## Why the Need for LAN Extensions ?

- Applications running in the VMs use non-routable traffic
  - e.g. Node Discovery & Heartbeats in clustered Applications
- With Virtualization, application members may be distributed across PODs/Data-centers
- Moving and distributing application members across locations should not break the application



# Solution Components

## Virtualization

- Distributed Virtual Switching - Nexus 1000V
- Distributed Virtual Security - Cisco VSG
- Hypervisor - VMware ESXi 4.1 & vSphere

## LAN Extension

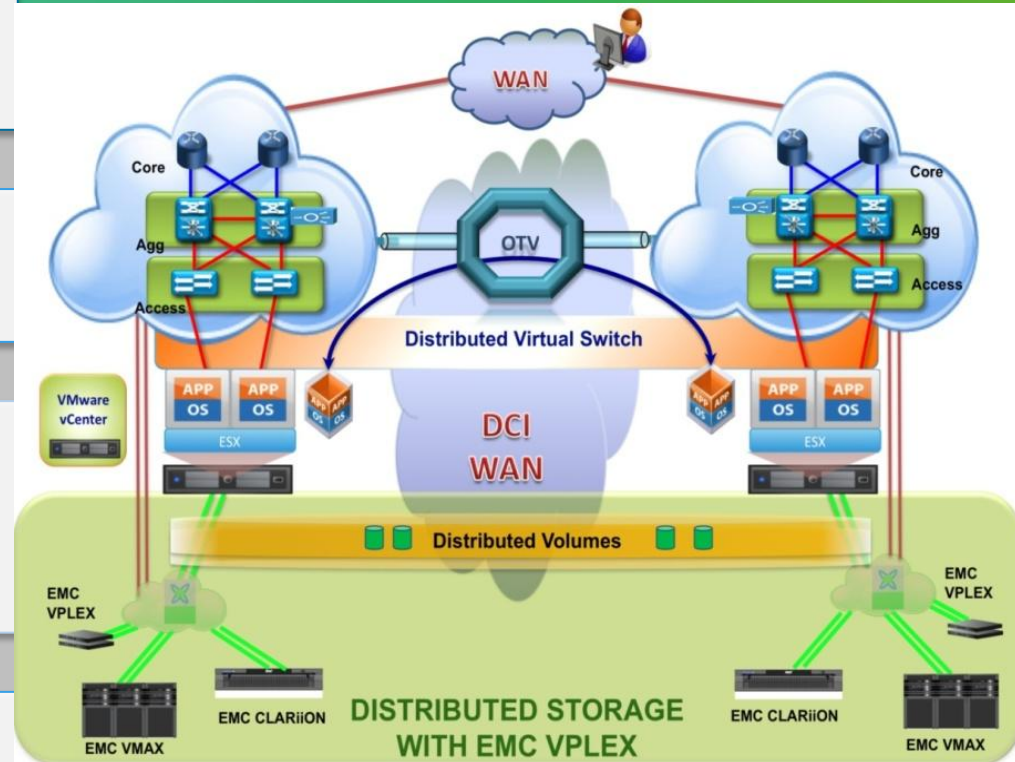
- Overlay Transport Virtualization (or)
- Virtual Port Channels

## Storage Extension

- Synchronous Replication distances
- Shared Storage Model
- Active / Cache - Netapp FlexCache
- Active / Active - EMC VPLEX

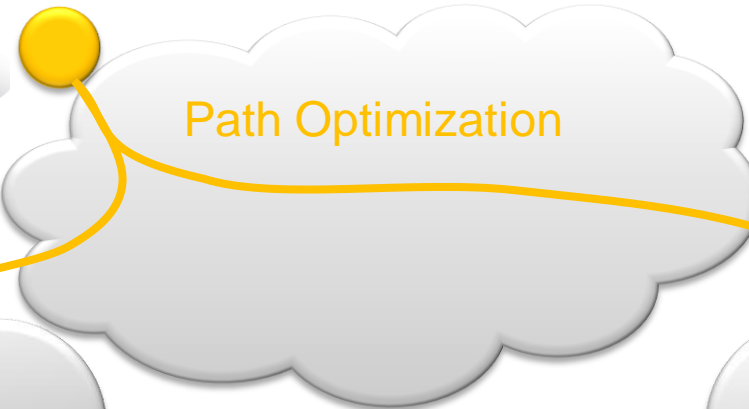
## Path Optimization

- Egress the Virtual Data Center – FHRP Filtering
- Ingress the Virtual Data Center – ACE/GSS integration with vCenter



# Virtualized Workload Mobility

## Component View



Cisco-VMware With  
EMC & NetApp  
Validated Design for  
Virtualized Workload  
Mobility

DC 1

DC 2

LAN Extension

ESX-A source

ESX-B target

Nexus 1000V with  
distributed switching

Storage Elasticity



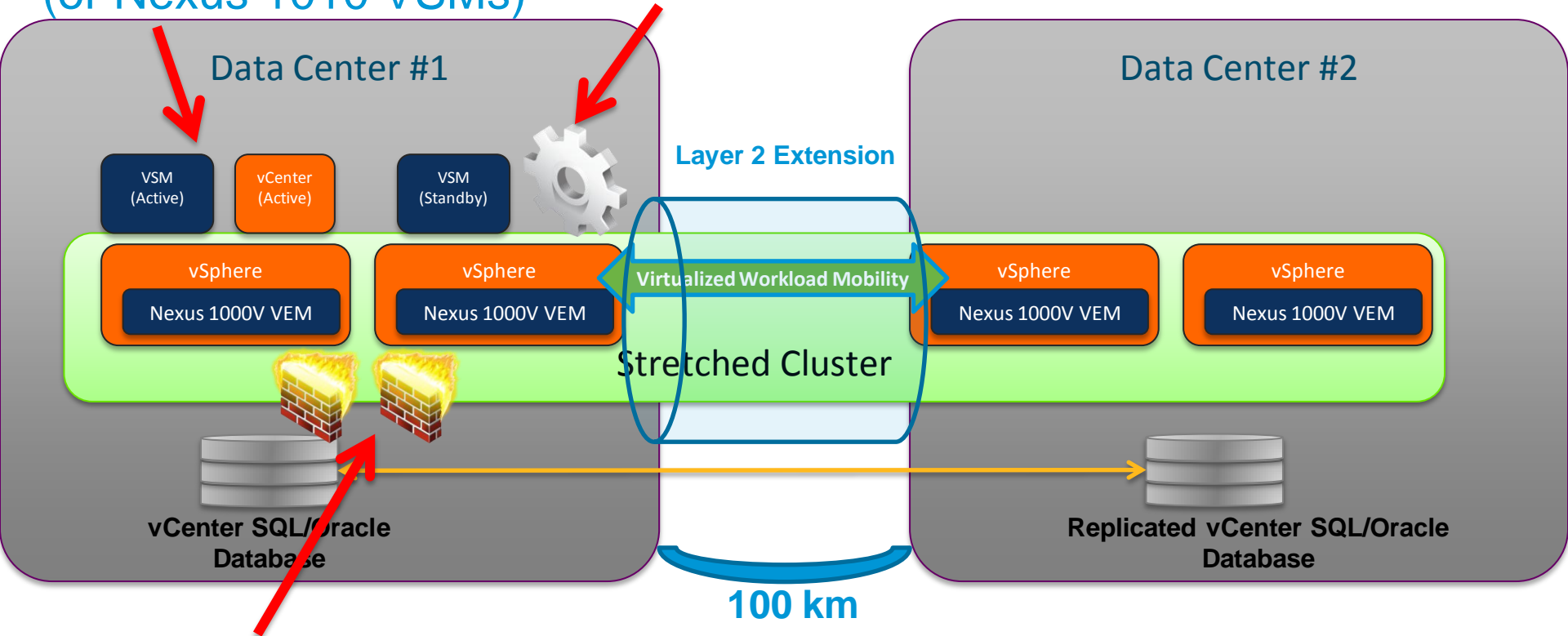
# Nexus 1000V Deployment Model

## A Closer Look

### Stretching the ESX Cluster to 100km apart

Nexus 1000V VSM Pair  
(or Nexus 1010 VSMs)

VNMC



VSG Pair

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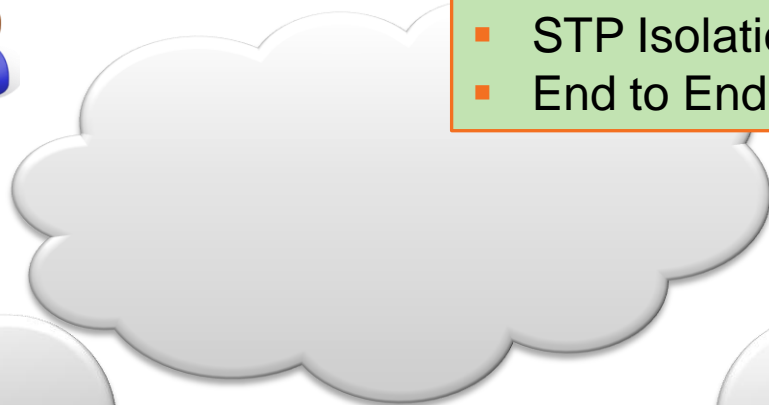


# Data Center Interconnect

## LAN Extension



- STP Isolation is the key element
- End to End Loop Avoidance



DC 1



ESX-A source



vmware



Edge



Director



DC 2



ESX-B target



vmware



Edge



Director

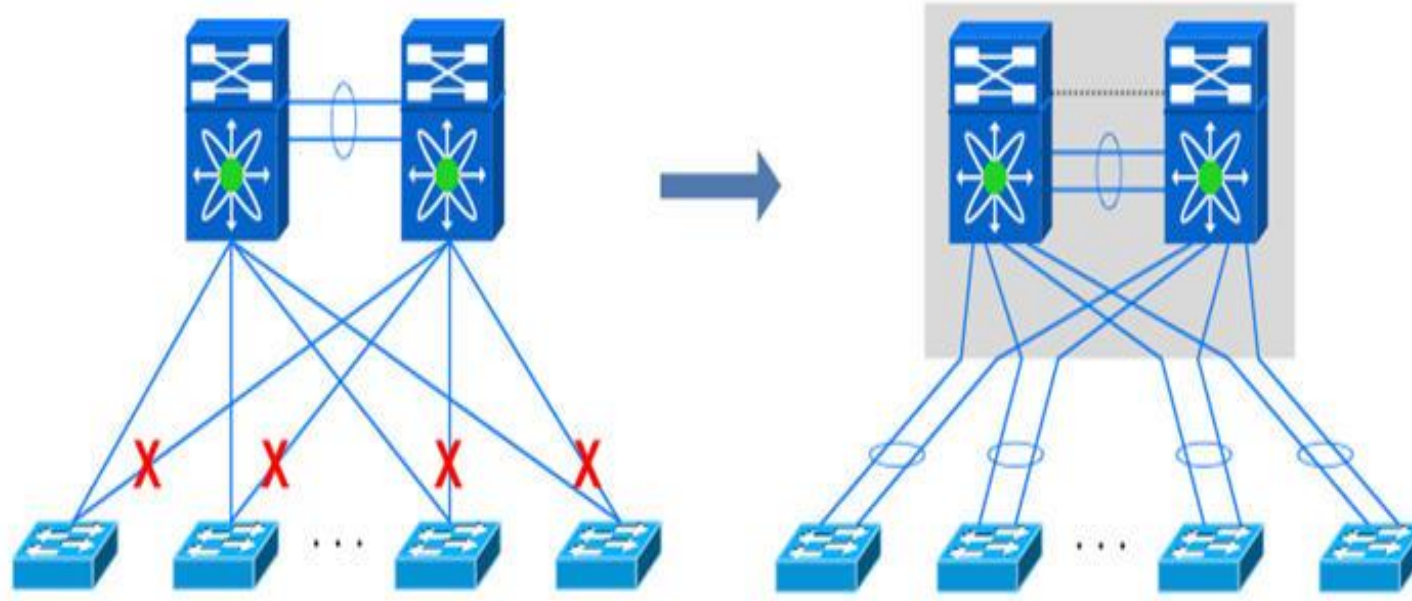


LAN Extension:  
OTV or vPC

Other options include:  
VSS, MPLS, VPLS

# LAN Extension

vPC



STP Topology

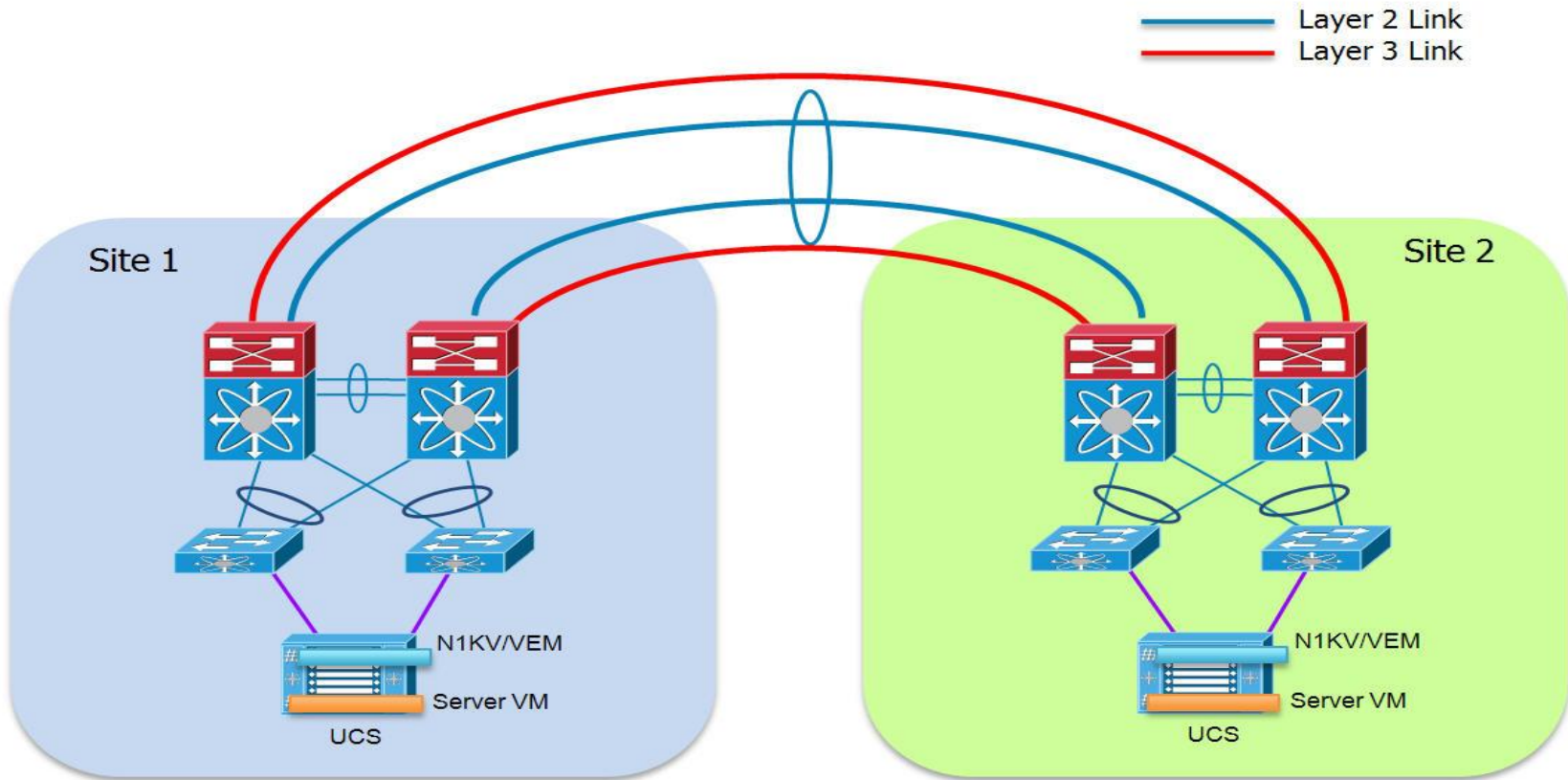
vPC Topology

STP - Half of the Ports are blocked

vPC – Loop Free topology and use all B/W

# LAN Extension

## vPC Extended over Dark Fiber



Extend Loop Free Topology over distance  
Separate L3 link for dynamic IGP

# LAN Extension

## Overlay Transport Virtualization



OTV is a “MAC in IP” technique to extend Layer 2 domains  
**OVER ANY TRANSPORT**



### Dynamic Encapsulation

No Pseudo-Wire State Maintenance

Optimal Multicast Replication

Multipoint Connectivity

Point-to-Cloud Model



**Nexus 7000**

*First platform to support OTV  
(from release 5.0)*

### Protocol Learning

Preserve Failure Boundary

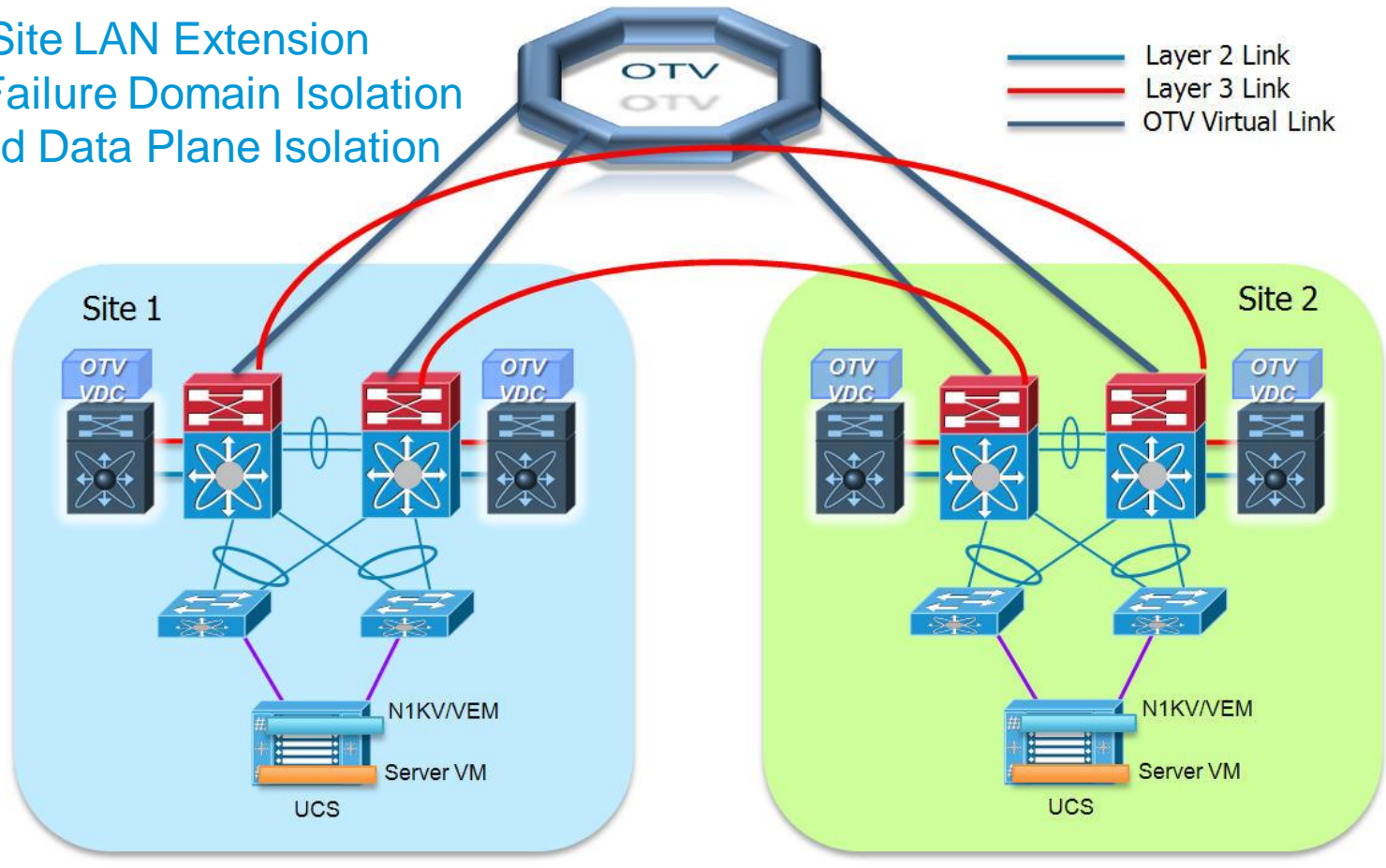
Built-in Loop Prevention

Automated Multi-homing

Site Independence

# Overlay Transport Virtualization

Site-to-Site LAN Extension  
 Native Failure Domain Isolation  
 Improved Data Plane Isolation



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# Data Center Interconnect Path Optimization



## Options

- Egress
  1. Addressed by FHRP Filtering
- Ingress:
  1. DNS redirection with ACE/GSS
  2. LISP (Future – NXOS 5.2)

DC 1



ESX-A source

vmware



DC 2



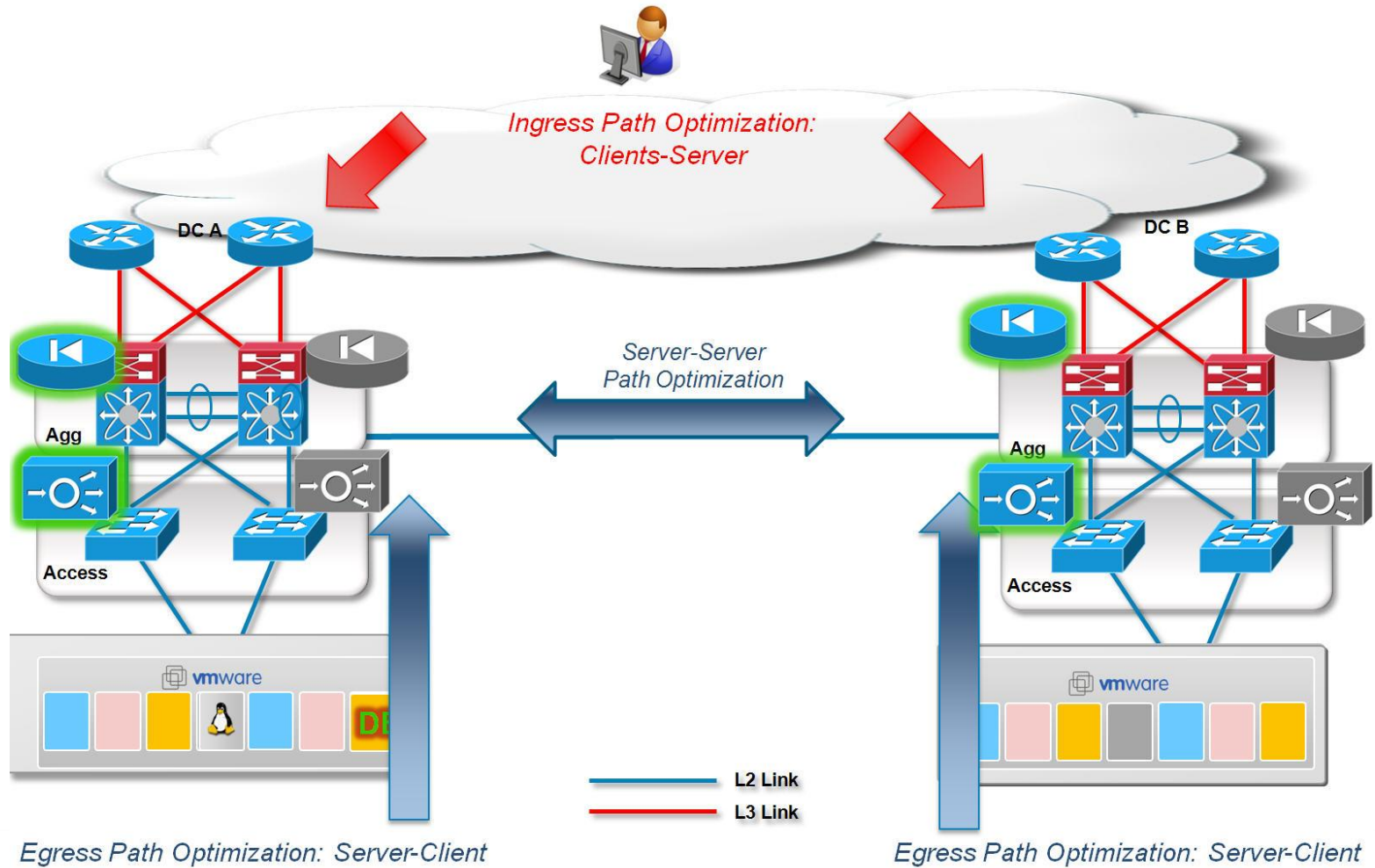
ESX-B target

vmware



# Path Optimization

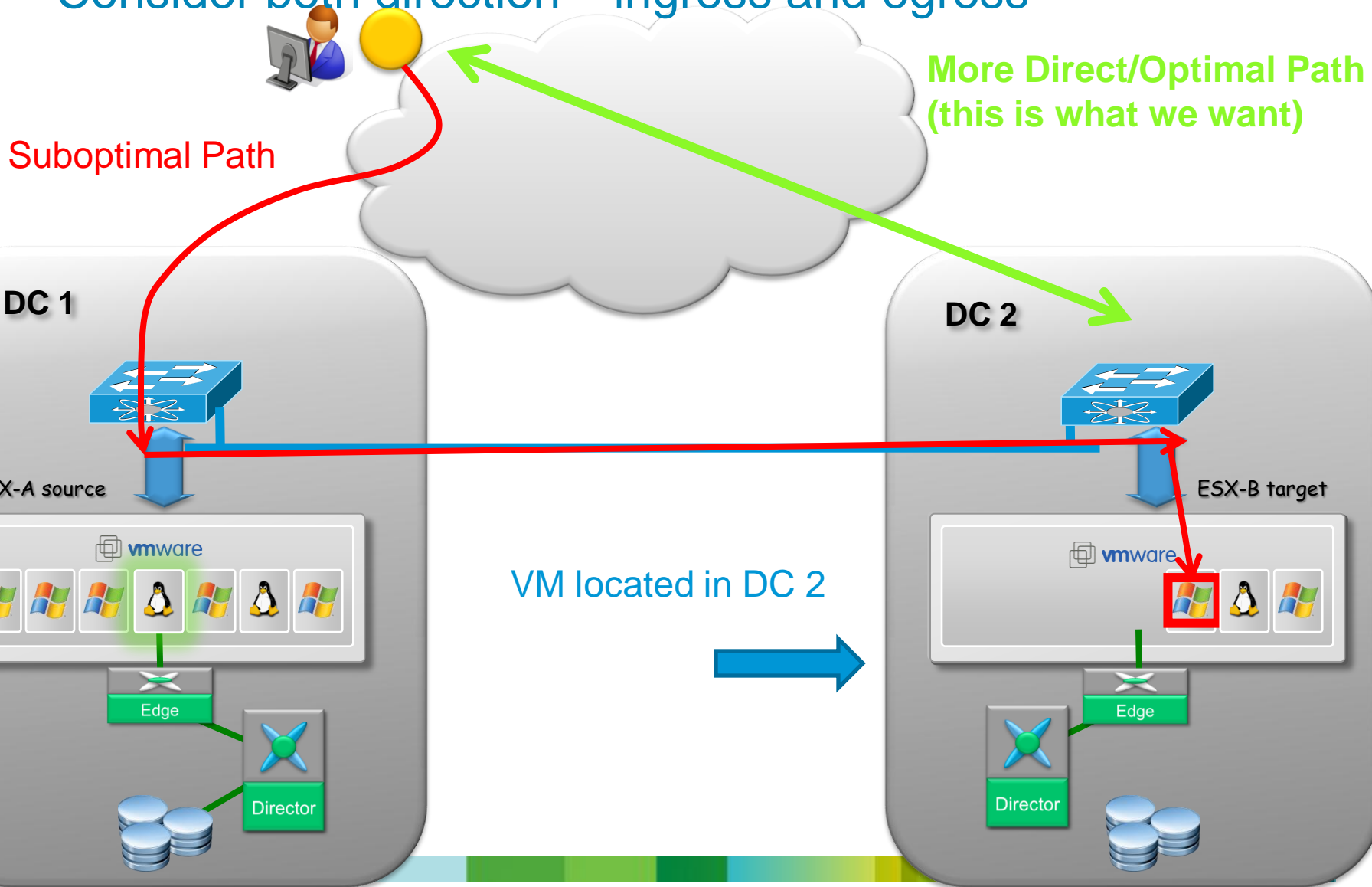
## 3 Different Paths to Optimize





# Path Optimization

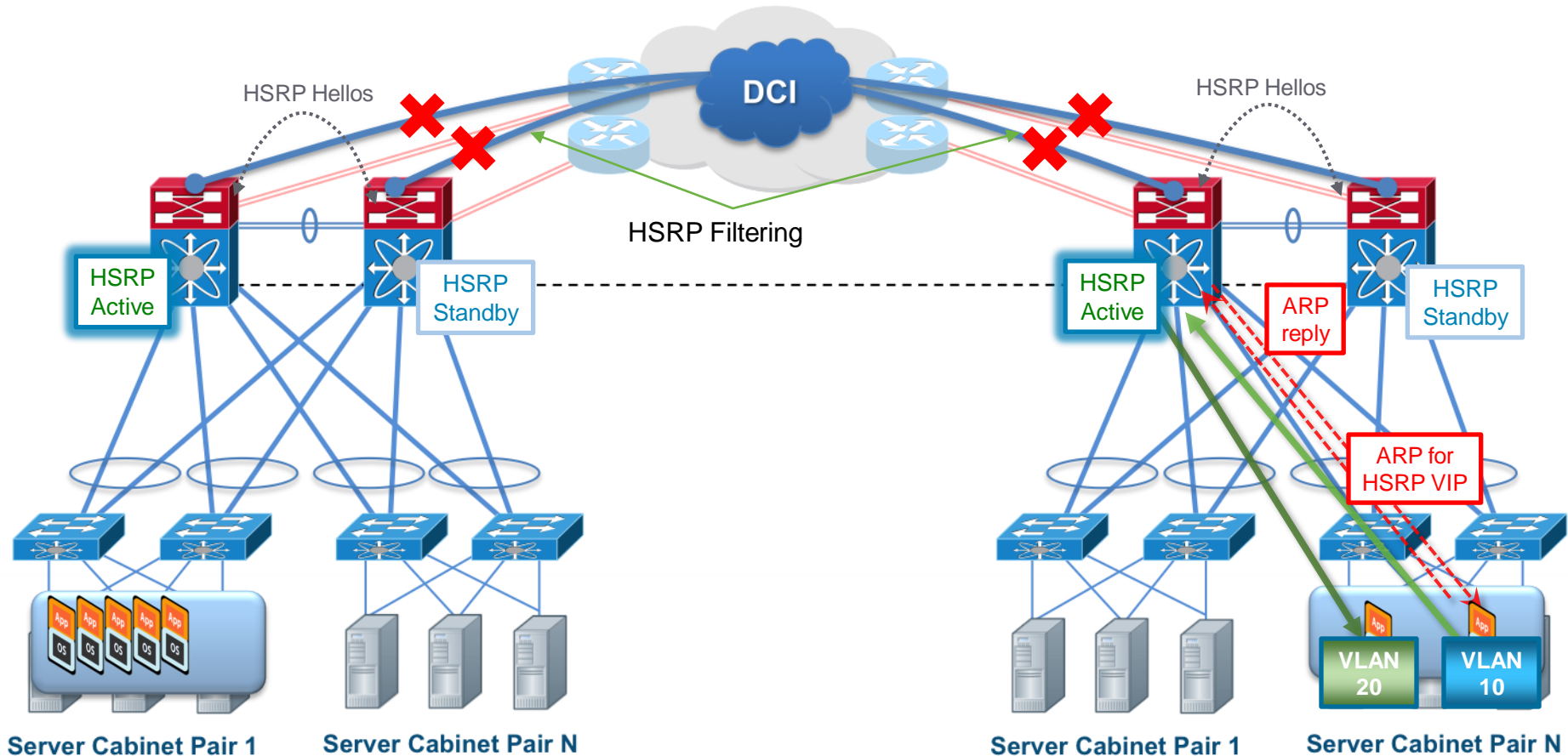
Consider both direction – ingress and egress



# Egress Path Optimization

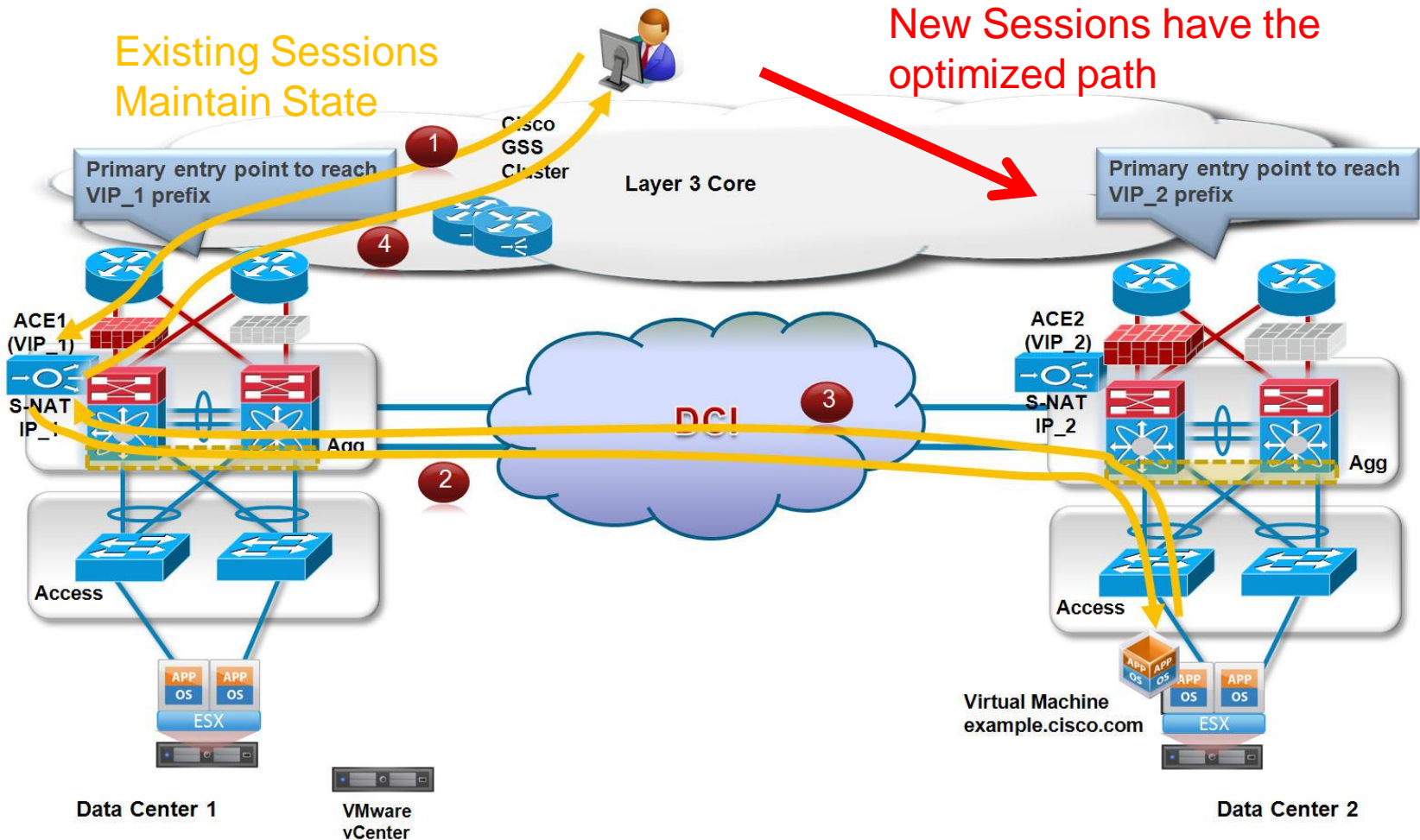
## FHRP Filtering Solution

- Filter FHRP with combination of VACL and MAC route filter
- **Result: Still have one HSRP group with one VIP**, but now have active router at each site for optimal first-hop routing



# Ingress Path Optimization

## DNS Based



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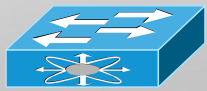
# Data Center Interconnect

## SAN Extension



- Synchronous I/O implies strict distance limitation
- Localization of Active Storage is key

DC 1



ESX-A source



Edge



Director



DC 2



ESX-B target



Edge



Director



Synchronous Data Replication  
Asynchronous Data replication

# Storage Elasticity

## Shared Storage



Core Network  
L2 extension for vMotion Network

DC 1



ESX-A source



vmware



DC 2



ESX-B target



vmware

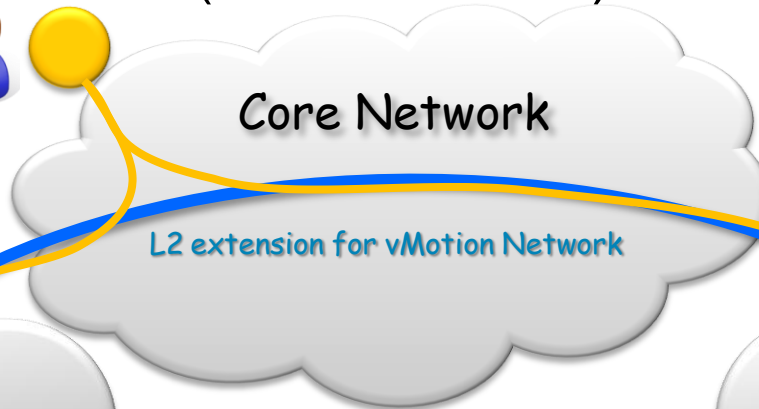


Virtual Center

VM and Storage in Different locations

# Storage Elasticity

## NetApp FlexCache (Active/Cache)



Core Network

L2 extension for vMotion Network

DC 1



ESX-A source



Origin Volume

vmware



DC 2



Cache Volume

ESX-B target

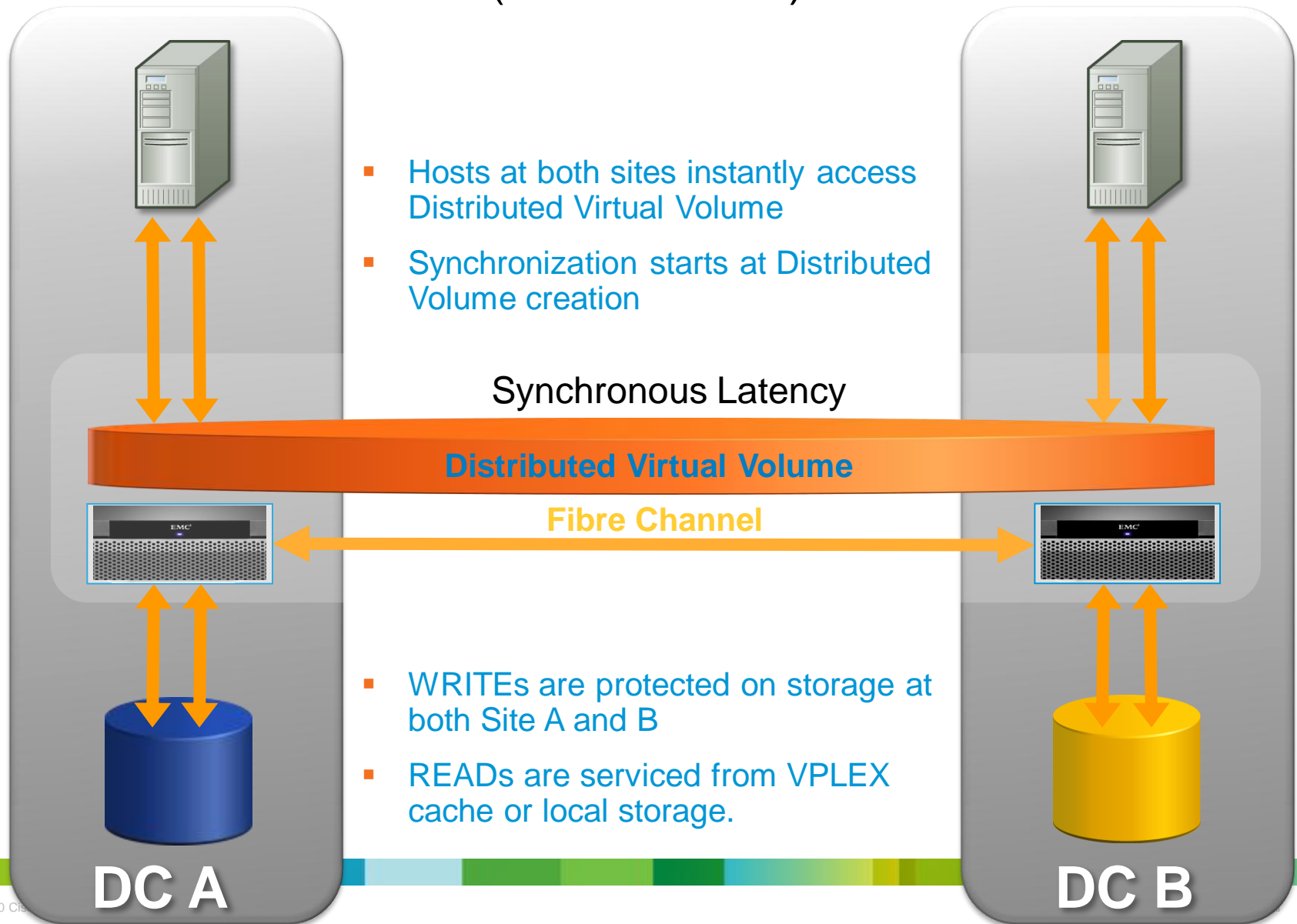
vmware



Virtual Center

# Storage Deployment in DCI

## EMC VPLEX Metro (Active/Active)



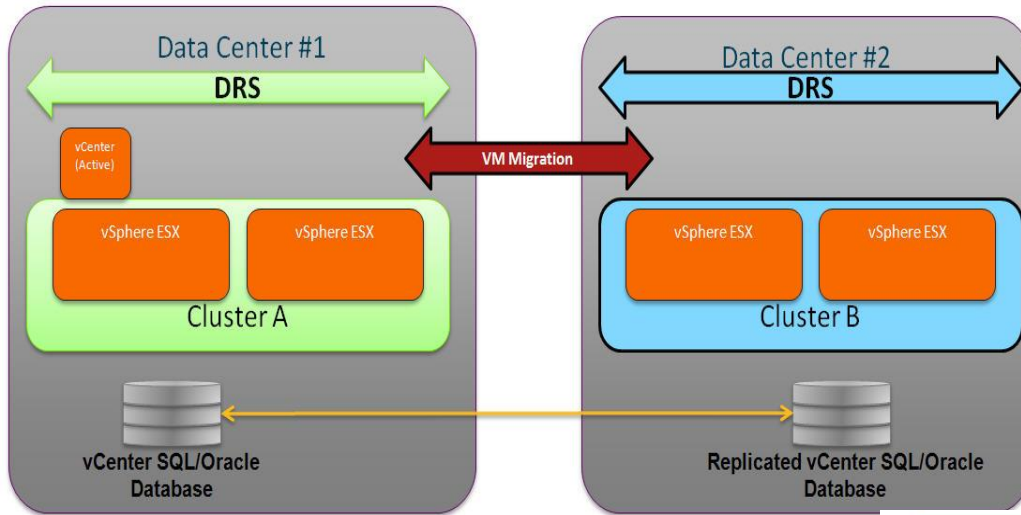


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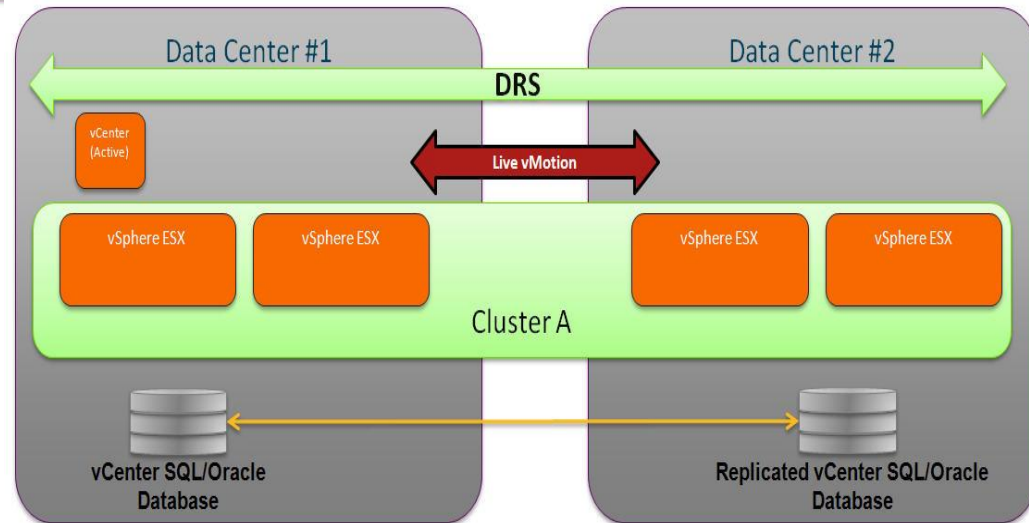


# Workload Mobility: ESX Cluster requirements ?



Solution works with Separate clusters

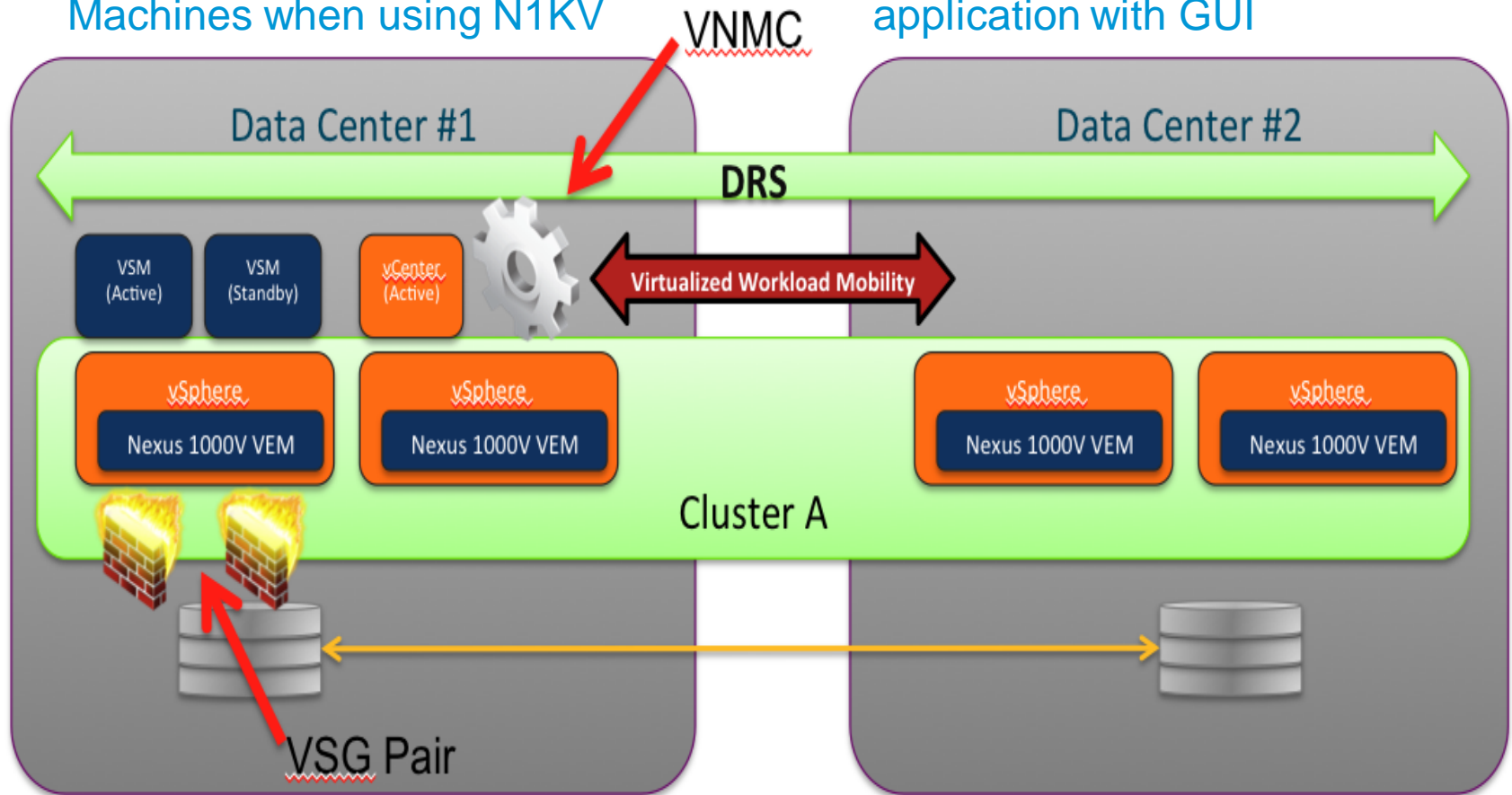
Or Stretched Clusters



# Workload Mobility: Stretched VSM & VSG Model

VSM and VSG are Virtual Machines when using N1KV

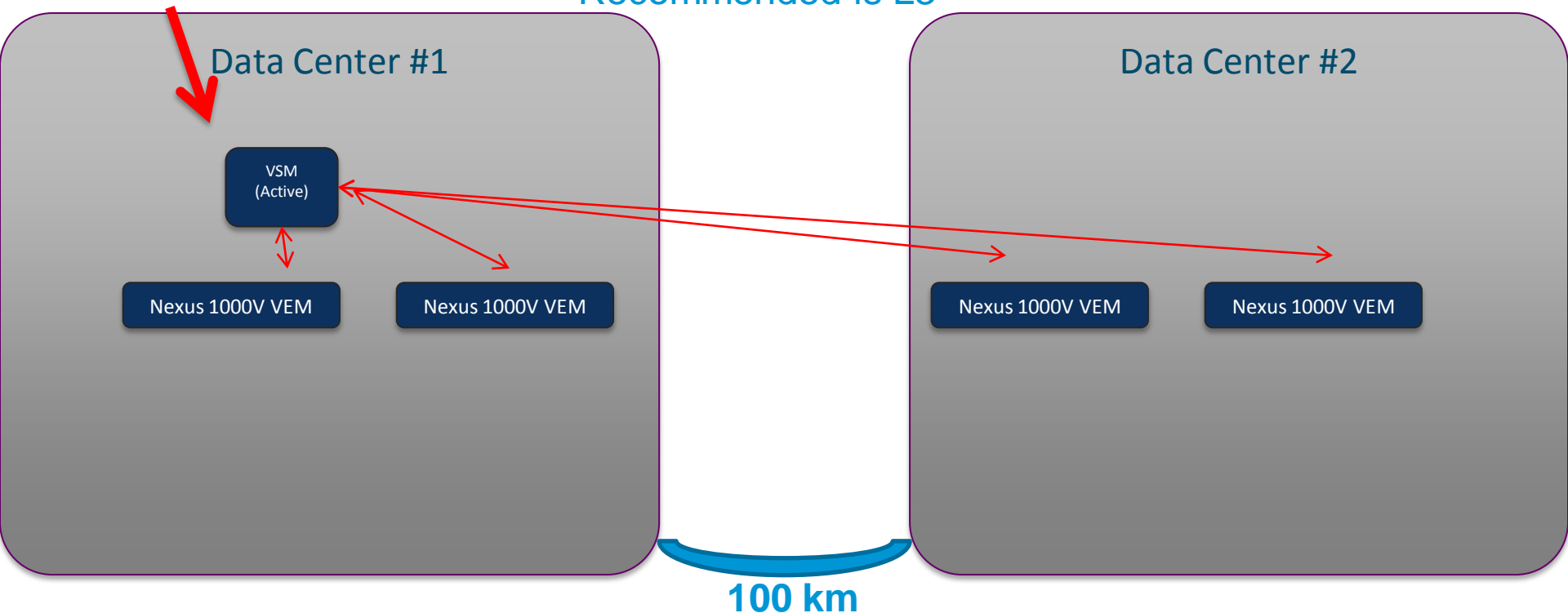
VNMC is a Network Management application with GUI



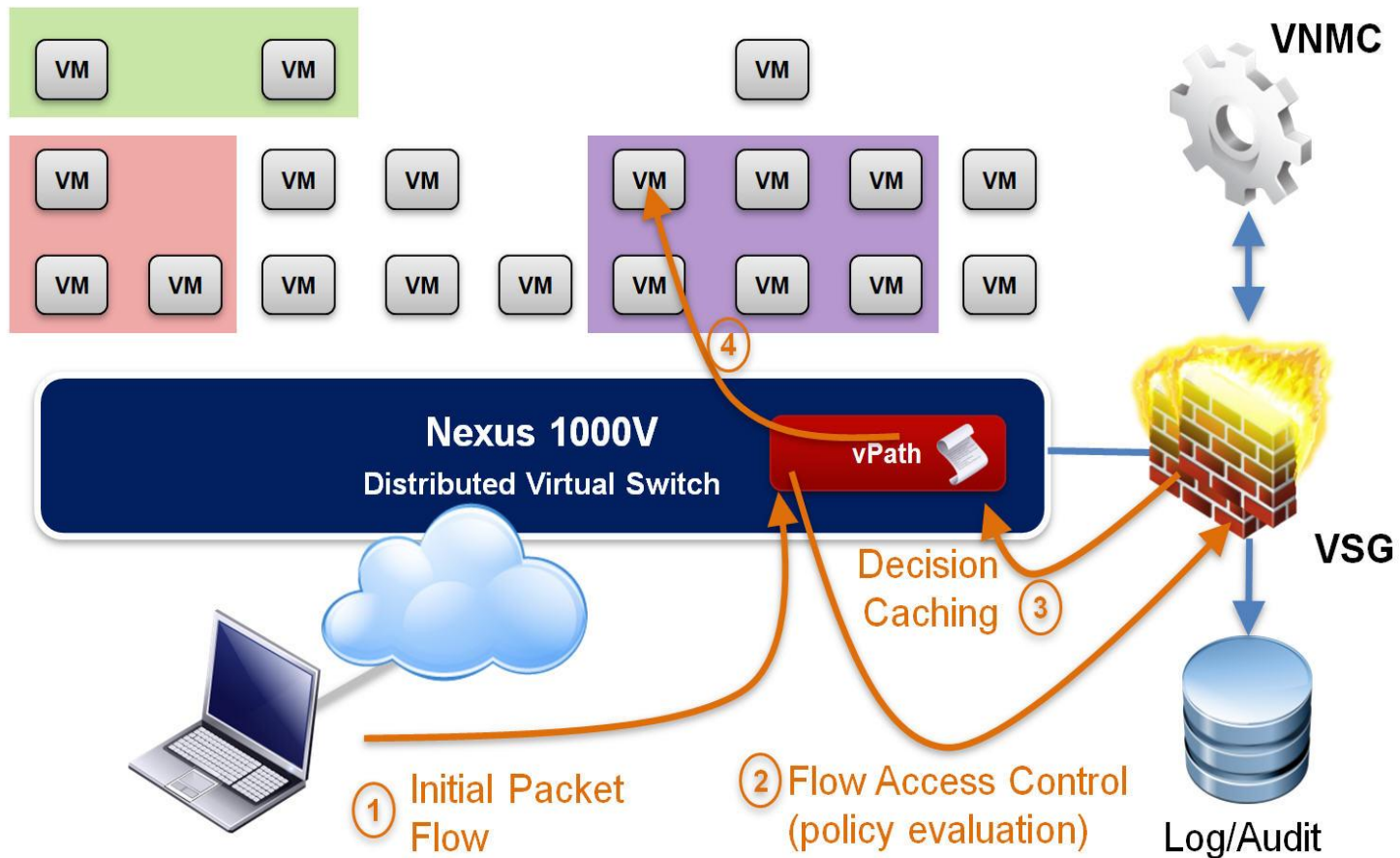
# Workload Mobility: VSM to VEM Control Plane

Nexus 1000V  
VSM

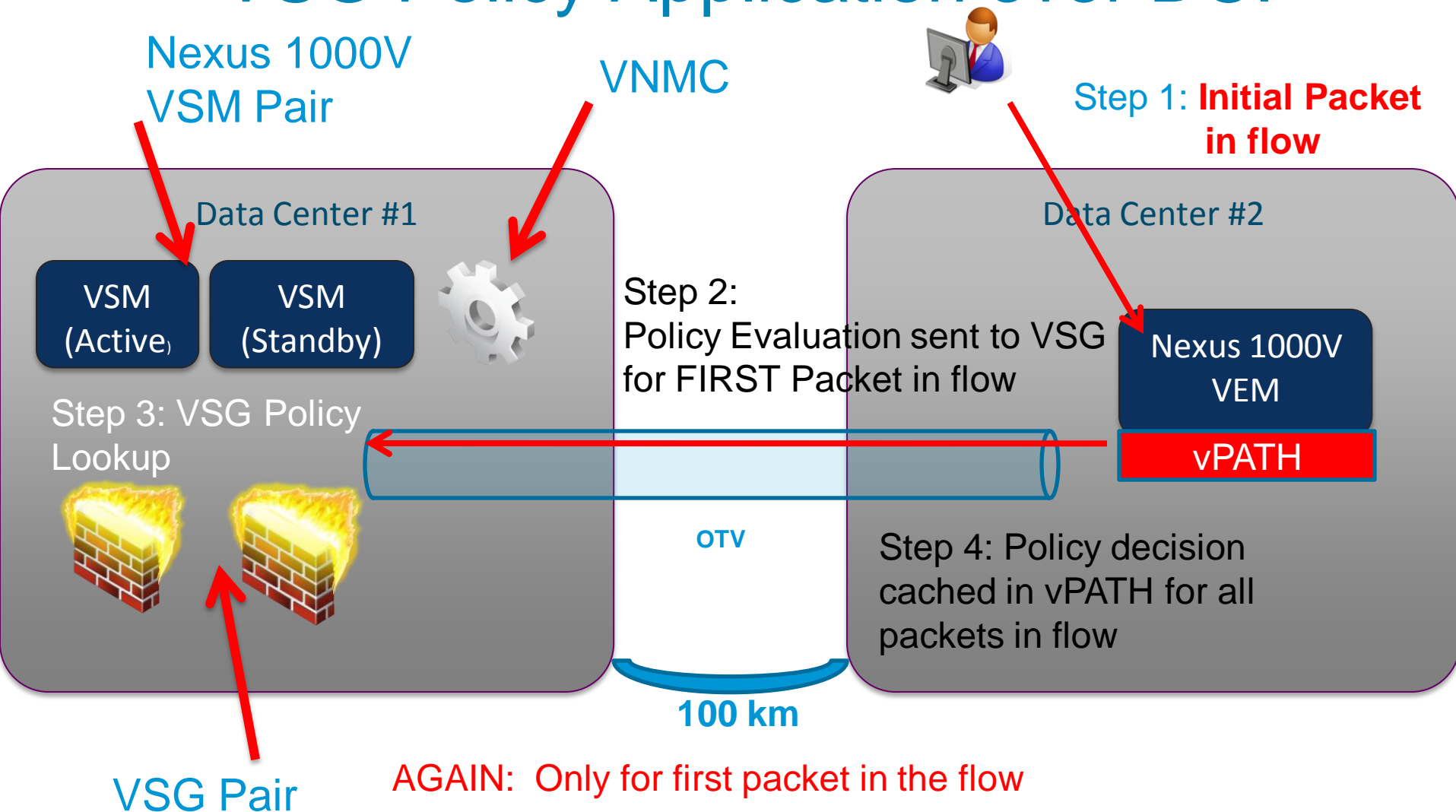
VSM to VEM Control Plane  
Connectivity – Can be L2 or L3  
Recommended is L3



# Workload Mobility: VSG Policy Application



# Workload Mobility: VSG Policy Application over DCI



# Virtualized Workload Mobility with Nexus 1000V

Sal Lopez



# N1K Deployment Requisites

- The following components must be in the **same physical data center**:

| Component   | Version   |
|---|---|
| Nexus 1000V VSM HA Pair, including VSM VM storage | 4.2(1)SV1(4) or later                               |
| vCenter Server and vCenter Server Heartbeat pair  | VMware vSphere 4.1                                  |
| VMware Update Manager                             | VMware vSphere 4.1                                  |
| Nexus 1010 HA Pair                                | 4.2(1)SP1(3)<br>(Release availability: August 2011) |
| Virtual Security Gateway                          | 4.2(1)VSG1(1)                                       |
| Virtual Network Management Center                 | VNMC release 1.0.1                                  |
| IP Storage, if vmk is on N1KV                     | Depends on underlying storage technology            |



# N1K Deployment Requisites

- The following components can be in the **different physical data centers**:

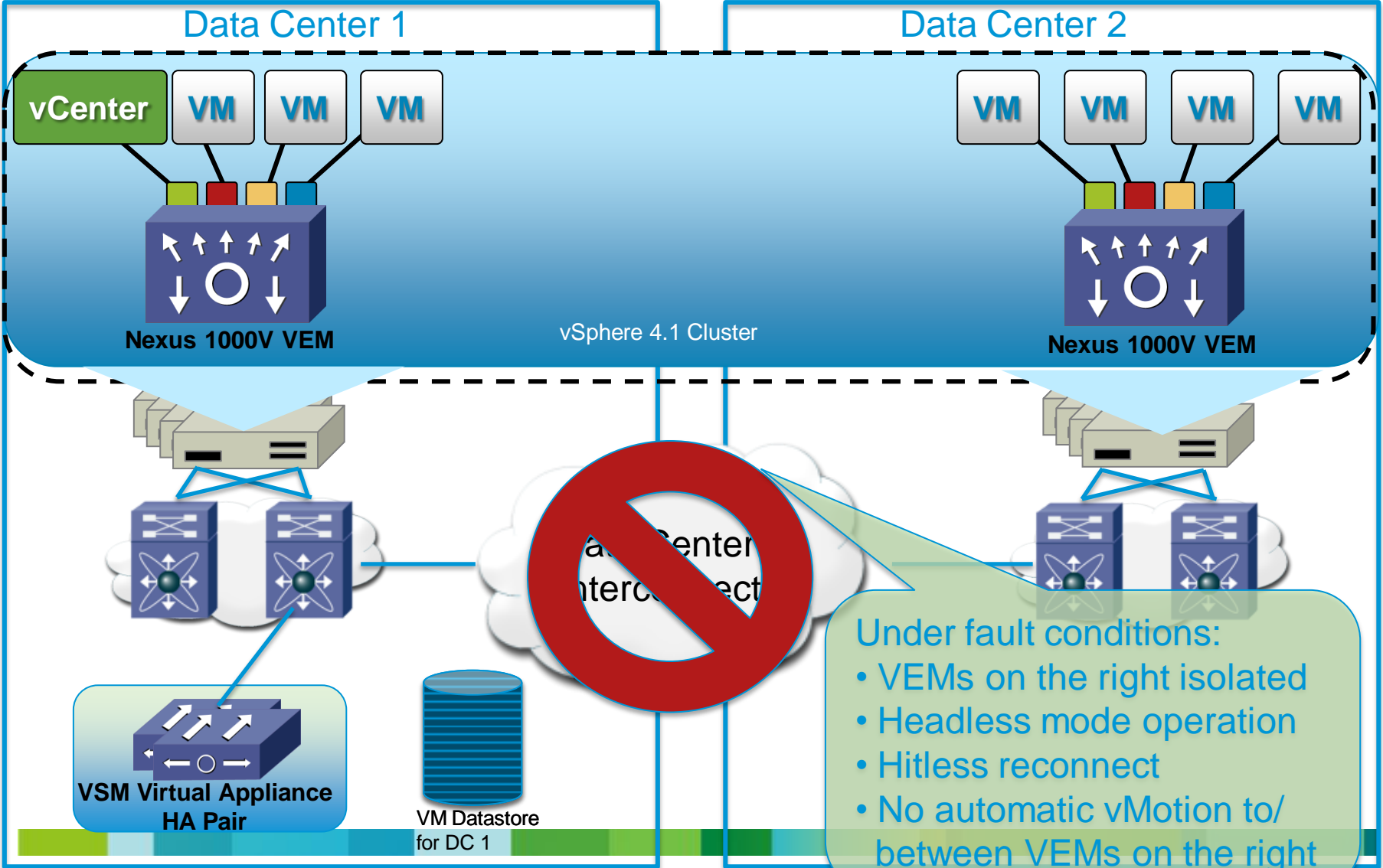
| Component   | Minimum Version                          |
|---|--|
| ESX/ESXi hosts  | VMware vSphere 4.1                       |
| VEM   | 4.2(1)SV1(4)                             |
| VM physical datastores, but must be local to associated VMs | Depends on underlying storage technology |

# N1K Networking Requisites

- L2 must be extended across data centers
- A variety of interconnect technologies are available
  - OTV and vPC validated by SDO
- DCI link must provide 5 ms or better latency between 2 sites (testing with ESXi 5.0 starting soon)
- Routing in data centers should be robust. This is important for L3 control from VSM to VEM.
  - ie. Routing protocol convergence

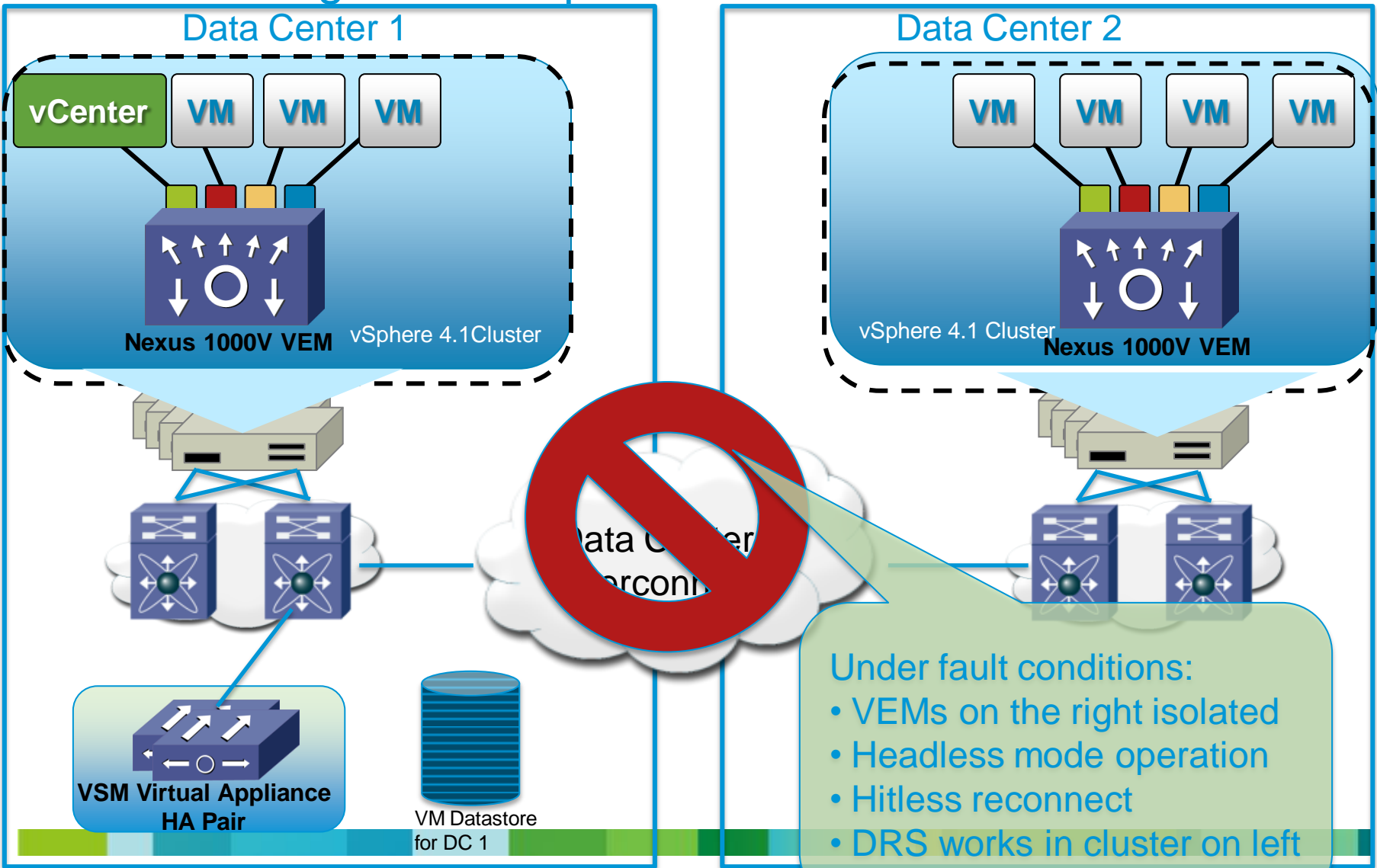
# Failure Scenario – Single, Stretched Cluster

## ESX/ESXi Stretched Cluster



# Failure Scenario – Multi Cluster

## ESX/ESXi Single Cluster per Site



# N1K Scalability requisites

- Stretched Cluster
  - 32 hosts per cluster (16 hosts/site), if using manual HA primary nodes election  
Total of 32 hosts per instance
  - 8 hosts per cluster (4 host/site), if using default HA settings  
Maximum 4 stretched clusters/ N1K instance, total of 32
- Single Cluster/Site - 32 total hosts (max 16 hosts/site)
- 1024 ports (across each N1KV DVS)
- Feature scalability at 50% feature numbers
  - ie. 1024 VLANs and port-profiles instead of 2048, 256 Mcast groups instead of 512, etc.
- “Configuration Limits” to be posted on CCO (available Aug 2011 with 4.2(1)SV1(4a) release)

# Deployment Best Practices

- Use L3 control for VSM-VEM (more flexibility)
- Prioritize N1KV control/management/packet traffic with QoS across DCI
- Use LACP offload (if topology requires LACP)
- VSM migration procedure (will be posted on CCO, August 2011)
- Review 4.2(1)SV1(4a) **release notes** for headless mode caveats (will be posted CCO, August 2011)

# Verifying Latency

For L3 Control From VMS to VEM, can get estimated min/avg/max latency, should be  $\leq 5\text{ms}$

- Ping from VSM to L3 control vmk intf
- Ping from VEM with 'vmkping' to VSM L3 control intf (mgmt0 or control0)

```
~ # vmkping 10.29.170.100
PING 10.29.170.100 (10.29.170.100): 56 data bytes
64 bytes from 10.29.170.100: icmp_seq=0 ttl=254 time=0.495 ms
64 bytes from 10.29.170.100: icmp_seq=1 ttl=254 time=0.555 ms
64 bytes from 10.29.170.100: icmp_seq=2 ttl=254 time=0.386 ms

--- 10.29.170.100 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.386/0.479/0.555 ms
```

# Verifying Latency

For L2 Control, you can use “mping” to estimate latency, which should be  $\leq 5\text{ms}$

```
BL1-VSM# mping broadcast
64 bytes from node 0x0101 (msg id = 0x816e052 1) (time=0 sec, 275 usec)
64 bytes from node 0x0201 (msg id = 0x0cfcbd 1) (time=0 sec, 904 usec)
64 bytes from node 0x0302 (msg id = 0x957607 1) (time=0 sec, 1179 usec)
10.29.176.159
64 bytes from node 0x0402 (msg id = 0x92a1e5 1) (time=0 sec, 1740 usec)
10.29.176.160
64 bytes from node 0x0101 (msg id = 0x816e086 2) (time=0 sec, 609 usec)
64 bytes from node 0x0201 (msg id = 0x0cfcbf 2) (time=0 sec, 624 usec)
64 bytes from node 0x0302 (msg id = 0x957609 2) (time=0 sec, 635 usec)
10.29.176.159
64 bytes from node 0x0402 (msg id = 0x92a1e7 2) (time=0 sec, 648 usec)
10.29.176.160
64 bytes from node 0x0101 (msg id = 0x816e097 3) (time=0 sec, 250 usec)
64 bytes from node 0x0201 (msg id = 0x0cfcbf 3) (time=0 sec, 630 usec)
64 bytes from node 0x0302 (msg id = 0x95760b 3) (time=0 sec, 643 usec)
10.29.176.159
64 bytes from node 0x0402 (msg id = 0x92a1e9 3) (time=0 sec, 653 usec)
10.29.176.160
64 bytes from node 0x0101 (msg id = 0x816e0aa 4) (time=0 sec, 249 usec)
64 bytes from node 0x0201 (msg id = 0x0cfcc0 4) (time=0 sec, 672 usec)
64 bytes from node 0x0302 (msg id = 0x95760d 4) (time=0 sec, 684 usec)
10.29.176.159
```



# Common Verification Commands

This is the same as local DC deployment

```
show system redundancy status
```

```
show inventory
```

```
show module
```

```
show module uptime
```

```
show module vem mapping
```

```
show module vem missing
```

```
show svs connection
```

```
show svs neighbors
```

# Resources



# Data Center Interconnect

## Where to Go for More Information

### Data Center Interconnect General:

<http://www.cisco.com/go/dci>

[http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps708/white\\_paper\\_c11\\_493718.html](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps708/white_paper_c11_493718.html)

### Nexus 7000 OTV Specific:

[http://www.cisco.com/en/US/docs/solutions/Enterprise/Data\\_Center/DCI/whitepaper/DCI3\\_OTV\\_Intro\\_WP.pdf](http://www.cisco.com/en/US/docs/solutions/Enterprise/Data_Center/DCI/whitepaper/DCI3_OTV_Intro_WP.pdf)

### TechWiseTV and Youtube Videos

[http://www.cisco.com/en/US/solutions/ns340/ns339/ns638/ns914/html/TWTV/twtv\\_episode\\_69.html](http://www.cisco.com/en/US/solutions/ns340/ns339/ns638/ns914/html/TWTV/twtv_episode_69.html)

<http://www.youtube.com/watch?v=H5f5Q6UgvnQ&feature=related>

### Cisco Validated Designs

<http://www.cisco.com/go/datacenter>

[http://www.cisco.com/en/US/partner/solutions/ns340/ns414/ns742/ns743/ns749/landing\\_site\\_selection.html](http://www.cisco.com/en/US/partner/solutions/ns340/ns414/ns742/ns743/ns749/landing_site_selection.html)

### Nexus 1000V Resources

<http://www.tinyurl.com/N1k-Resources>

<https://communities.cisco.com/docs/DOC-24984>

# N1K Resources

- CCO Links
  - 1000V: [www.cisco.com/go/1000v](http://www.cisco.com/go/1000v)
  - 1010: [www.cisco.com/go/1010](http://www.cisco.com/go/1010)
  - VSG: [www.cisco.com/go/vsg](http://www.cisco.com/go/vsg)
  - VNMC: [www.cisco.com/go/vnmc](http://www.cisco.com/go/vnmc)
  - vWAAS: [www.cisco.com/go/waas](http://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](http://www.cisco.com/go/1000vdownload)
- N1K Product Page: [www.cisco.com/go/1000v](http://www.cisco.com/go/1000v)
- N1K Community: [www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity)
- N1K Twitter [www.twitter.com/official\\_1000V](http://www.twitter.com/official_1000V)
- N1K Webinars: [www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity)
- N1K Case Studies: [www.tinyurl.com/n1k-casestudy](http://www.tinyurl.com/n1k-casestudy)
- N1K Whitepapers [www.tinyurl.com/n1k-whitepaper](http://www.tinyurl.com/n1k-whitepaper)
- N1K Deployment Guide: [www.tinyurl.com/N1k-Deploy-Guide](http://www.tinyurl.com/N1k-Deploy-Guide)
- VXI Reference Implementation: [www.tinyurl.com/vxiconfigguide](http://www.tinyurl.com/vxiconfigguide)
- N1K on UCS Best Practices: [www.tinyurl.com/N1k-On-UCS-Deploy-Guide](http://www.tinyurl.com/N1k-On-UCS-Deploy-Guide)

# N1K Public Webinars

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

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

Webinar Link: [www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity)

Upcoming Webinars: [PCI 2.0](#) (10-Aug-2011)

# 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)



Q & A

Thank you.

