



Nexus 1000V Key Features Overview

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Cisco Confidential



Nexus 1000V Public Webinar Series

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
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

Virtual Network Services

Today's Agenda

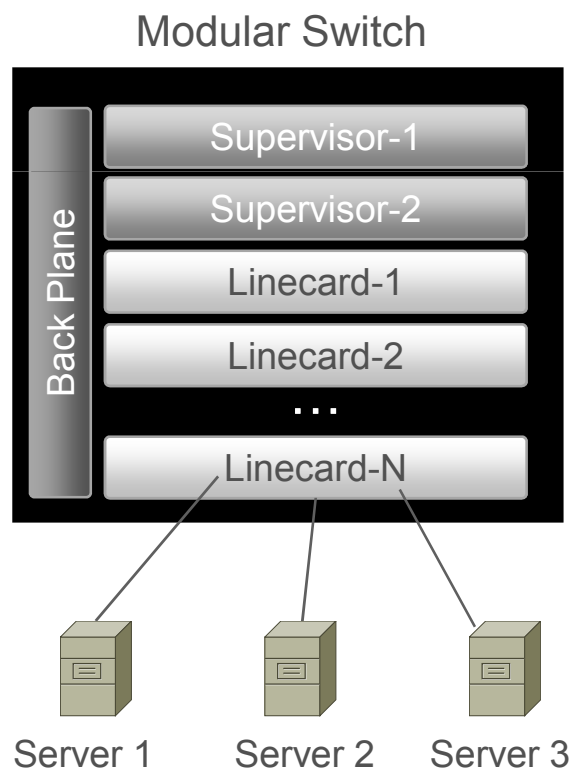
- Nexus 1000V Architecture – Joe Dillon
 - Virtual Supervisors and Ethernet Modules
 - Virtual Service Datapath (vPath)
- Nexus 1000V Key Features – Syed Ghayur
- Q &A

Nexus 1000V Architecture Overview



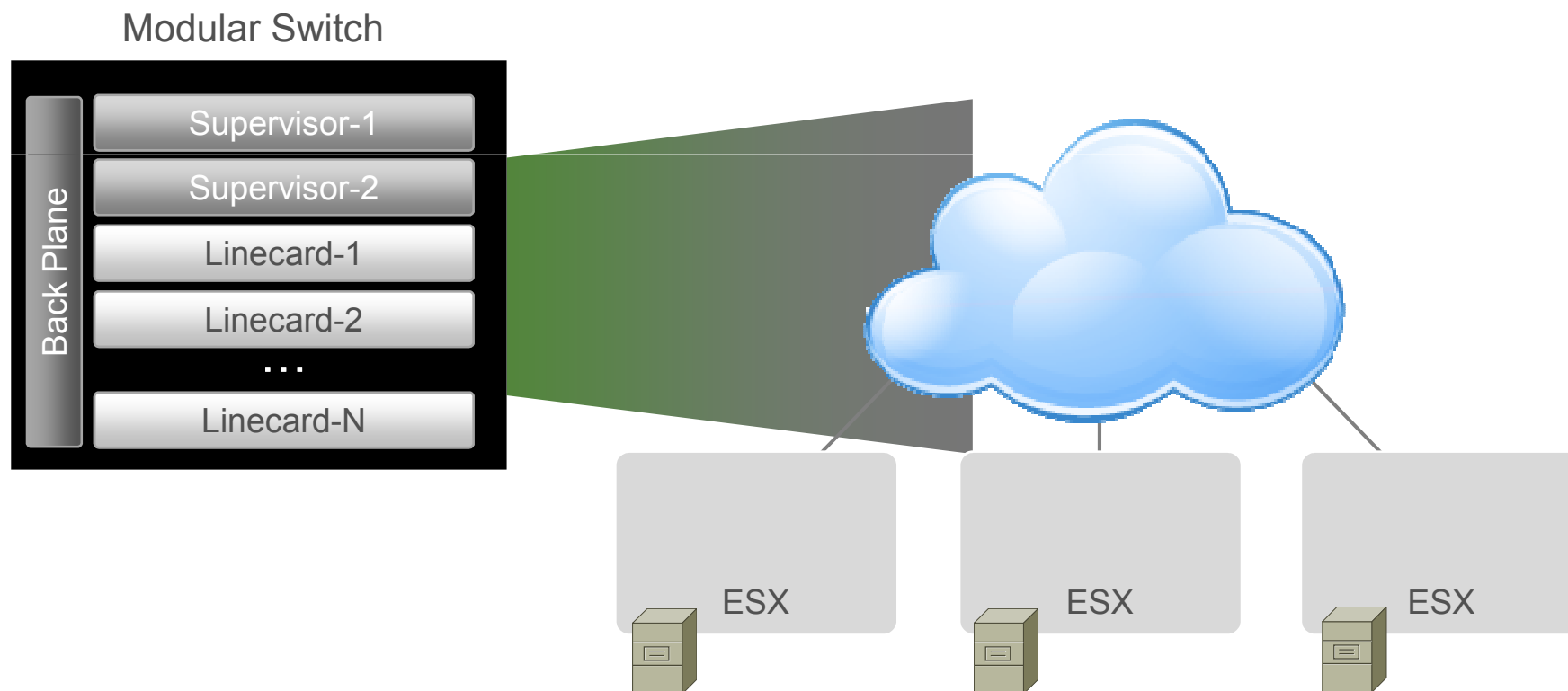
Nexus 1000V Architecture

Comparison to a Physical Switch



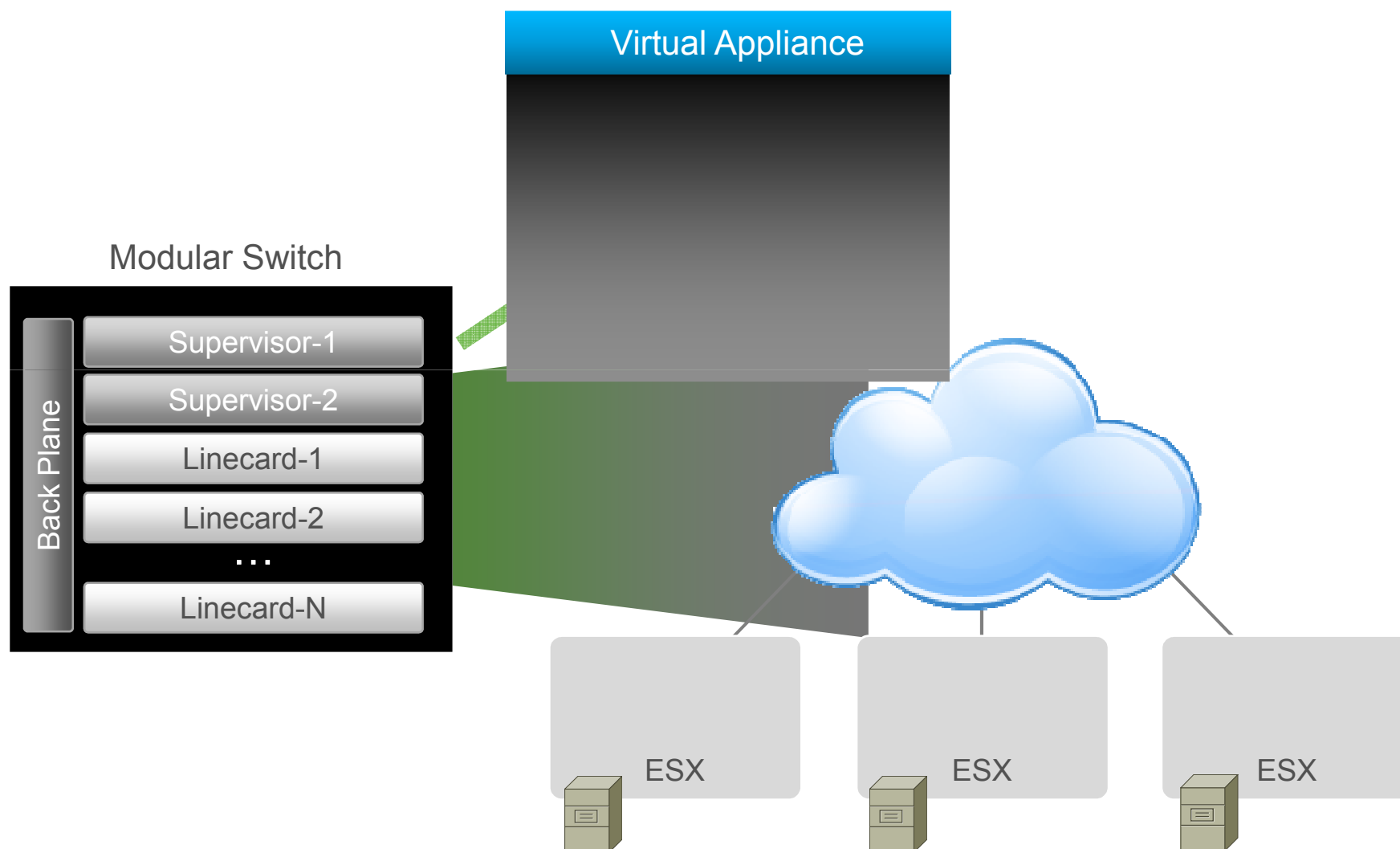
Nexus 1000V Architecture

Moving to a Virtual Environment



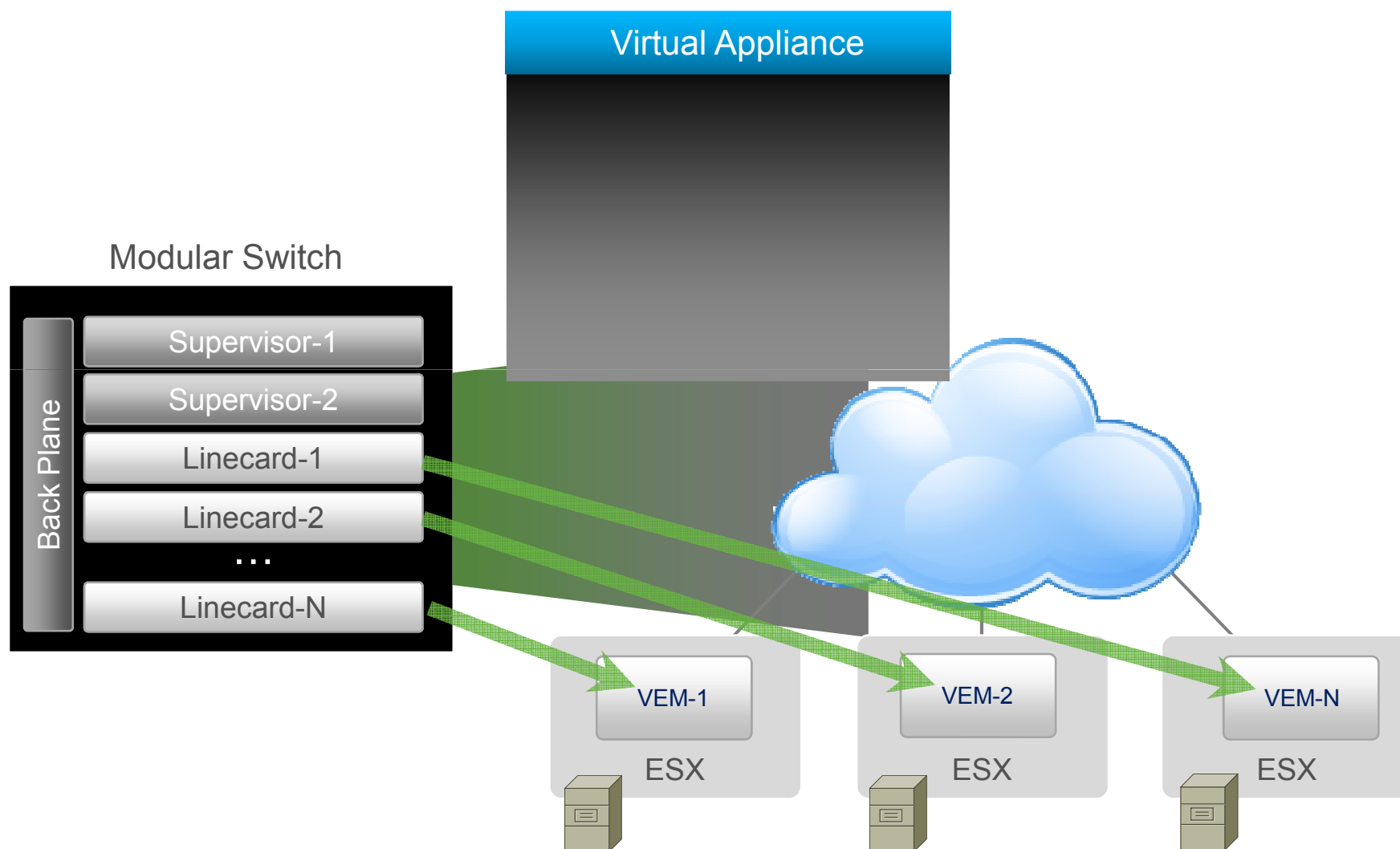
Nexus 1000V Architecture

Supervisors → Virtual Supervisor Modules (VSMs)



Nexus 1000V Architecture

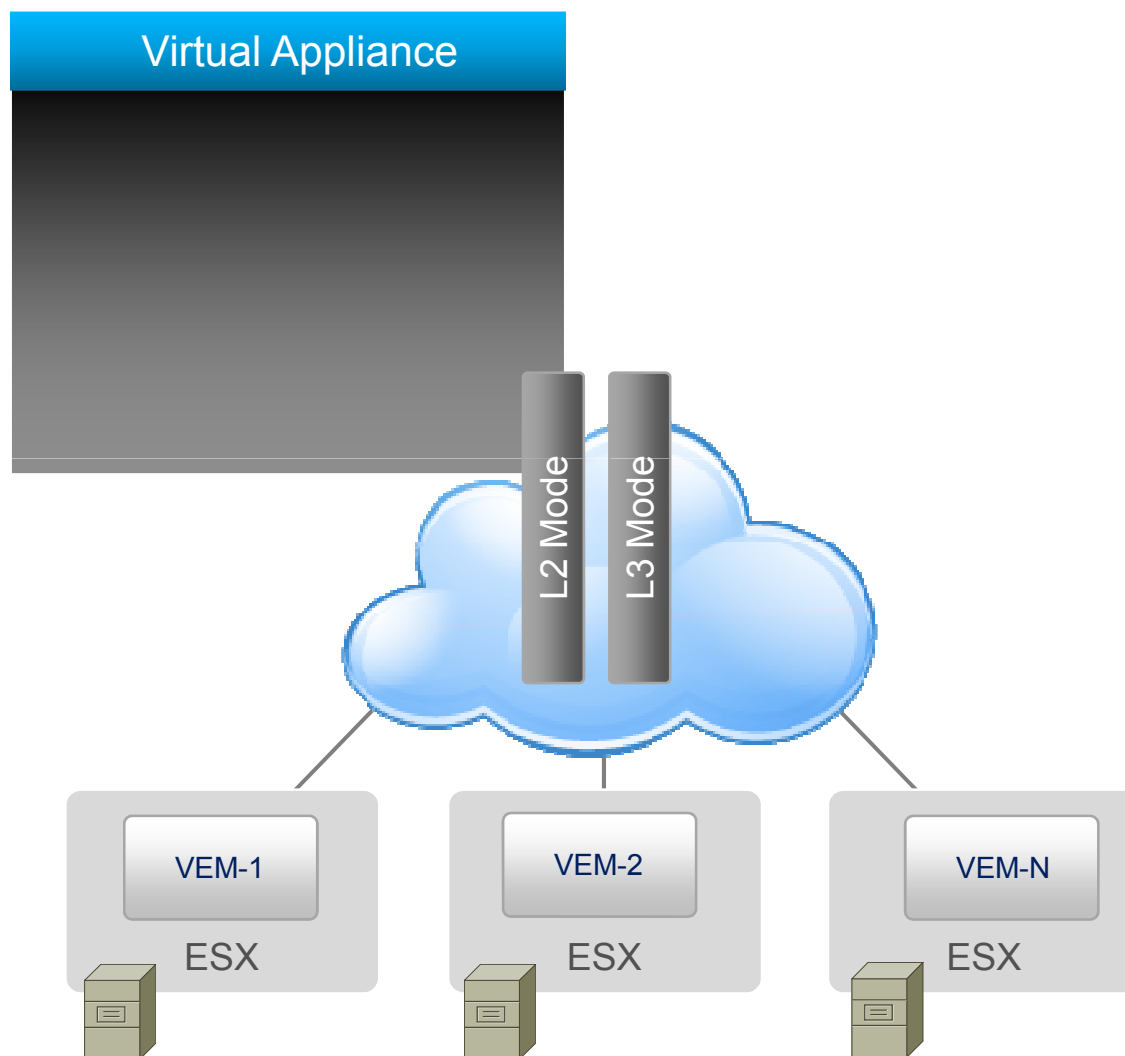
Linecards → Virtual Ethernet Modules (VEMs)



Nexus 1000V Architecture

VSM + VEMs = Nexus 1000V Virtual Chassis

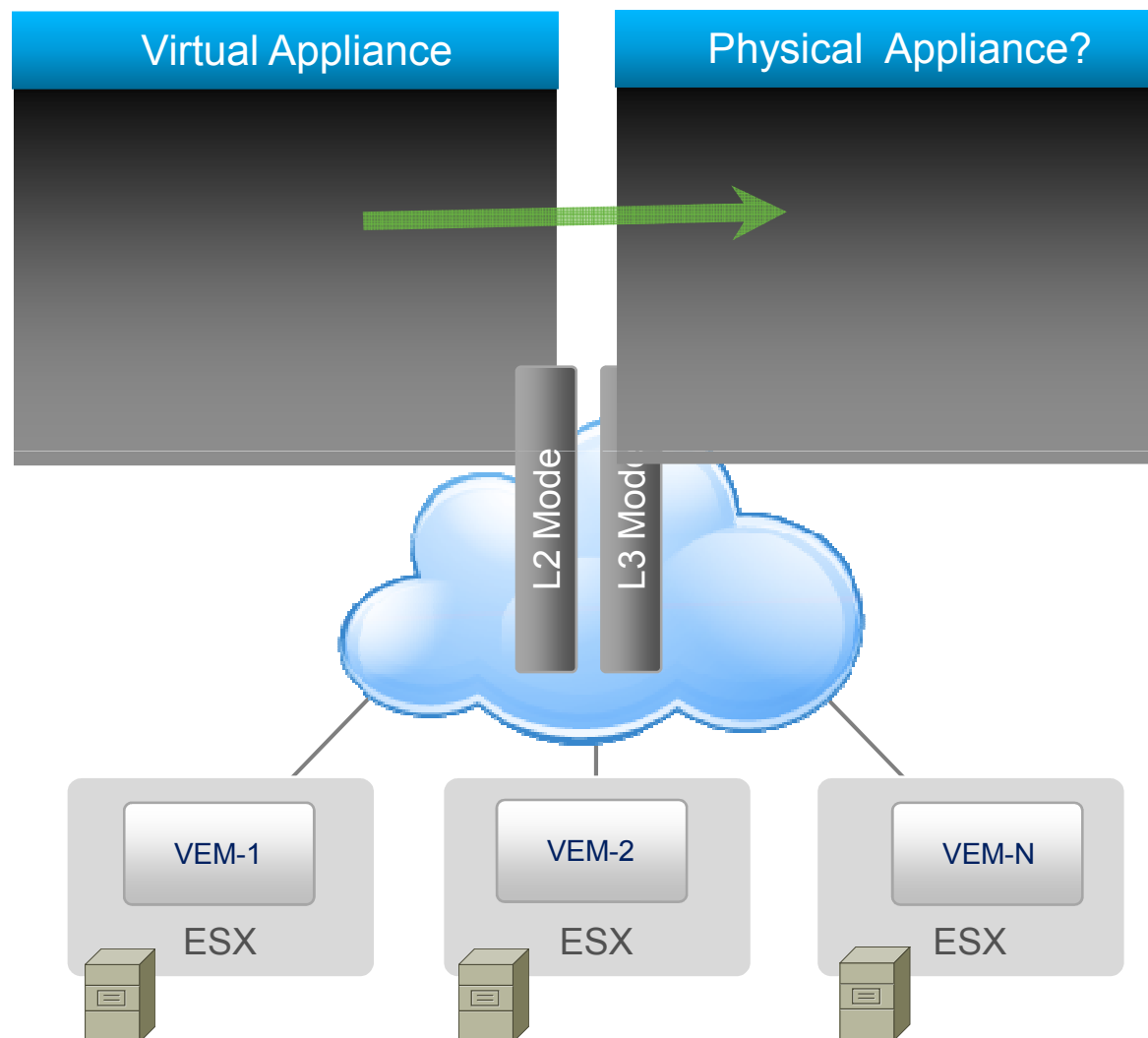
- 64 VEMs per 1000V (connected by L2 or L3)
- 200+ vEth ports per VEM
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter



VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Nexus 1000V Architecture

Customer Request: Host VSMs on a Physical Appliance



- 200+ vEth ports per VEM
- 64 VEMs per 1000V
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter

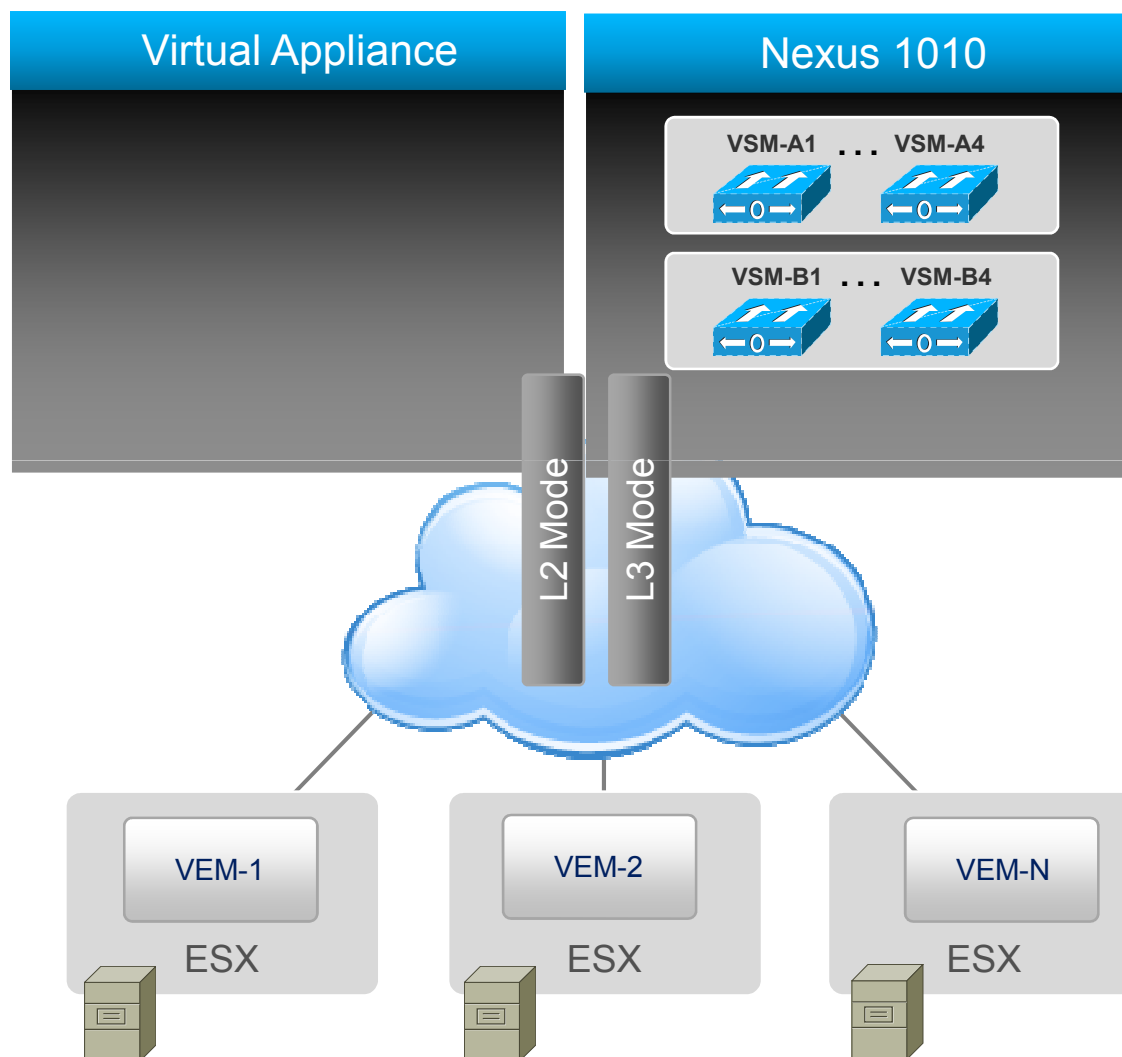
VSM: Virtual Supervisor Module

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

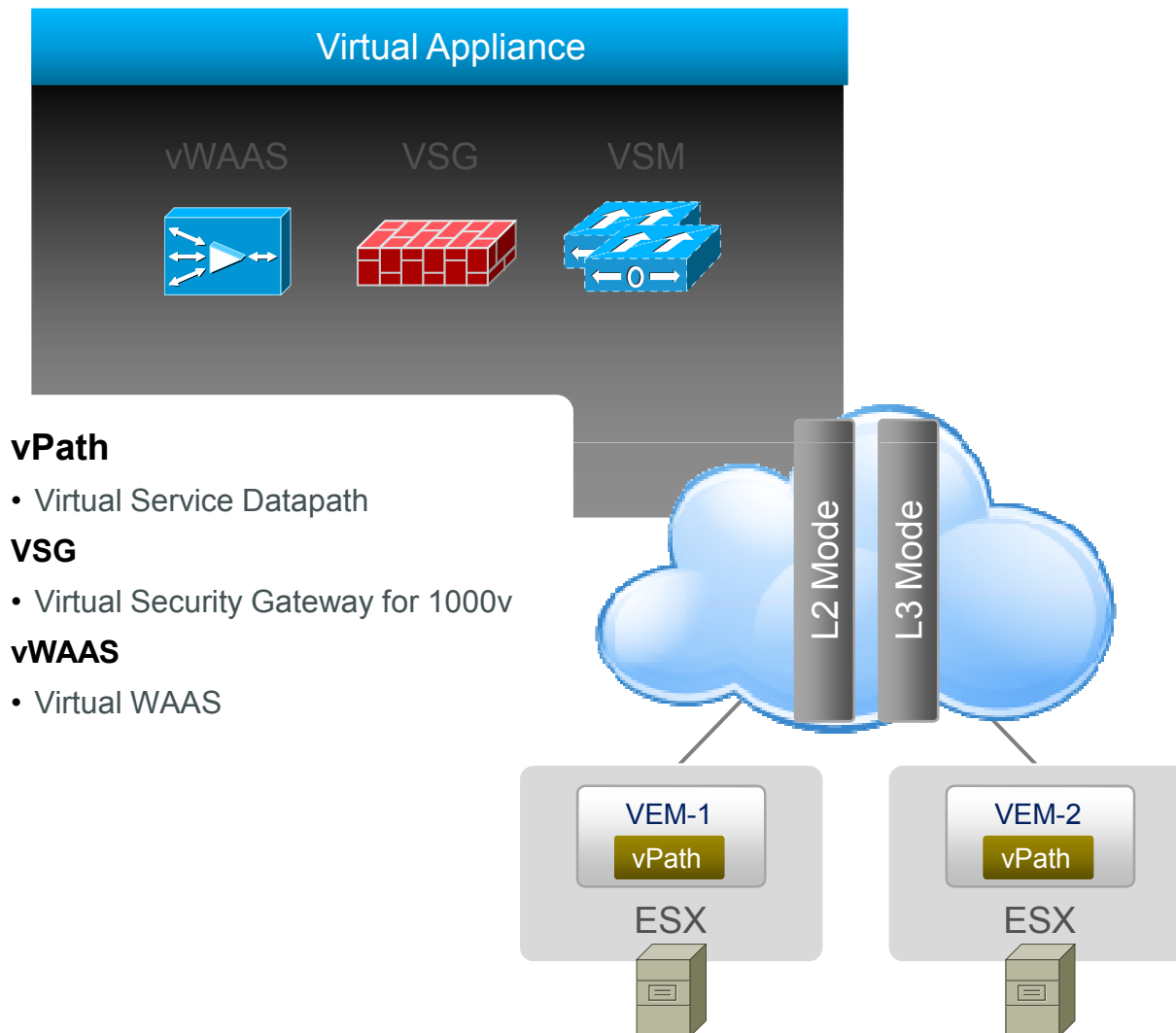


- 200+ vEth ports per VEM
- 64 VEMs per 1000V
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter

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

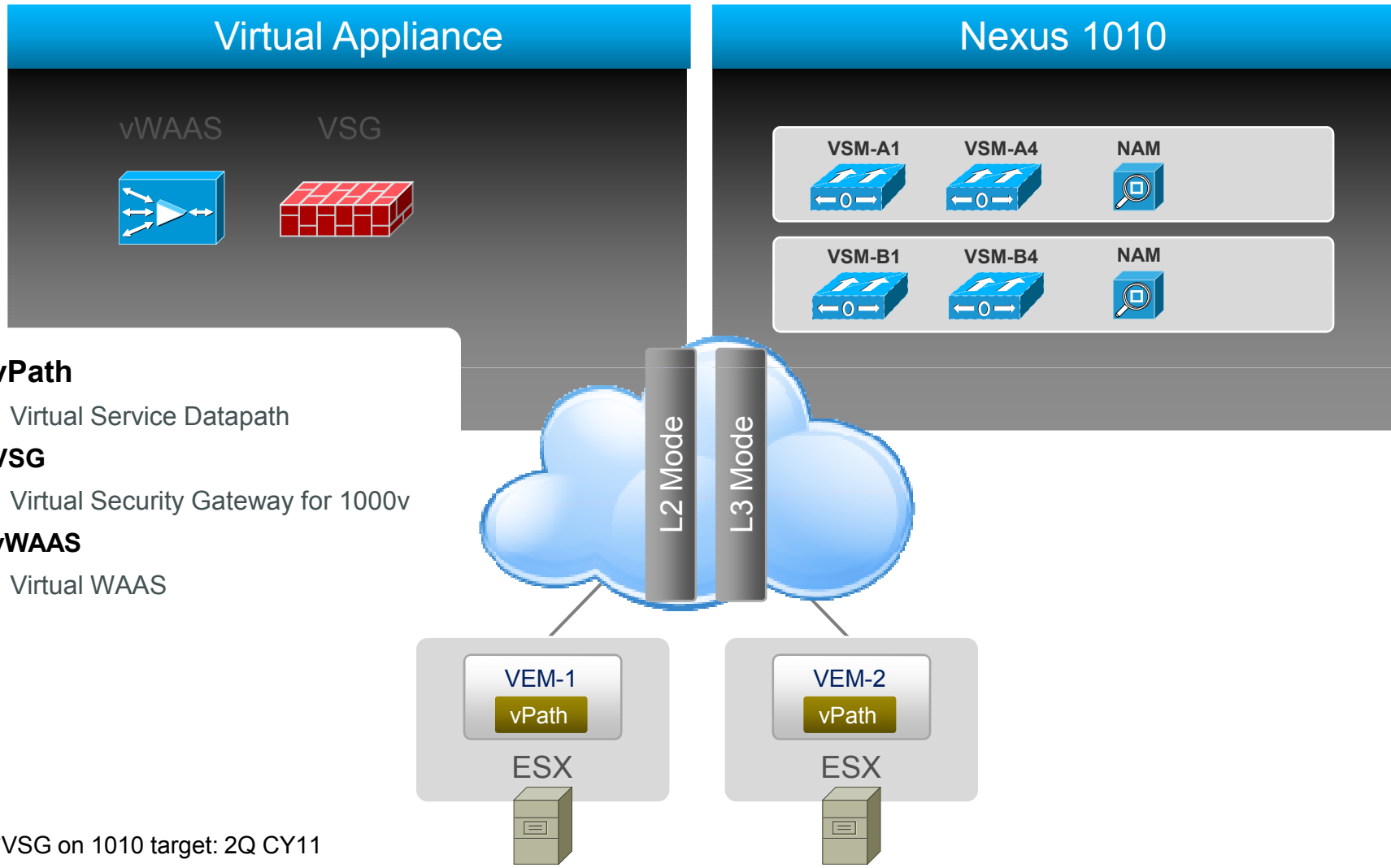
- Virtual WAAS

vPath

- Traffic Steering
- Fast -Path Offload

• **Nexus 1000V ver 1.4 & above**

Nexus 1010 – Hosting Platform for Services



Nexus 1000V

Key Features

Technical Marketing Engineer
Syed Ghayur

Agenda



Deployment Flexibility Feature

Class Based Weighted Fair Queuing (CBWFQ)

Integration with vCloud Director

vPath – Virtual Services Data Path

Policy Based ERSPAN

Port-profile Visibility Feature

Scalability

Security Features

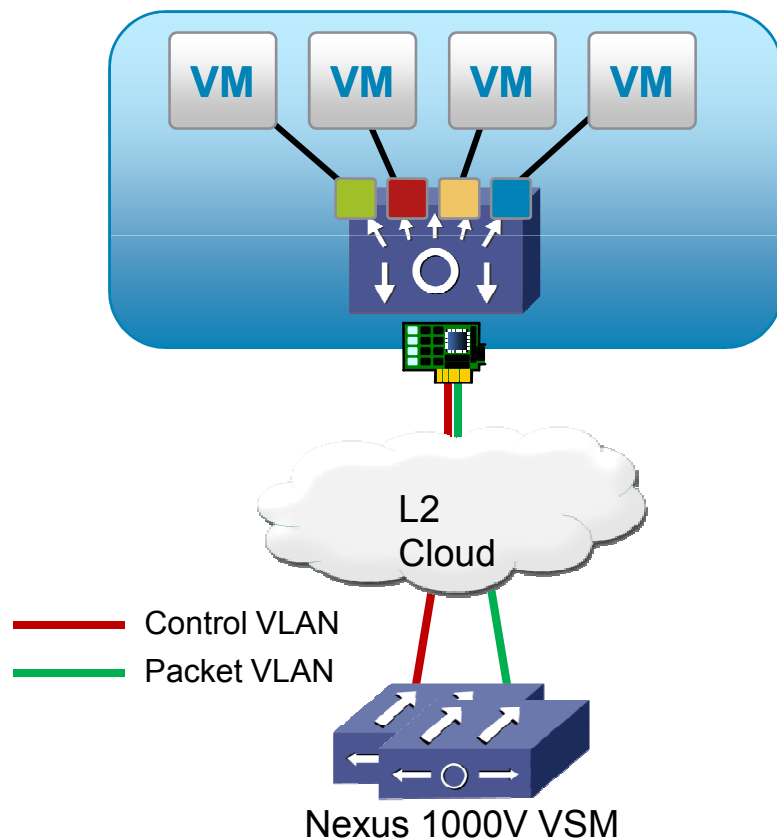
Summary



Deployment Flexibility Feature: L2 / L3 Mode

Layer 2 connectivity of the VSM and VEM

Two virtual interfaces are used to communicate between the VSM and VEM



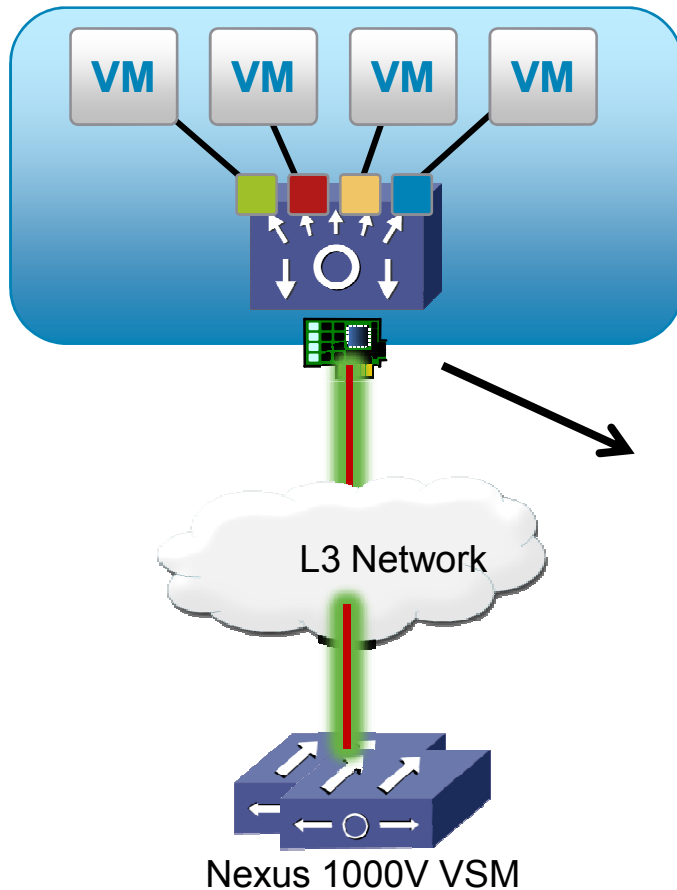
Control VLAN

- Extend the usual backplane of the switch over the network
- Carries low level messages to ensure proper configuration of the VEM.
- Maintains a 1sec heartbeat with the VSM to the VEM (timeout 6 seconds)
- Maintains synchronization between primary and secondary VSMs

Packet VLAN

For control plane processing like CDP, IGMP snooping, or stat collections like SNMP, Netflow

L3 VSM Connectivity



The VEM will use the VMkernel interface to tunnel the Control Traffic using **UDP** to the VSM

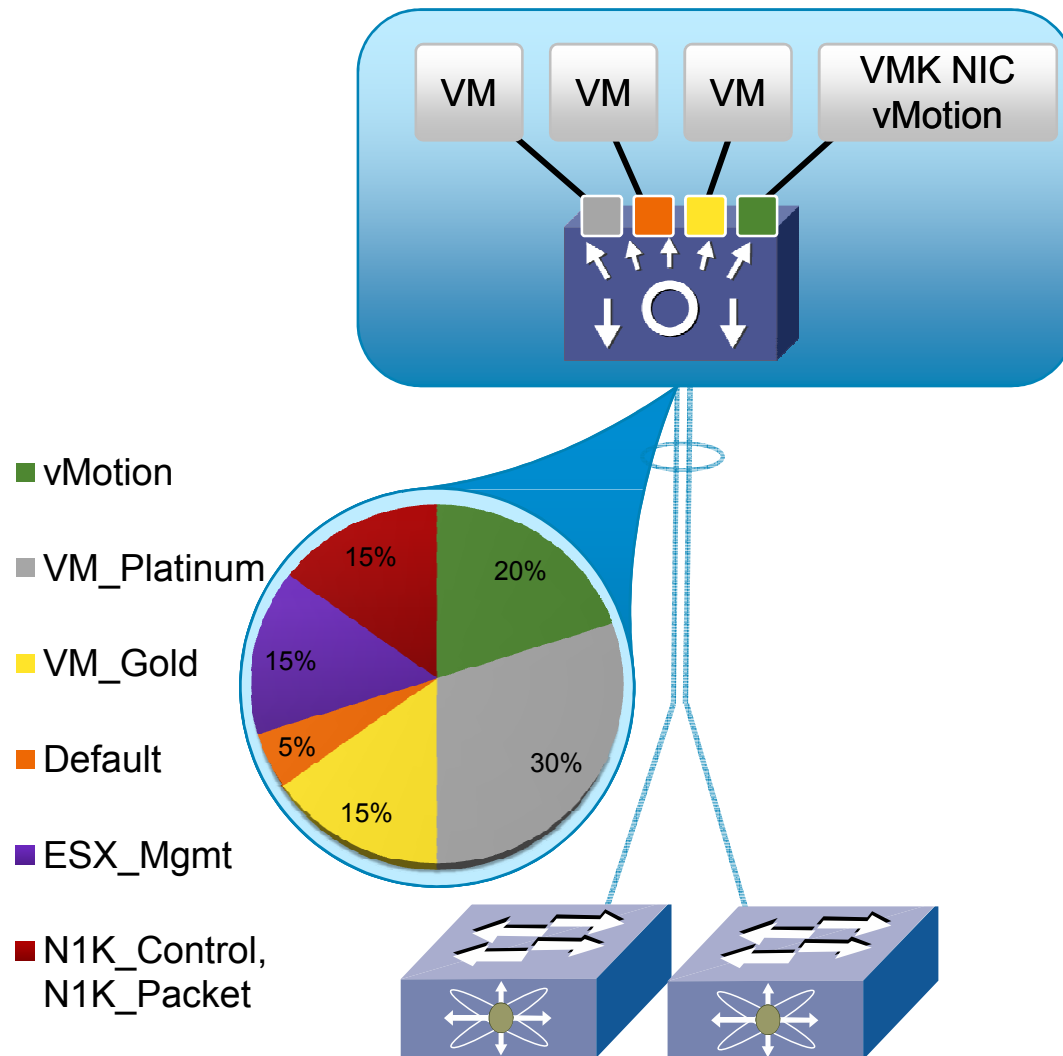
Create a VMkernel Interface per VEM and attached a l3control port-profile

port-profile Layer3
capability **l3control**
switchport mode access
switchport access vlan 1401
system vlan 1401



Class-Based Weighted Fair Queuing on Nexus 1000V

Class-Based Weighted Fair Queuing on Nexus 1000V



- Provide bandwidth guarantee for up to 64 total queues on uplinks
- User defined Queues
- 8 Predefined traffic classes
 - For VMware and N1KV protocol traffic
- Queuing configured via MQC

Class-Based Weighted Fair Queuing on Nexus 1000V

- Configure up to 56 custom queuing classes of VM, vApp data and other traffic
- Each queue can have a queue limit (# of packets)
- Queuing is done per physical uplink outbound
- 8 predefined protocol classes:
 - vMotion
 - FT-Logging
 - iSCSI
 - NFS
 - ESX Management
 - N1K Control
 - N1K Packet
 - N1K Management

CBWFQ Configuration

- Step 1: Create queuing class-map and define the traffic class.

```
class-map type queuing [match-all | match-any] {class-map-name}  
    match [cos | protocol] {cos-value | protocol-name}
```

- Example:

```
class-map type queuing match-all vmotion_class  
    match protocol vmw_vmotion  
class-map type queuing match-all vm_platinum_class  
    match cos 5
```

CBWFQ Configuration (cont.)

- Step 2: Create queuing policy-map to define the queue.

```
policy-map type queuing [match-first] {policy-map-name}  
  class type queuing {class-map-name}  
    bandwidth percent {value}  
    [queue-limit] {value} packets
```

- Example:

```
policy-map type queuing uplink_queue_policy  
  class type queuing vmotion_class  
    bandwidth percent 20  
    queue-limit 1000 packets  
  class type queuing vm_platinum_class  
    bandwidth percent 30
```

CBWFQ Configuration (cont.)

- Step 3: Apply queuing service-policy to uplink port-profile outbound.

The service-policy can also be applied to physical ethernet or port-channel interfaces.

```
port-profile type ethernet {port-profile-name}
```

```
service-policy type queuing output {policy-map-name}
```

- Example:

```
port-profile type ethernet system-uplink
```

```
service-policy type queuing output uplink_queue_policy
```


CBWFQ Basic Verification

- **show policy-map interface {interface-name}**
- **Example**

```
BL-VSM-A# show policy-map interface port-channel 2
```

```
Global statistics status : enabled
```

```
port-channel2
```

```
Service-policy (queuing) output: uplink_queue_policy  
policy statistics status: enabled
```

```
Class-map (queuing): vmotion_class (match-all)  
  Match: protocol vmw_vmotion  
  bandwidth percent 20  
  queue-limit 150 kbytes  
  queue dropped pkts : 0
```

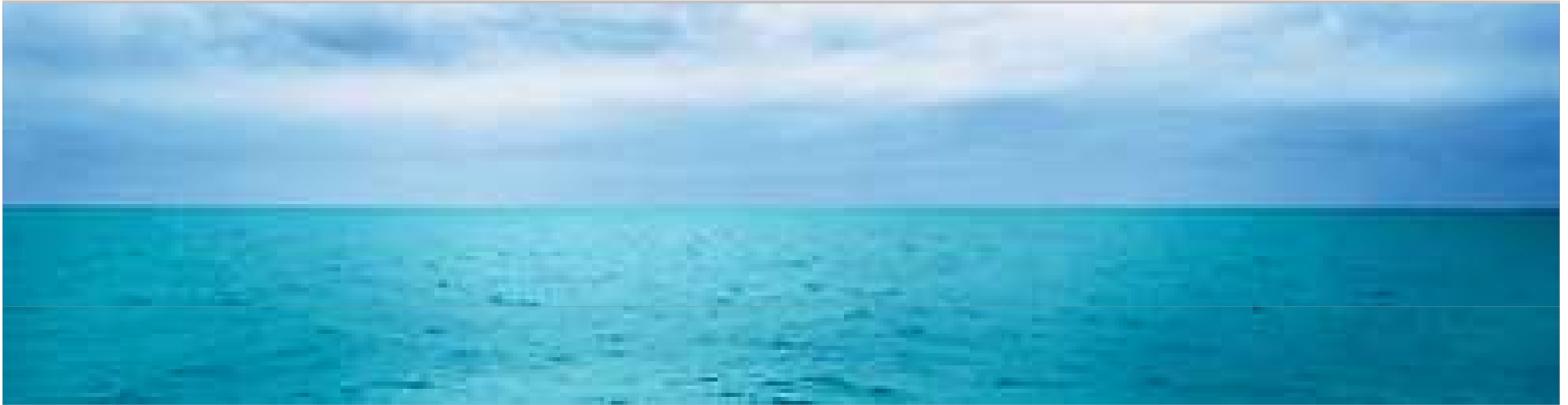
```
Class-map (queuing): vm_platinum_class (match-all)  
  Match: cos 5  
  bandwidth percent 30  
  queue dropped pkts : 0
```

CBWFQ Basic Verification (Cont.)

- **show policy-map interface brief**
- **Example**

```
BL-VSM-A# show policy-map interface brief
```

```
Interface/VLAN [Status]:INP QOS      OUT QOS      INP QUE      OUT QUE
=====
port-channel1  [Active]:
port-channel2  [Active]:
Vethernet2     [Active]:      platinum_in_m
Vethernet7     [Active]:      platinum_in_m
Vethernet9     [Active]:      platinum_in_m
Vethernet10    [Active]:      platinum_in_m
Vethernet11    [Active]:      platinum_in_m
=====
```

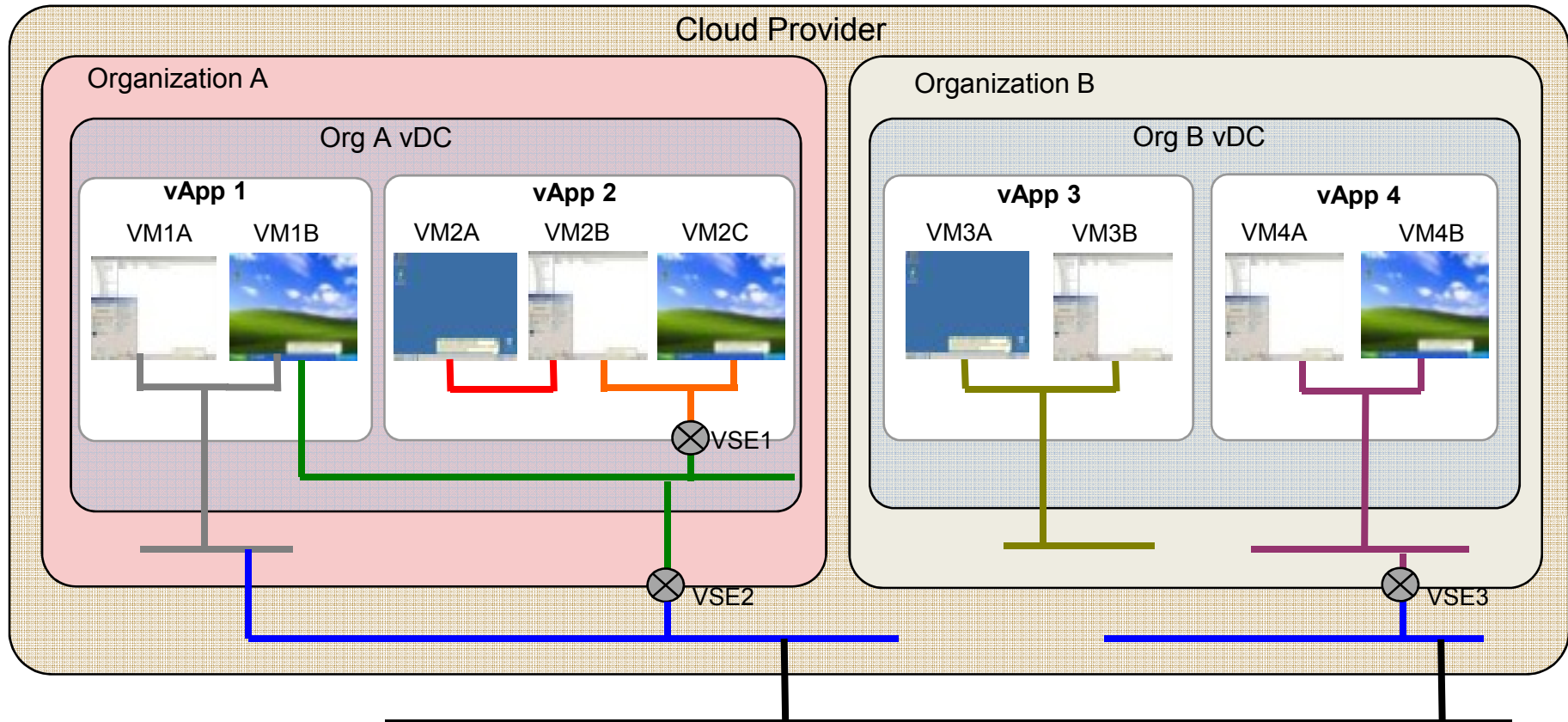


Nexus 1000V and VMware vCloud Director

VMware vCloud Director and Cisco Nexus 1000V Interoperability

- 3 Network Types on vCD
 - vApp Internal
 - Organization
 - Provider
- Layer-2 networking isolation domains in the cloud to be allocated automatically during deployment time
- This is done via Network Pools
 - Port-Group Backed
 - VLAN Backed
 - VCNI Backed
- Deployed with Nexus 1000V using Port-Group backed Network pools
- vethernet type Port-Profiles provide port-group backed with VLAN based isolation functionality

vCloud Director and Nexus 1000V Networking



Network Type	Label	Nexus 1000V Port-Profile
vApp Internal Network	— —	N1KV_vApp_VLAN301 N1KV_vApp_VLAN300
Organization Directly Connected External Network	—	Connected to N1KV_Provider_Ext
Organization Routed Network	—	N1KV_Org_VLAN200, N1KV_Org_VLAN201
Provider External Network	—	N1KV_Provider_VLAN170

Isolation Domains

- VMware vCloud Director provides 2 mechanisms for this
- VLAN based isolation
 - 802.1Q Standards based with “port-group backed” or “VLAN backed” network pools
 - VLAN isolation has major benefits, as in physical networks like QoS, monitoring and security
 - Nexus 1000V supports VLAN based isolation with “port-group backed” pools
- vCloud Director Network Isolation (VCNI)
 - VMware specific to be used with vSphere vDS

Configuration Guidelines

- VSM must be present on vCenter to be used with vCloud
- Predefine port-profiles prior to vCloud networks definition
- Allocate a range of VLAN IDs to use for vCloud deployment and associate each to a unique port-profile
- Use descriptive port-profile names that include type of network and/or customer information

VLAN ID

vApp, Organization or Provider part of name

- Use these when creating port-group backed network pools from vCloud Director interface
- Will eventually be assigned to a VM by vCloud Director, so can use QoS and security within port-profile

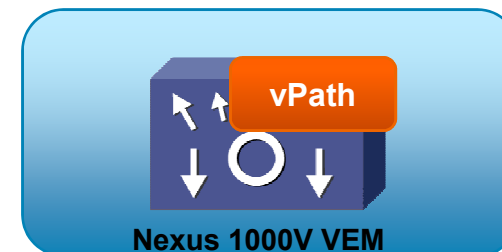


vPath – Virtual Service Data Path

Virtual Service Datapath (vPath)

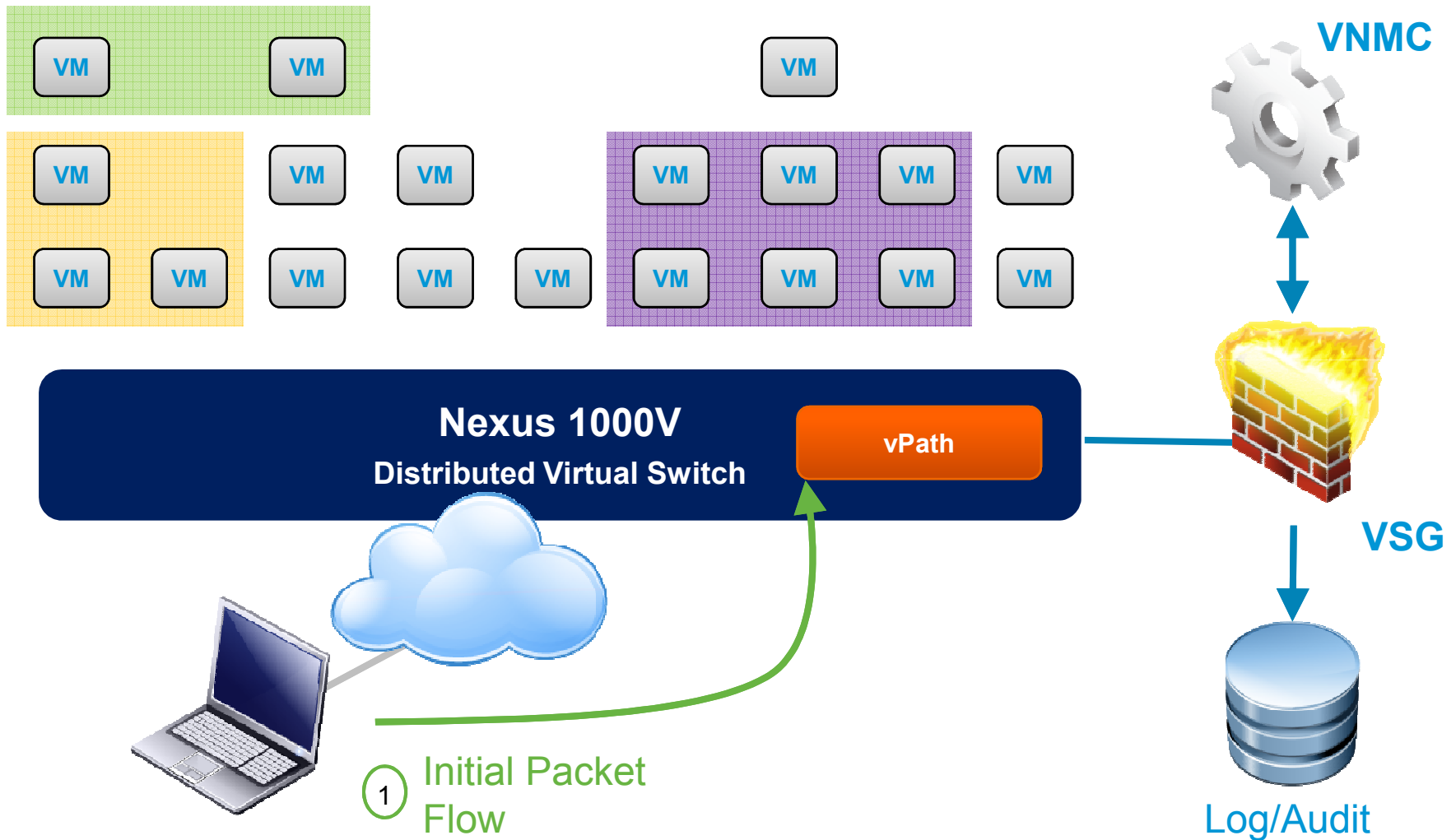
Enabling Virtual Network Services

- Intelligent data plane component integrated into Nexus 1000V VEM
- Enables the use of Virtual Service Nodes
Virtual Security Gateway (VSG), vWAAS
- Provides traffic steering and processing of intelligent network services at the hypervisor
- Multi-tenant aware
- Virtual Network Service configured at port-profile level
- Tables and flows formed dynamically and works with vMotion



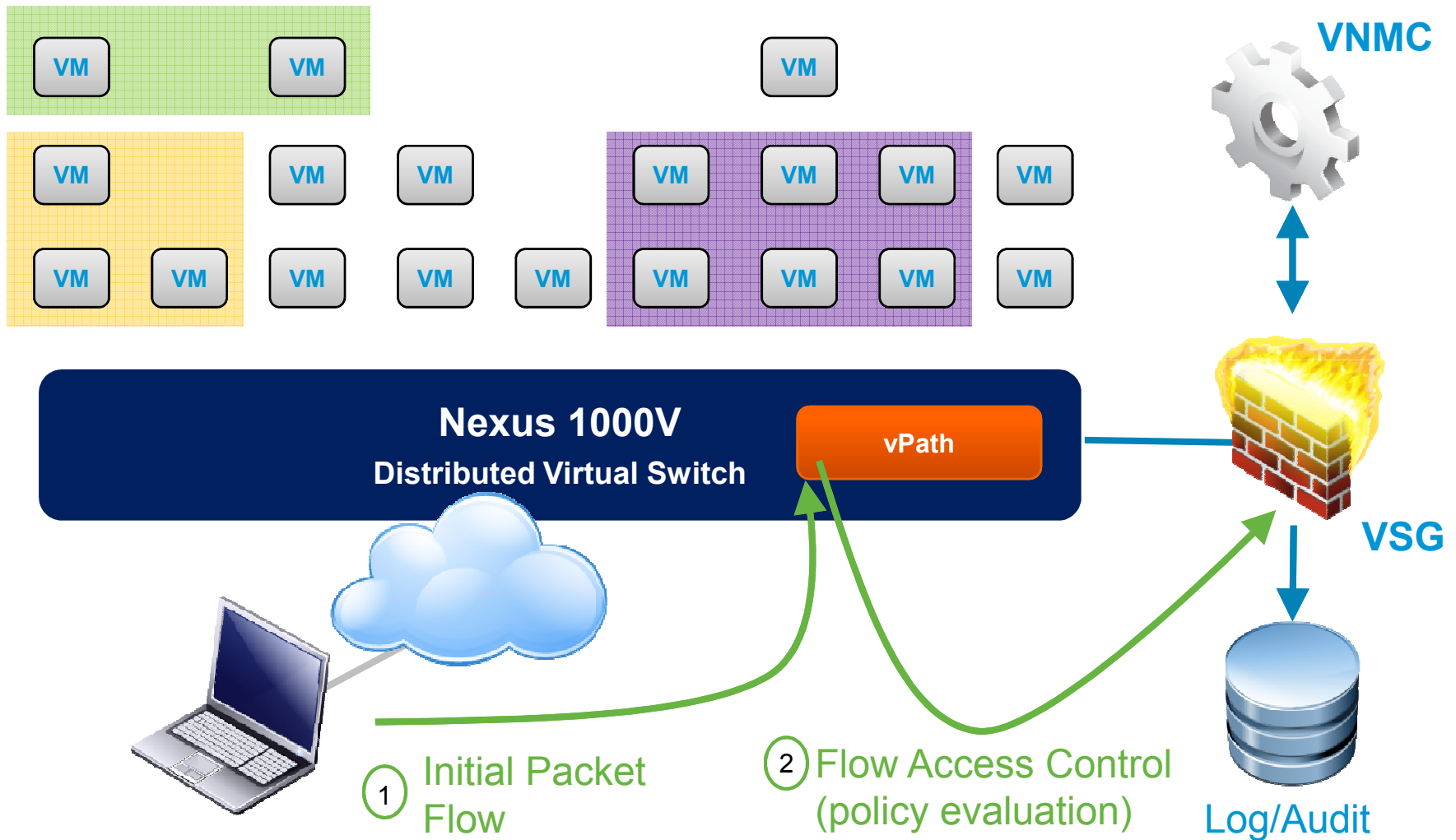
Virtual Security Gateway

Intelligent Traffic Steering with vPath



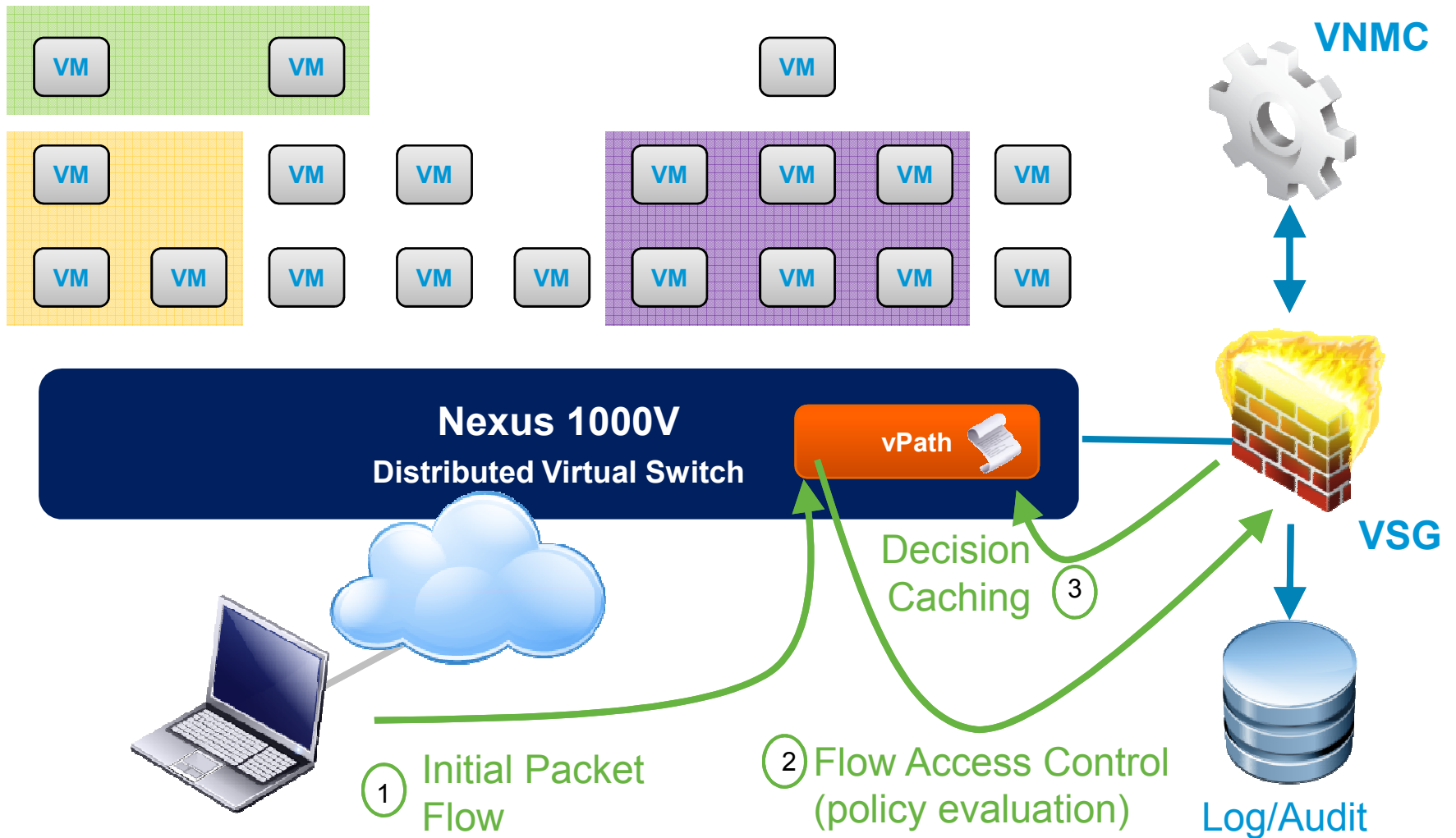
Virtual Security Gateway

Intelligent Traffic Steering with vPath



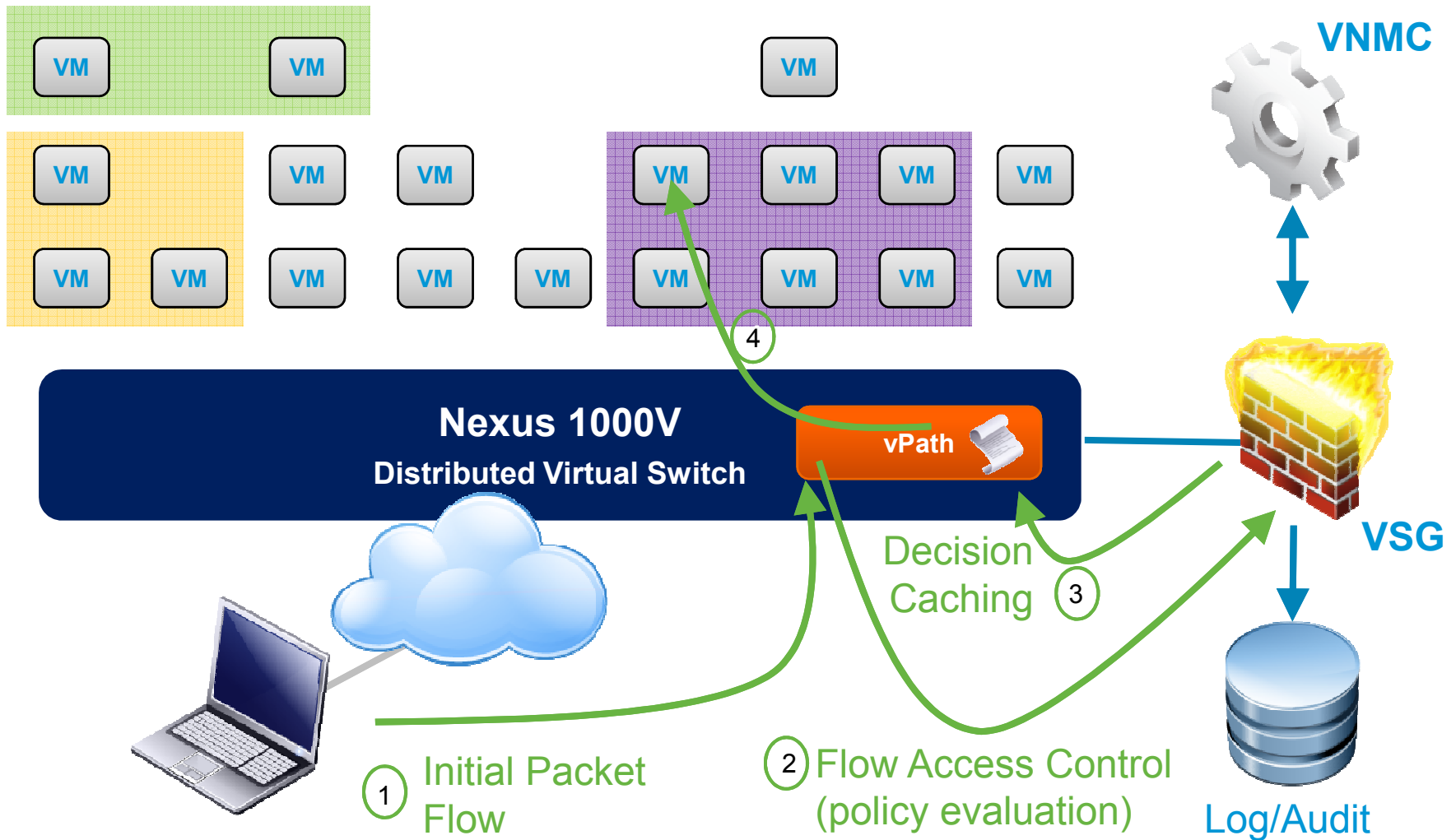
Virtual Security Gateway

Intelligent Traffic Steering with vPath

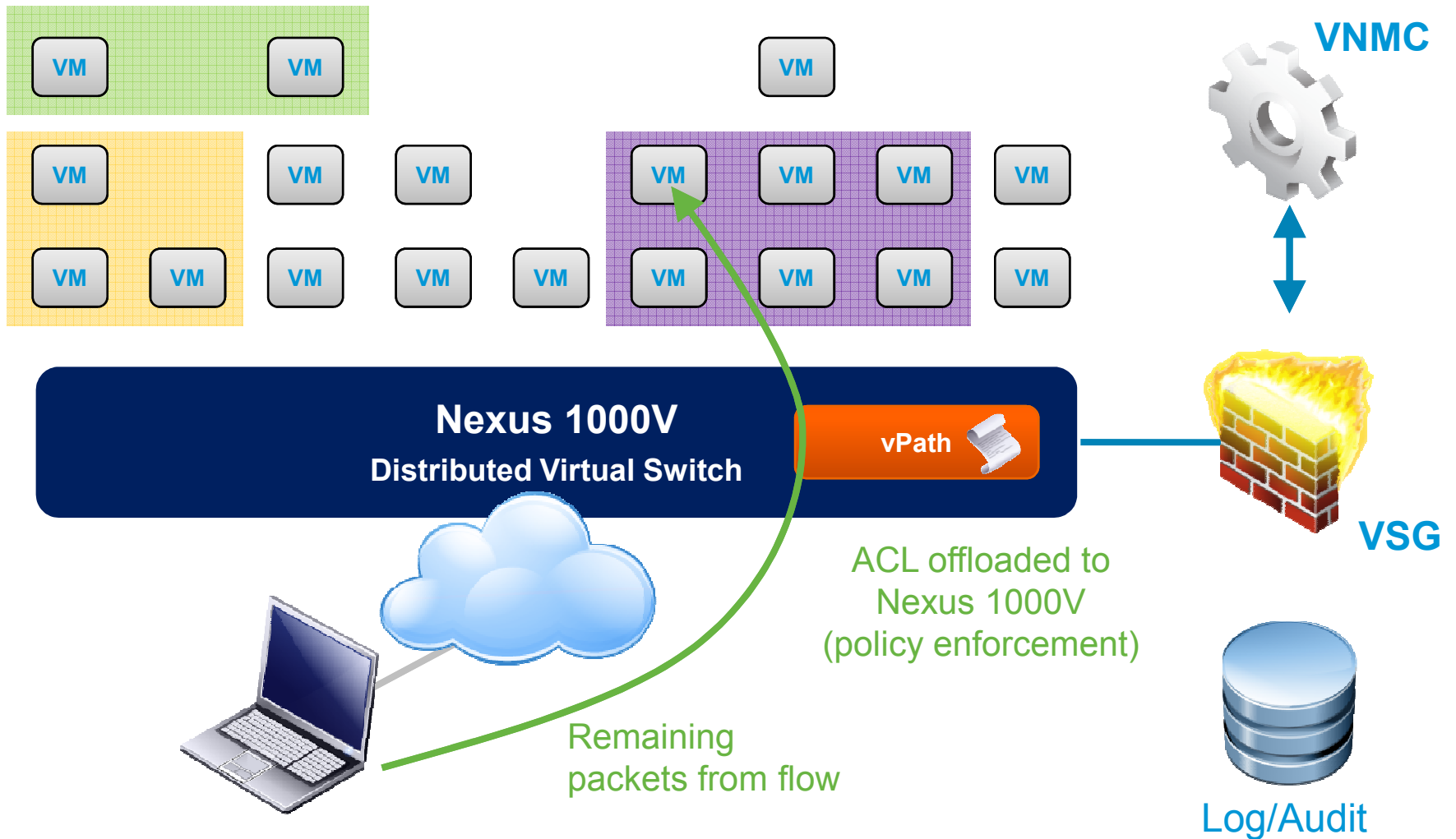


Virtual Security Gateway

Intelligent Traffic Steering with vPath



Virtual Security Gateway Performance Acceleration with vPath



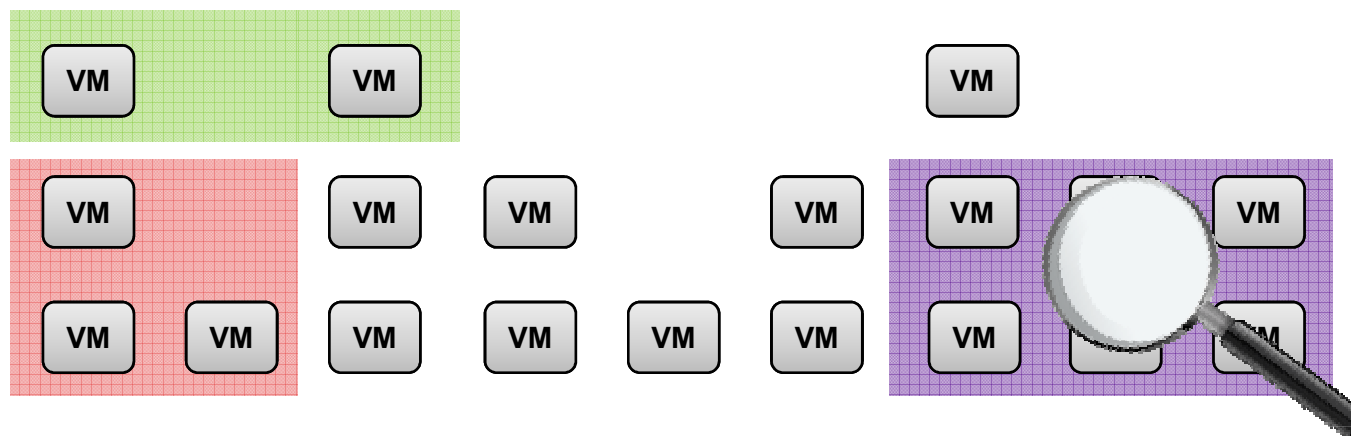
How to Enable vPath on Nexus 1000V

```
port-profile type vethernet TenantA
  vmware port-group
  switchport access vlan 10
  switchport mode access
  org root/TenantA
  vn-service ip-address 192.168.173.42 vlan 20 security-profile Secure_TenantA
state enabled
```



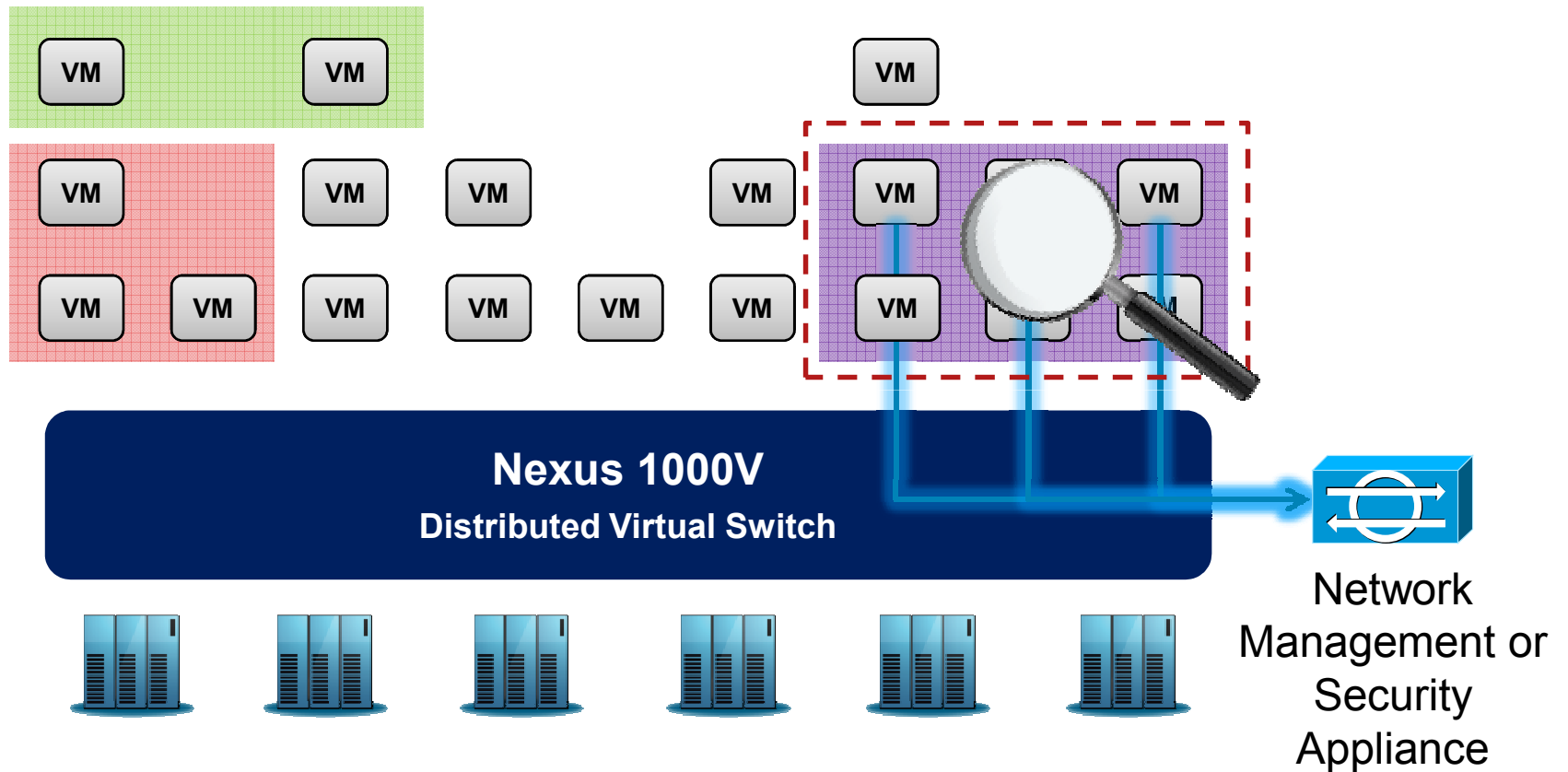
Policy Based SPAN/ERSPAN

Policy Based SPAN/ERSPAN



- Both Local SPAN and ERSPAN are supported
- Troubleshoot applications in the cloud

Policy Based SPAN/ERSPAN



- ERSPAN all interfaces with same policy
veth, eth, VLAN, port-channel and **port-profiles**

Policy Based SPAN/ERSPAN

Example for Port-Profile base:

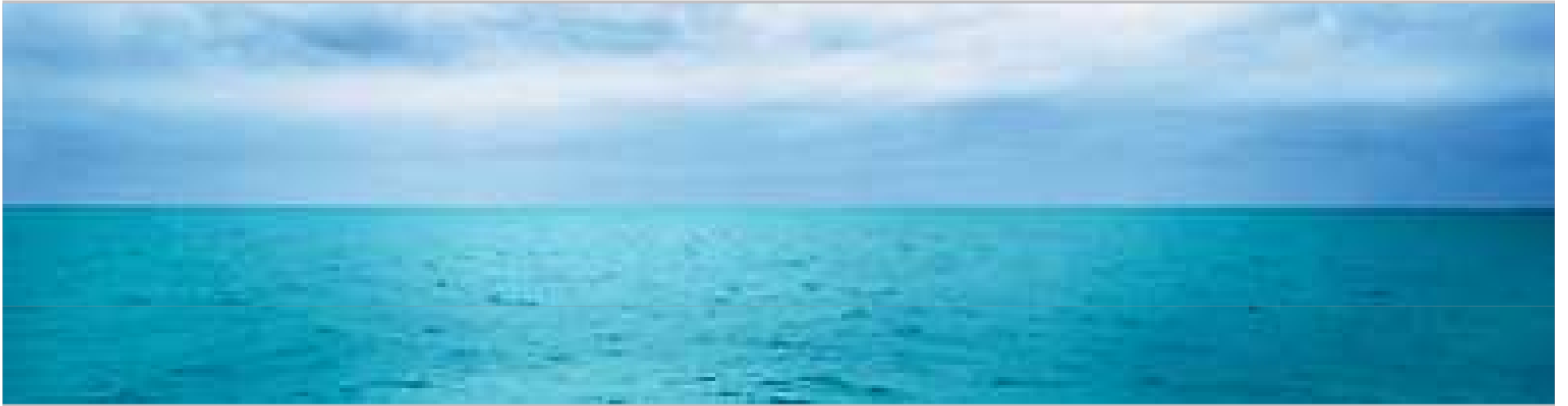
monitor session 1

source port-profile TenantA both

destination port-profile Analyzer_Interface

No shut

Note: Destination requires Traffic Analyzer (Software or Hardware)



Port-Profile Visibility

Restricting Port Profile Visibility in vCenter Server

- Based on vCenter Server users and user groups, Port Profiles can be configured to restrict access
- Prevent server administrators from large list of Port Groups
- Restrict access to sensitive Port Profiles to only privileged administrators

- Must define access on vCenter

- Must enable new feature on VSM:

```
feature port-profile-role
```

- Configure and assign visibility:

Example:

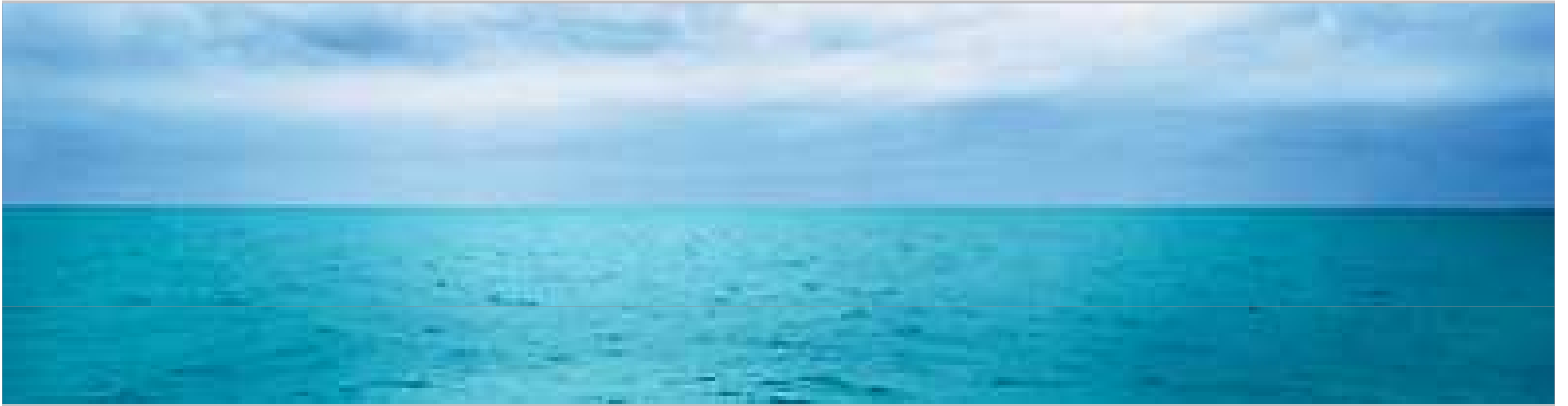
```
port-profile-role adminUser
```

```
description adminOnly
```

```
user GroupA (User/Group in vCenter)
```

```
port-profile allaccess2
```

```
assign port-profile-role adminUser
```

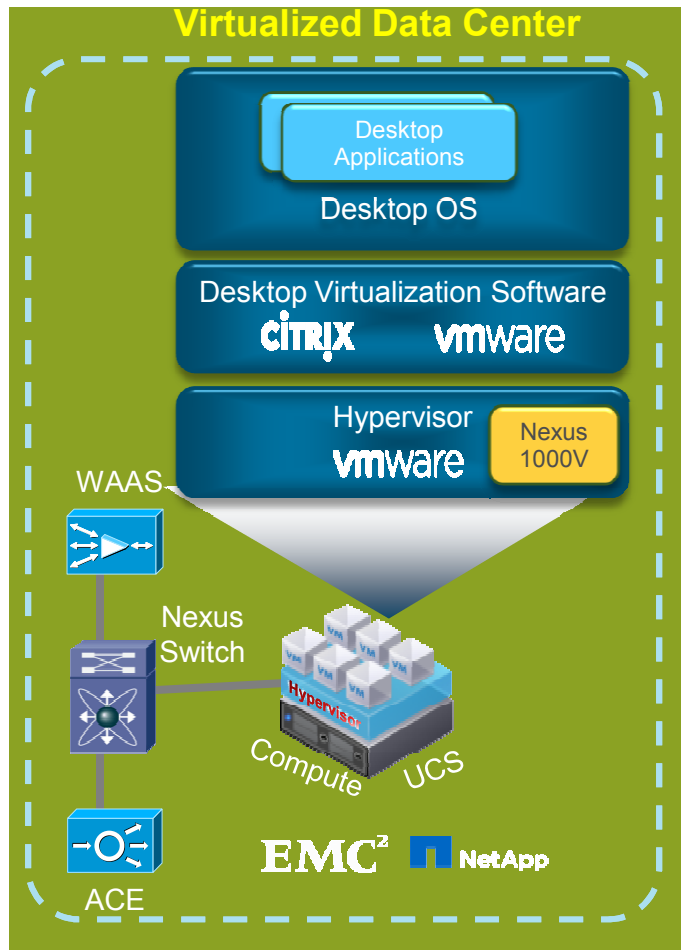


Security Features- Nexus 1000V

Nexus 1000V Security Features

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

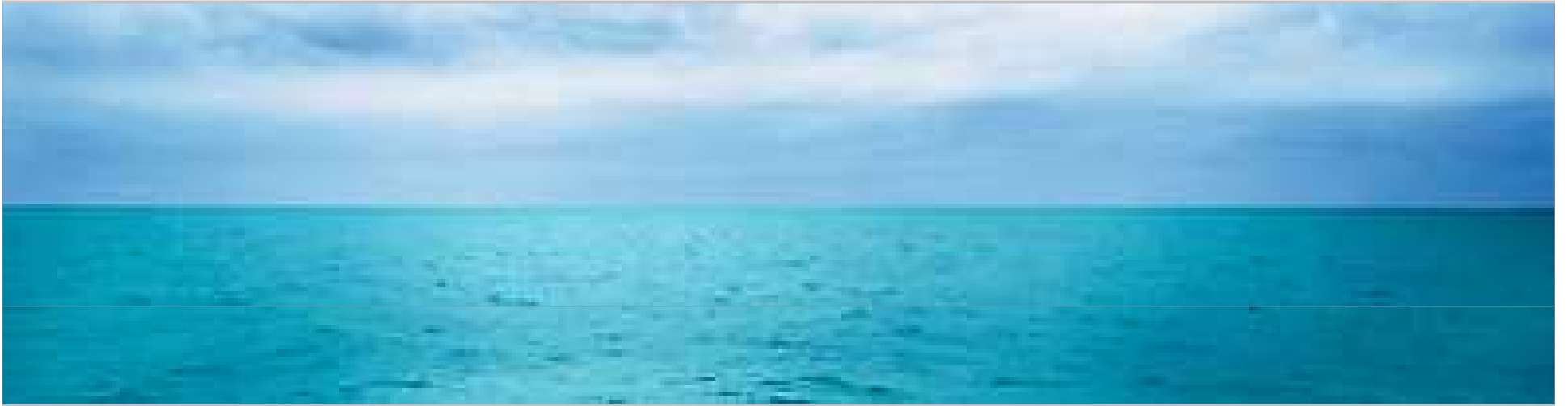
Securing Virtual Desktops (VDI)



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



Enhanced Scalability in 1.4

Increased Scalability

- 64 VEMs per VSM
- *2048 Active VLANs per VSM*
- *2048 vEths per VSM*
- *2048 Port-Profiles per VSM*
- *4K Mac Addresses per VLAN*
- *16K Mac Address Table per VEM*

Red Italicized Indicate Increased Scalability

Summary

- Nexus 1000V Switch is a platform to deploy Virtual Network Services (vPath)
- Non-Disruptive Administration Model
- Key Features available similar to physical Cisco Access Switches





Sign up at: <http://tinyurl.com/1000v-webinar>

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Web Sites

www.cisco.com/go/1000v

www.cisco.com/go/nexus1010

www.cisco.com/go/vsg

www.cisco.com/go/vnmc

www.cisco.com/go/1000vcommunity
 (Preso and Q&A posted here)

Thank you.

