



Nexus 1000V New Features and Installation/Upgrade Overview – v1.4

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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 Services (vPath, vWAAS, NAM)
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

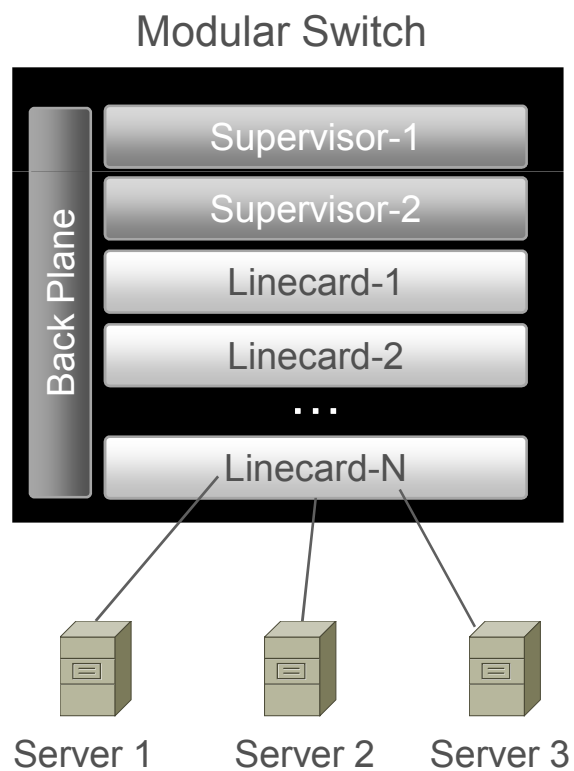
Date	Technical Sessions
29-Mar	Nexus 1000V New Features and Installation Overview
12-Apr	Nexus1010 Installation & Upgrade
26-Apr	Virtual Security Gateway Installation and Basic Configuration
10-May	Nexus 1000V Advanced Configuration
24-May	Nexus 1000V Troubleshooting

Nexus 1000V Architecture Overview



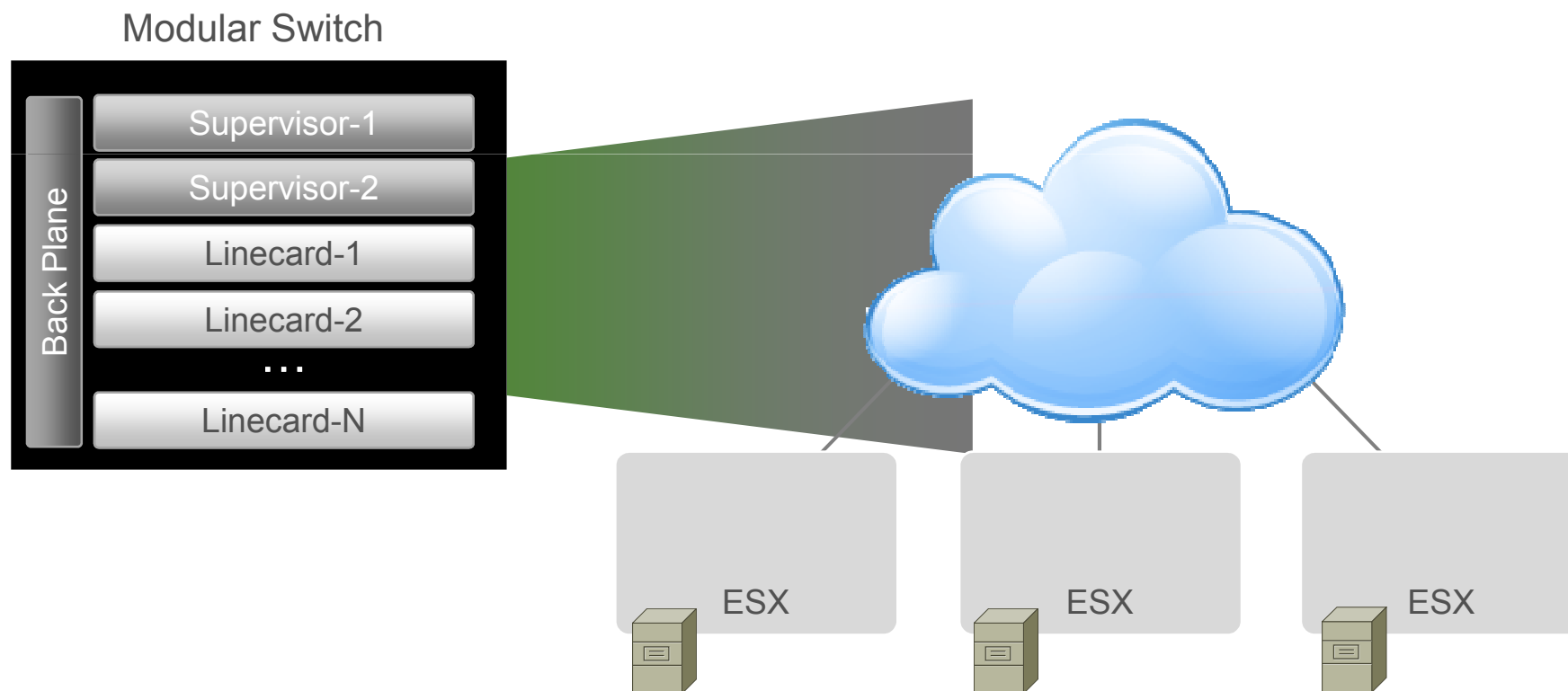
Nexus 1000V Architecture

Comparison to a Physical Switch



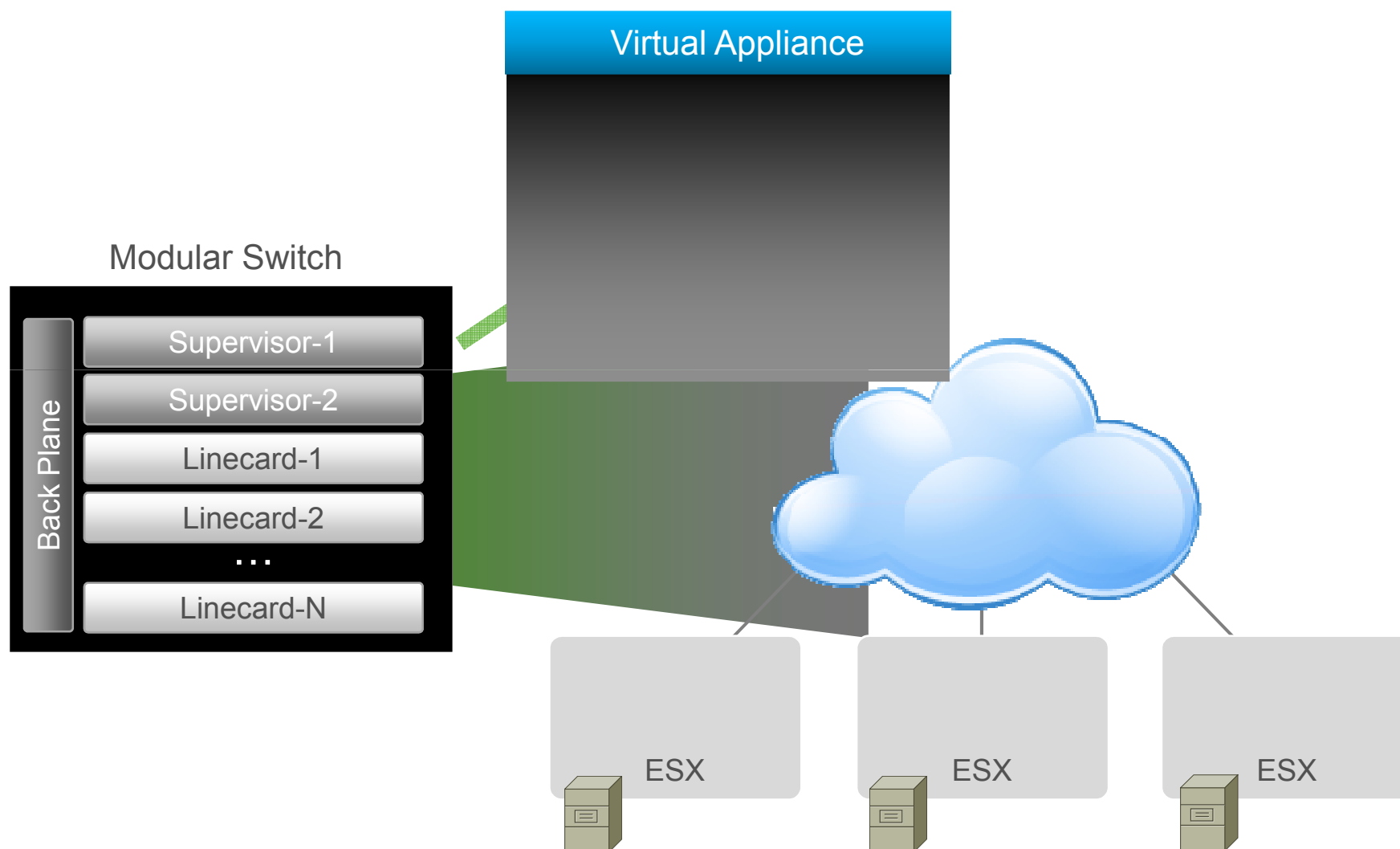
Nexus 1000V Architecture

Moving to a Virtual Environment



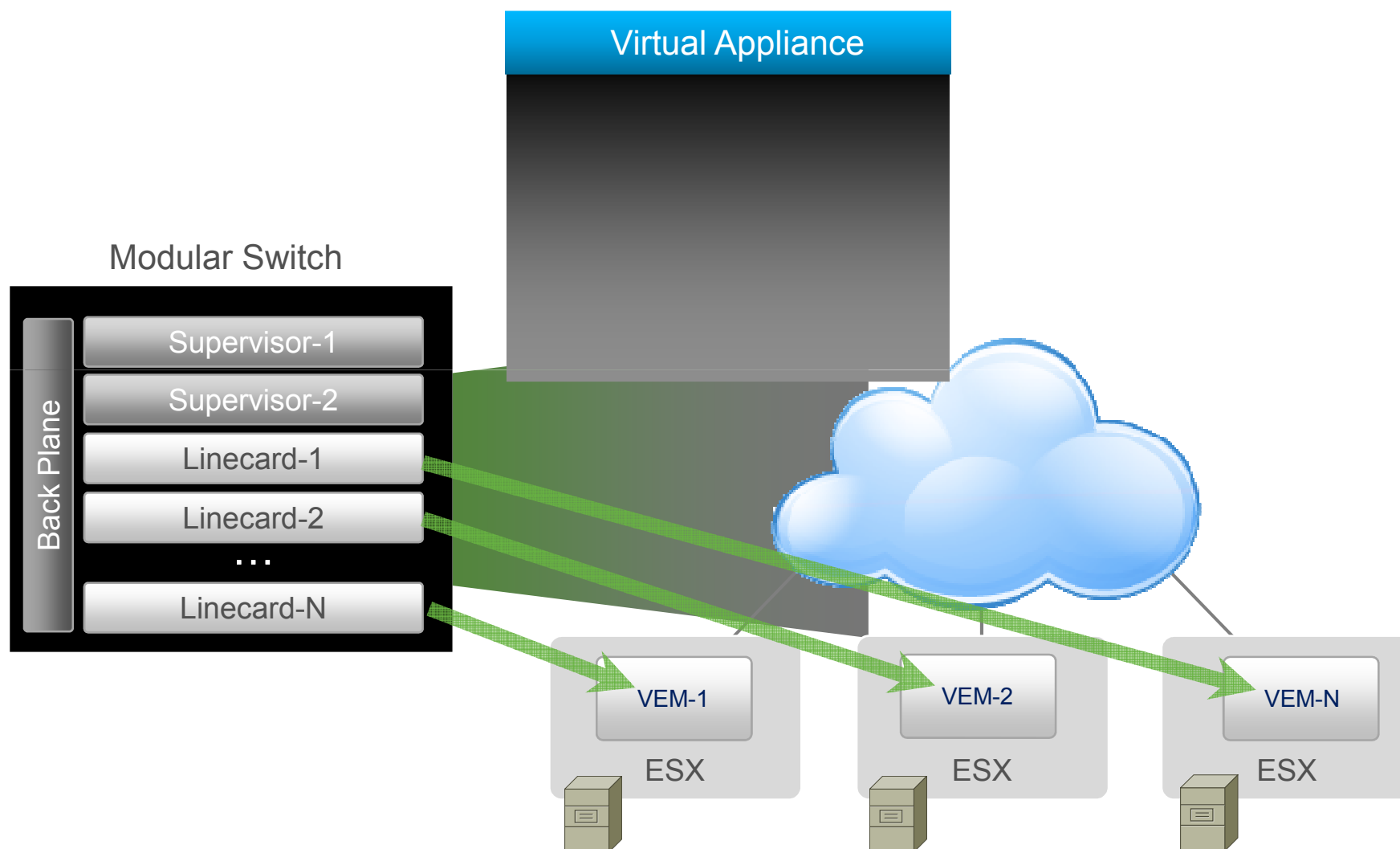
Nexus 1000V Architecture

Supervisors → Virtual Supervisor Modules (VSMs)



Nexus 1000V Architecture

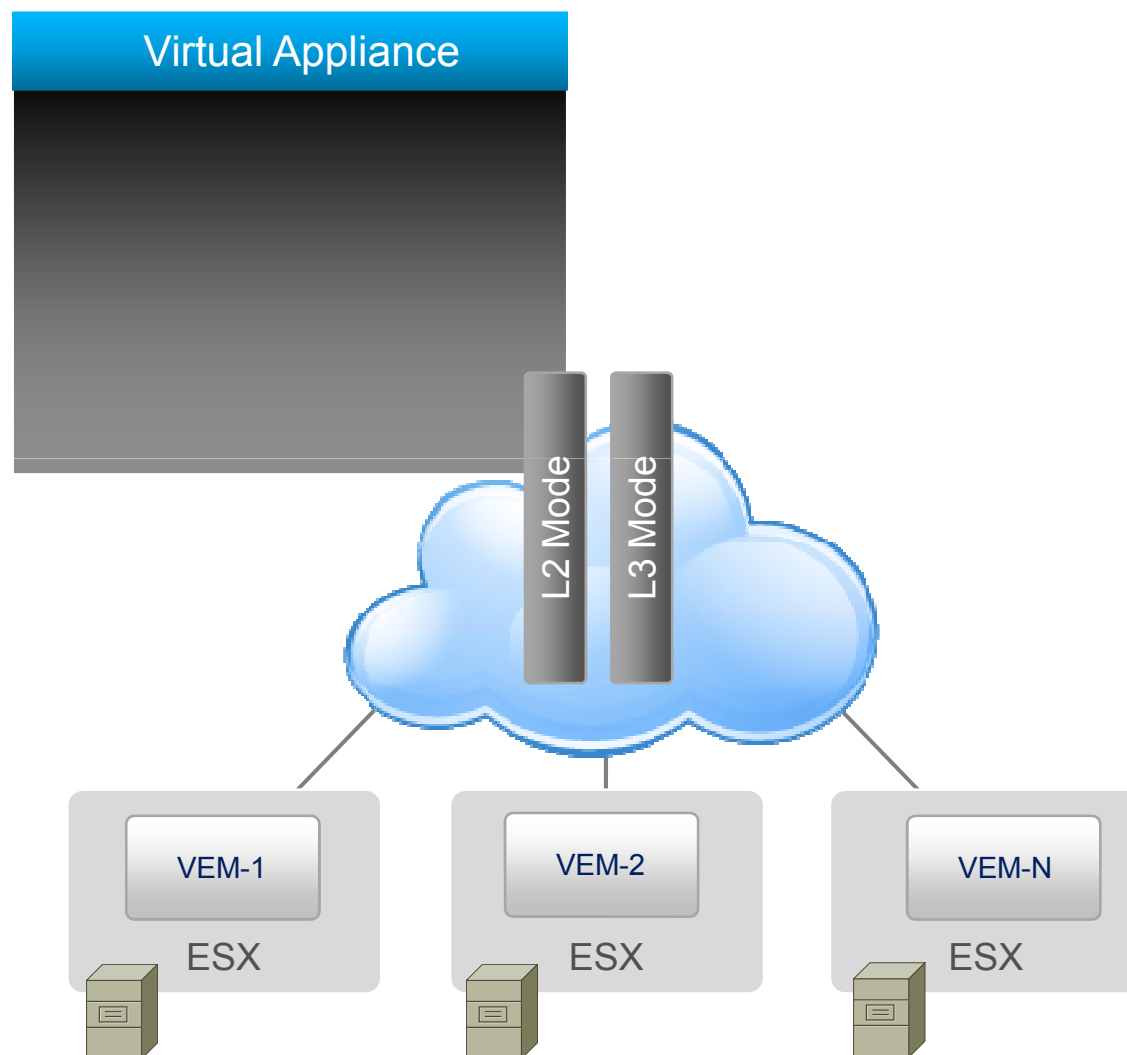
Linecards → Virtual Ethernet Modules (VEMs)



Nexus 1000V Architecture

VSM + VEMs = Nexus 1000V Virtual Chassis

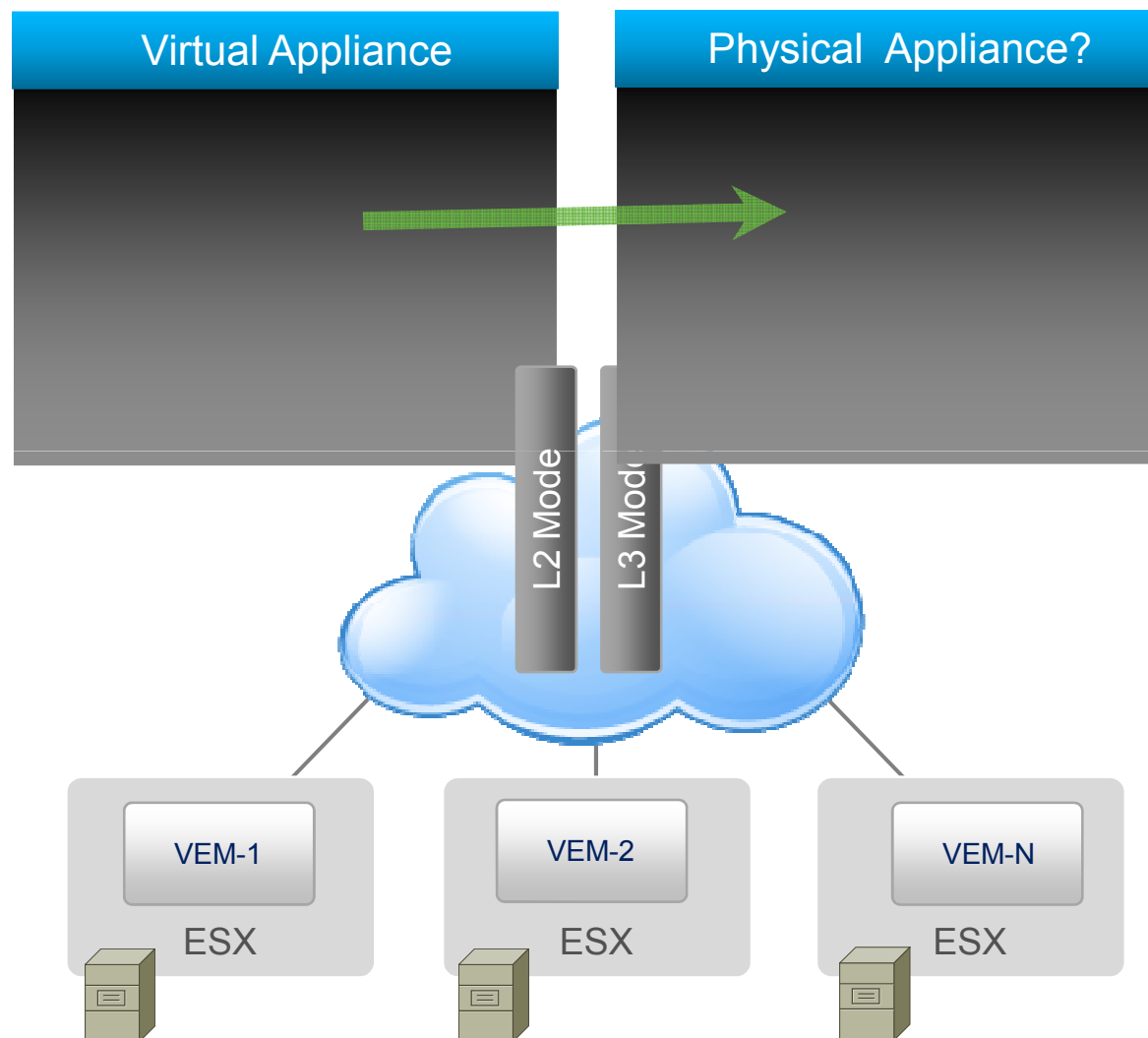
- 64 VEMs per 1000V (connected by L2 or L3)
- 200+ vEth ports per VEM
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter



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

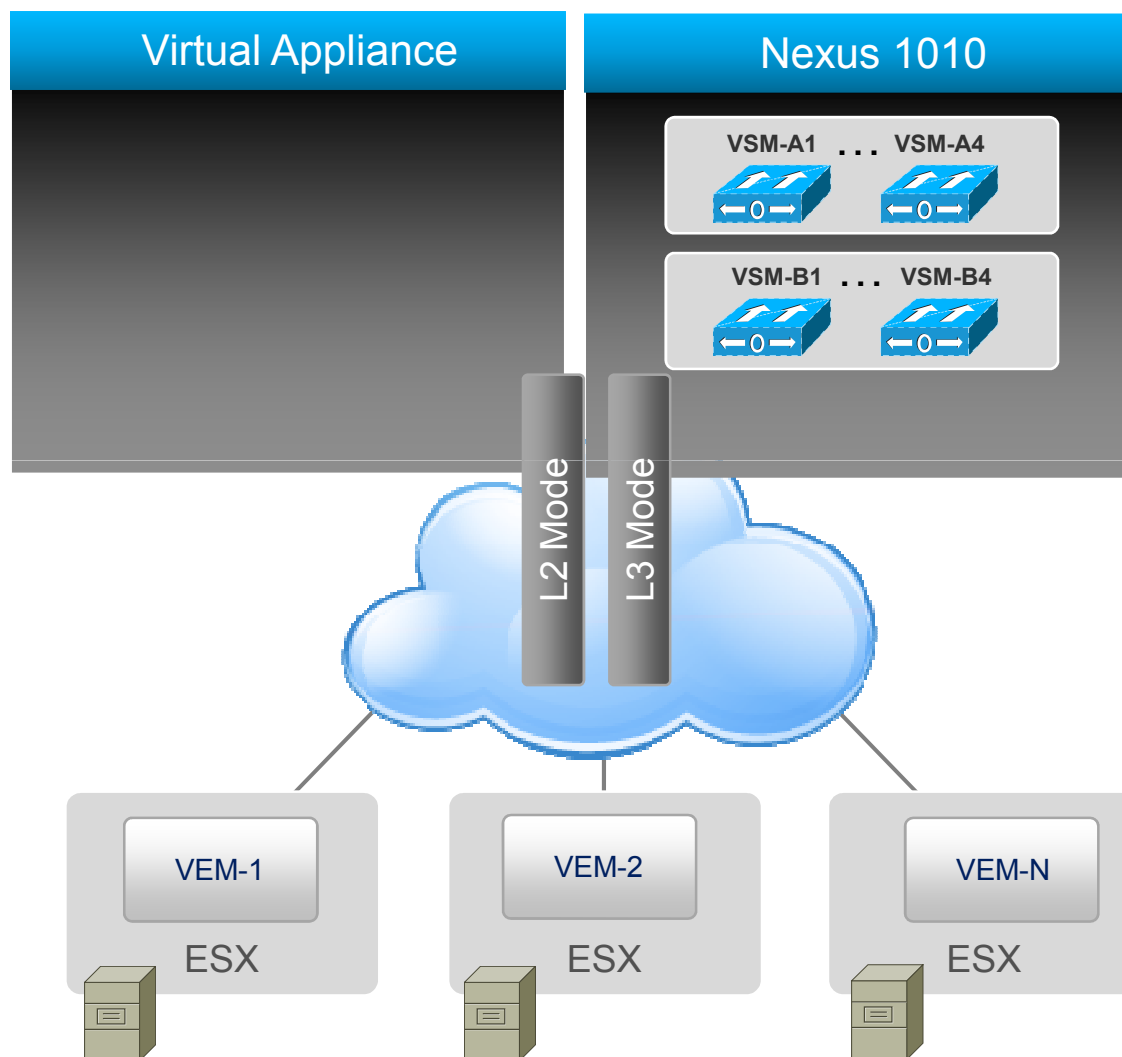
VSM: Virtual Supervisor Module

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

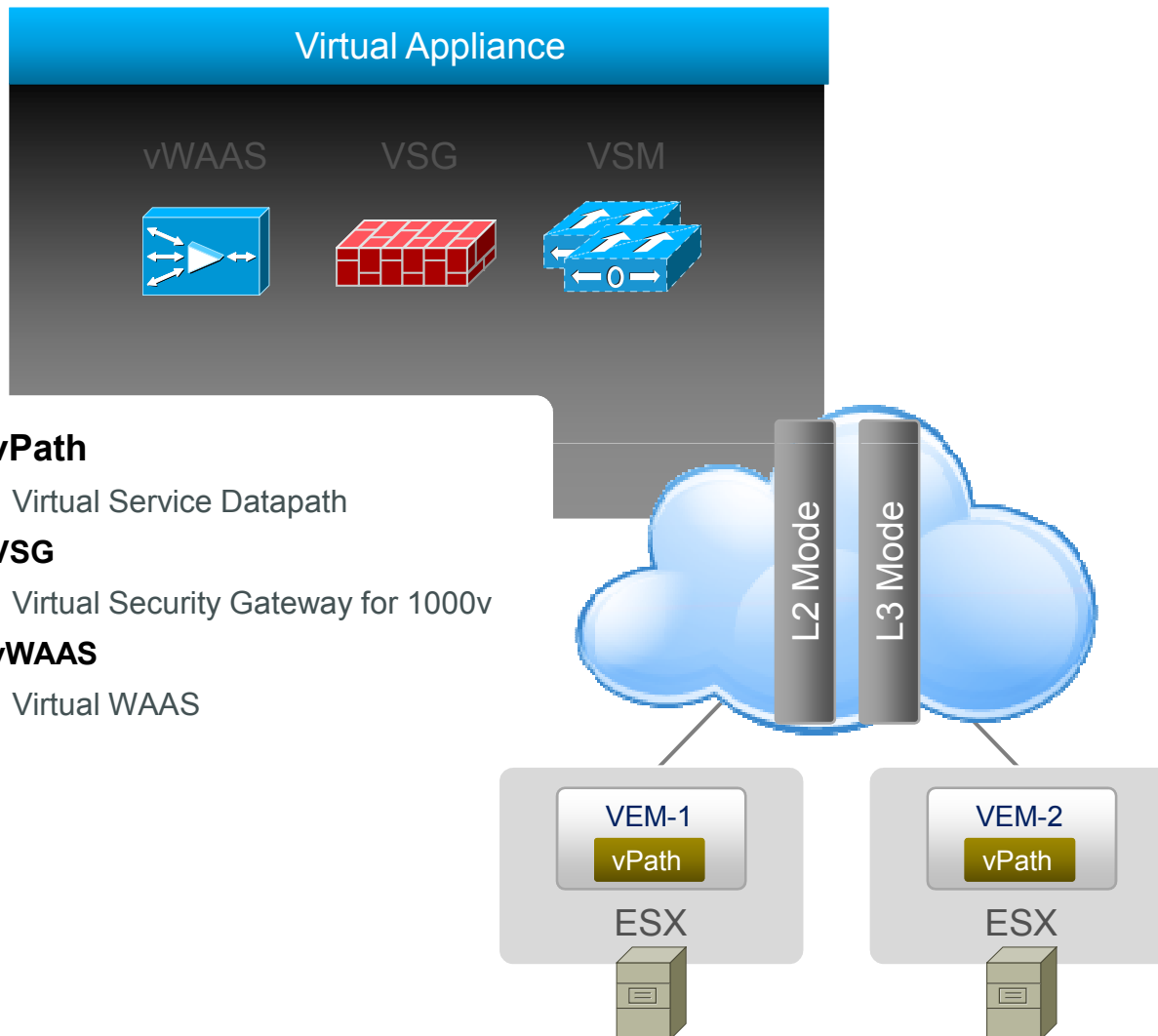


- 200+ vEth ports per VEM
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VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module

Embedding Intelligence for Virtual Services

vPath – Virtual Service Datapath



VSG and vWAAS available now

vPath

- Virtual Service Datapath

VSG

- Virtual Security Gateway for 1000v

vWAAS

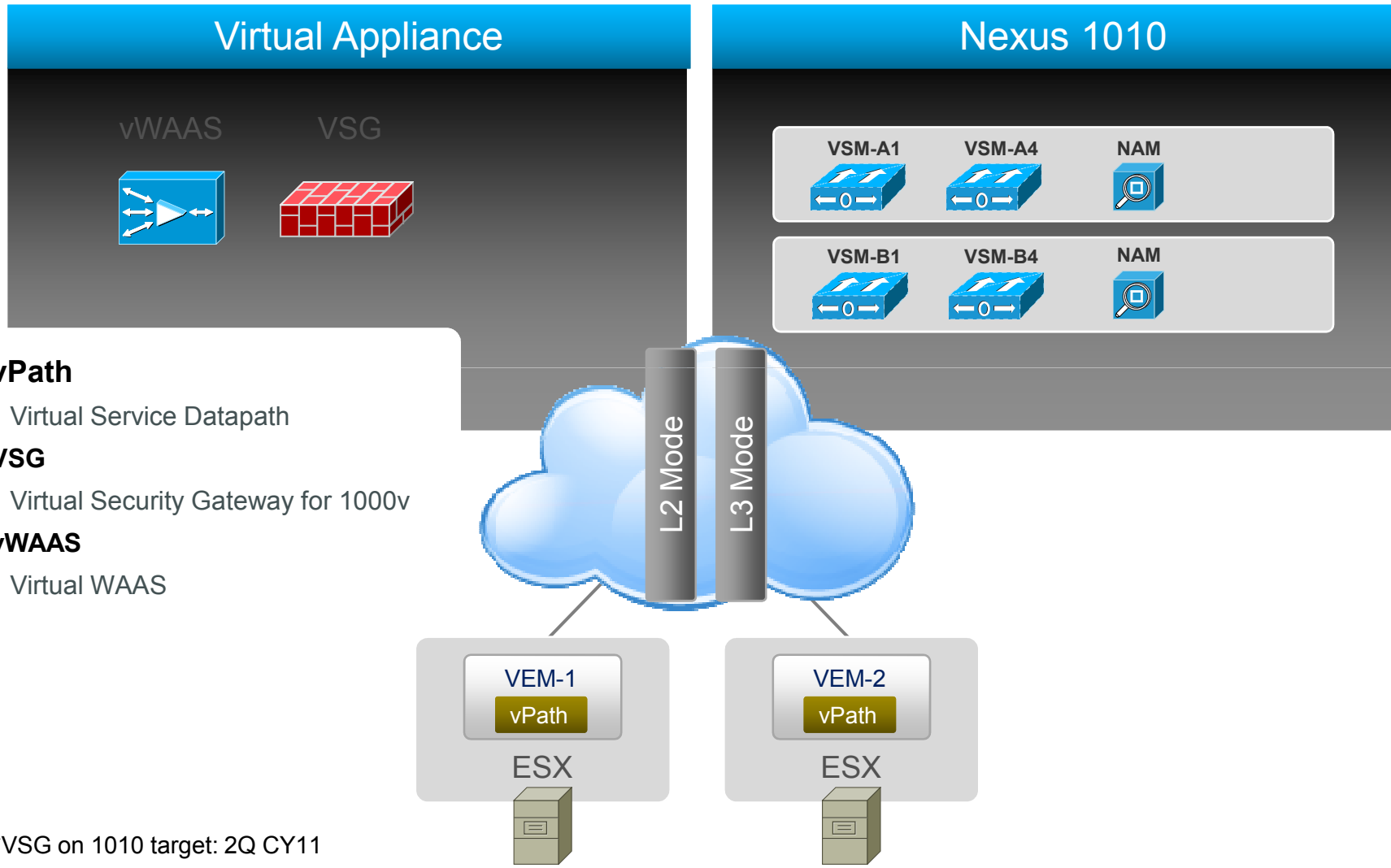
- Virtual WAAS

vPath

- Traffic Steering
- Fast -Path Offload

• Nexus 1000V ver 1.4 & above

Nexus 1010 – Hosting Platform for Services



Nexus 1000V

New Features & Installation/Upgrade Overview

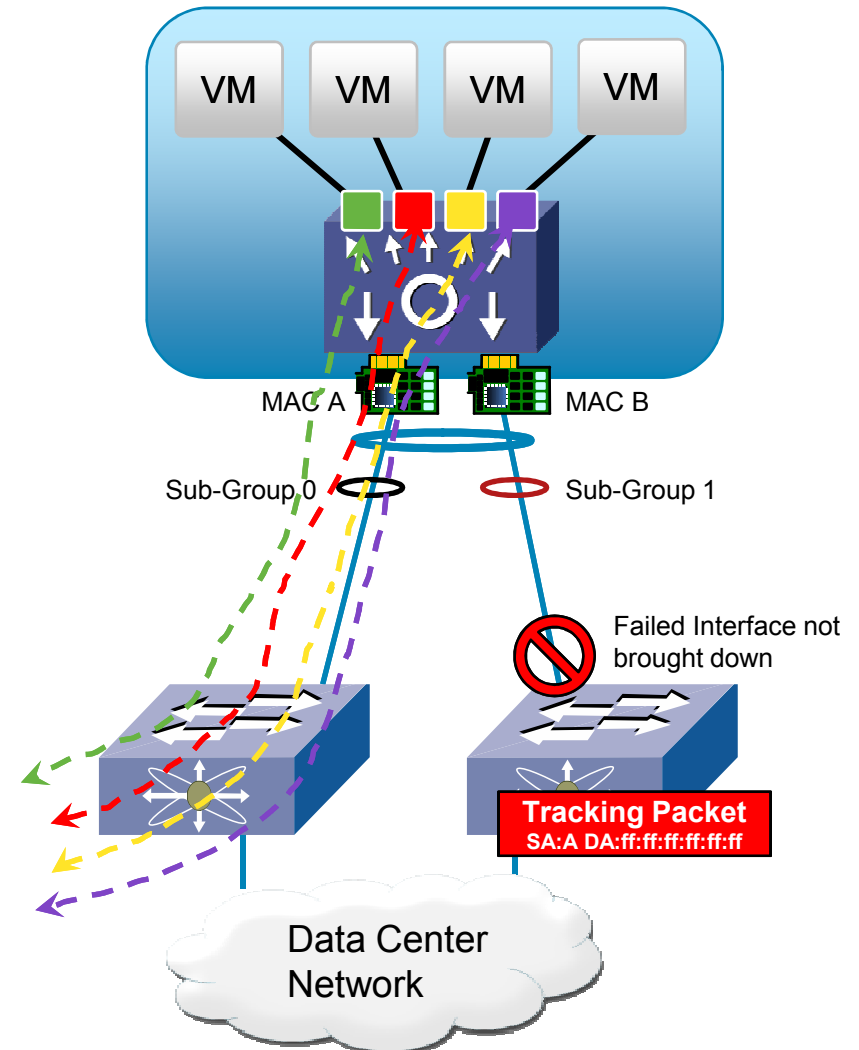


Agenda

- Network State Tracking
- LACP Offload
- Class-Based Weighted Fair Queuing
- Nexus 1000V and VMware vCloud Director
- Virtual Service Datapath (vPath)
- Policy Based ERSPAN
- Restricting Port Profile Visibility in vCenter Server
- Scalability
- Other Features
- Installation and Upgrade

Network State Tracking

- Used to detect L2 network connectivity failures that would cause VM traffic to be black-holed.
- Designed to work with vPC Host Mode port-channel (mac-pinning, manual pinning)
- Detects L1 and software failures on opposite end of link.
- Makes use of Network Tracking packet to probe interfaces on other Sub-Groups.
- Does not protect against mis-configuration.
- Fails over pinned traffic to available active Interface(s) after threshold and provides syslog entry.



Network State Tracking Configuration

```
Switch(config)# track network-state  
Switch(config)# no track network-state
```

Used to
enable/disable the
NST feature

```
Switch(config)# track network-state interval ?  
<1-10> interval (in seconds)
```

Configure the time
interval for SENDING
tracking packets out
the sub-group
interfaces

```
Switch(config)# track network-state split action  
repin
```

Specify to repin traffic to other sub-group interfaces and generate syslog in the event that a sub-group interface is declared inactive (default when NST enabled)

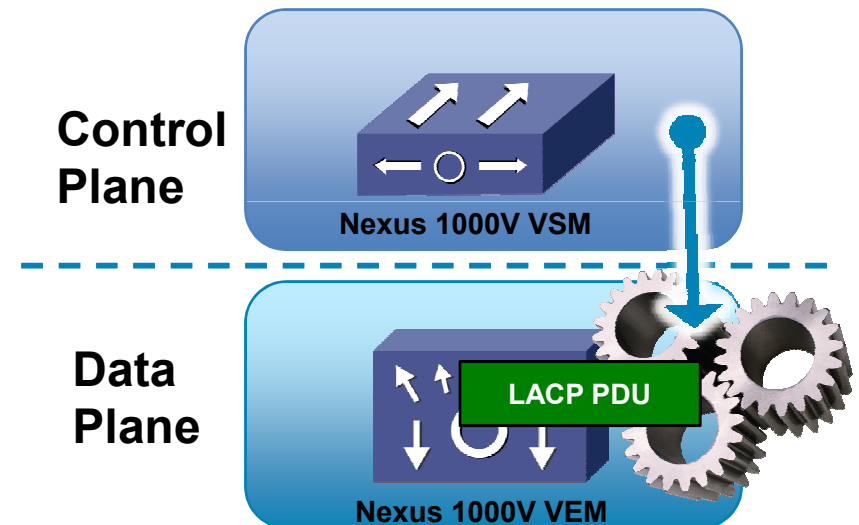
```
Switch(config)# track network-state threshold misscount 5
```

Configure the number of missed tracking packets which will result in a disconnect

LACP Offload

Motivation

- LACP is traditionally a control plane protocol run on the supervisor of a switch (VSM on N1KV)
- When VSM is down or disconnected, VEM operates in headless mode, without ability of LACP control plane operations
- LACP can not be run on a single link between a VEM and the upstream network
- LACP Offload solves this problem by offloading all LACP operations to the VEM
- Makes data plane more robust and helps in FCoE deployments where VSM is behind VEM



LACP Offload

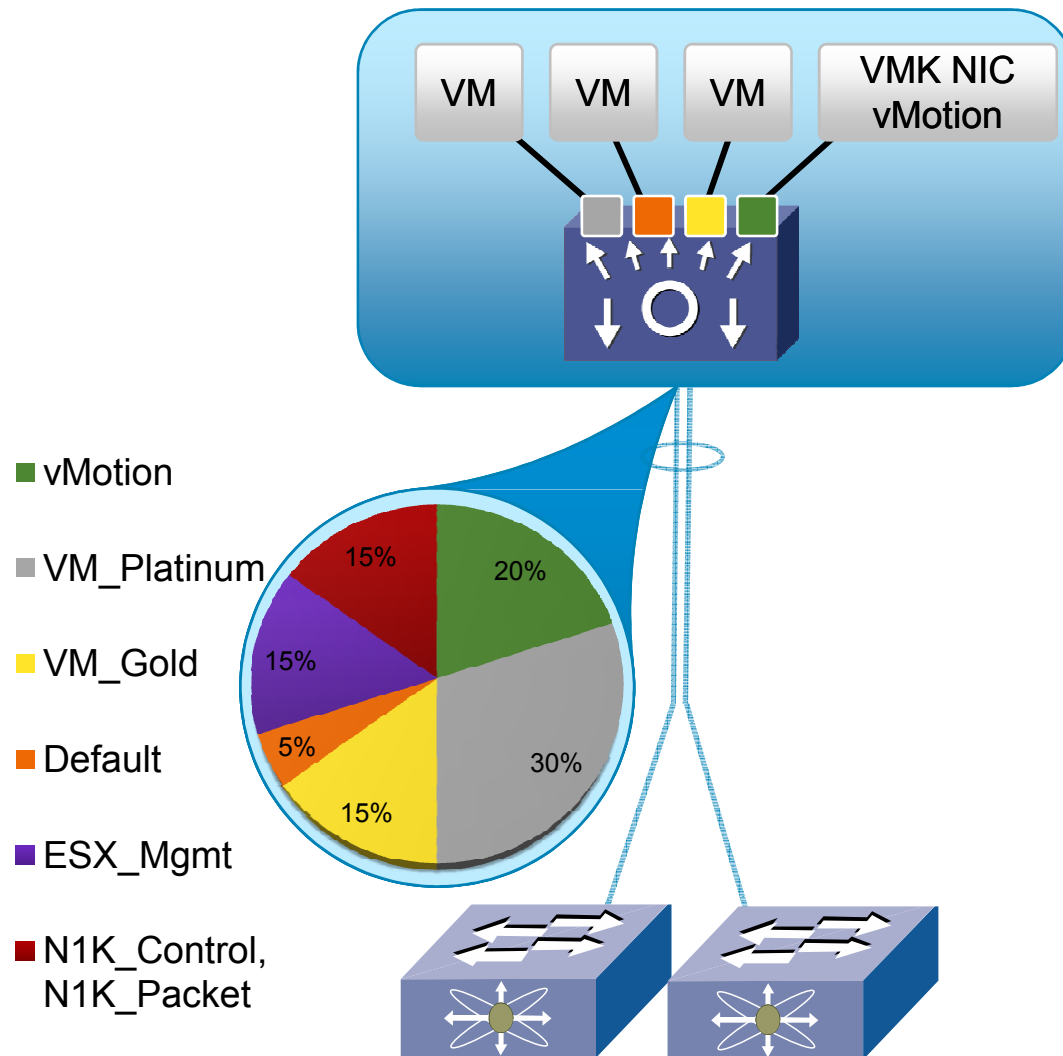
Configuration

- LACP offload is disabled by default and should not be enabled before upgrade to 4.2(1)SV1(4) is complete.
- LACP operation is supported whether all links are connected to the same physical switch or to separate switches via a clustering technology (vPC/VSS/StackWise)
- To enable first enable LACP:

```
Switch(config)# feature lacp
```
- Enable LACP offload:

```
Switch(config)# lacp offload
```
- Copy run start and reload VSM

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

Class-Based Weighted Fair Queuing with MQC

- Define Queuing Traffic Class with Class-map

```
class-map type queuing match-any n1kv_control_packet_class
  match protocol n1k_control
  match protocol n1k_packet
class-map type queuing match-all vmotion_class
  match protocol vmw_vmotion
class-map type queuing match-all vm_platinum_class
  match cos 5
```

Match protocol or CoS

- Define Queuing Policy-map

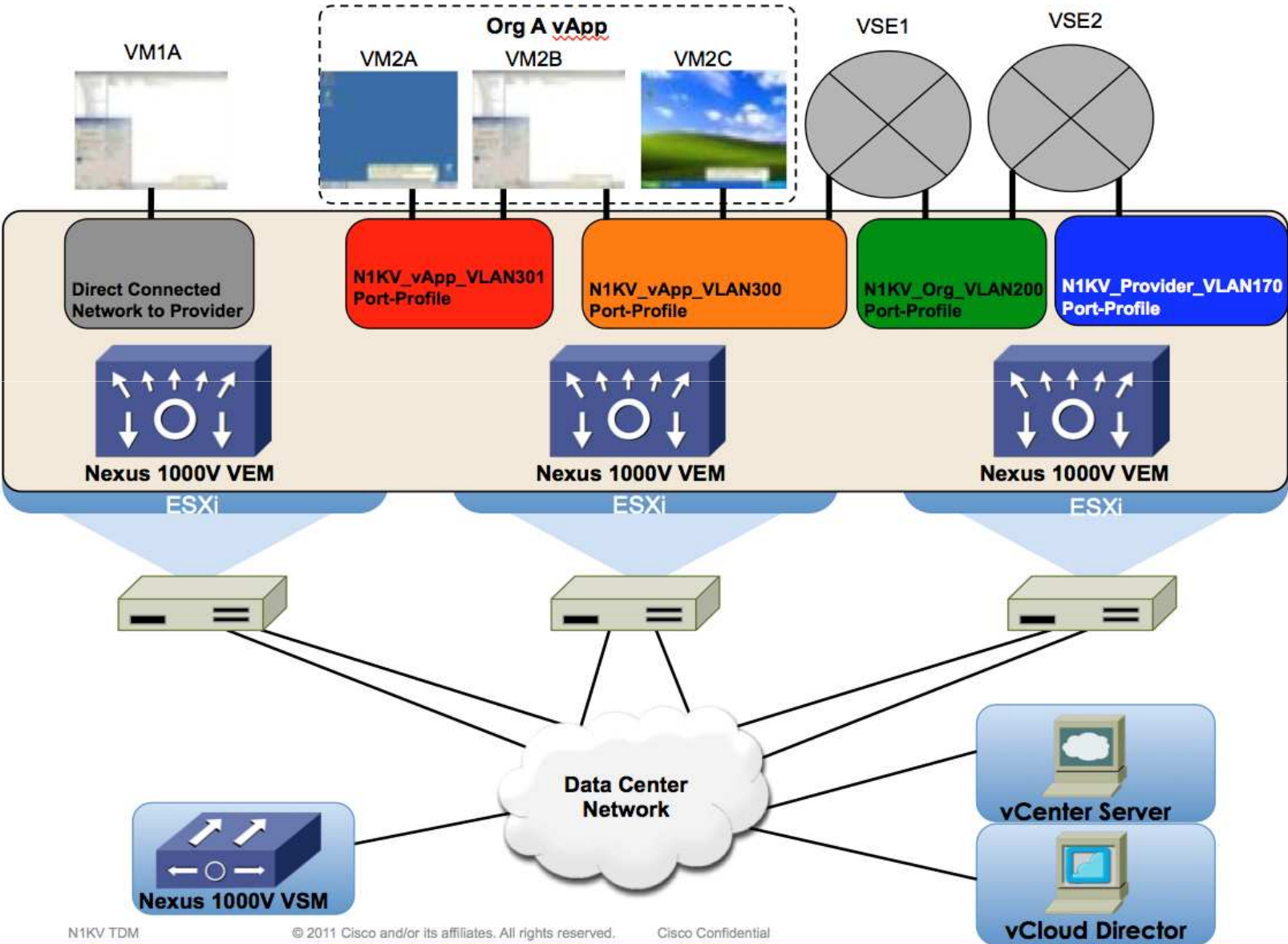
```
policy-map type queuing uplink_queue_policy
  class type queuing n1kv_control_packet_class
    bandwidth percent 15
  class type queuing vmotion_class
    bandwidth percent 20
  class type queuing vm_platinum_class
    bandwidth percent 30
```

Reserve bandwidth

- Apply Queuing Policy outbound

```
port-profile type ethernet uplink
  service-policy type queuing output uplink_queue_policy
```

Cisco Nexus 1000V and VMware vCloud Director Interoperability



Nexus 1000V and vCloud Director Configuration

- Port-profile configuration on VSM

```
port-profile type vethernet N1KV_Provider_VLAN170
  vmware port-group
  port-binding ephemeral
  switchport mode access
  switchport access vlan 170
  no shutdown
  state enabled
```

Descriptive Port-Profile name with VLAN ID

```
port-profile type vethernet N1KV_Org_VLAN200
  vmware port-group
  port-binding ephemeral
  switchport mode access
  switchport access vlan 200
  no shutdown
  state enabled
```

Use of ephemeral port binding

```
port-profile type vethernet N1KV_vApp_VLAN300
  vmware port-group
  port-binding ephemeral
  switchport mode access
  switchport access vlan 300
  no shutdown
  state enabled
```

Nexus 1000V and vCloud Director Configuration

- Port-Group backed network pool configuration on vCloud Director interface

New External Network

Select vSphere Network

An external network uses a network in vSphere to connect to a network outside of your cloud. The network can be a public network such as the Internet, or even an external VPN network that connects to a given organization.

If you don't see the vCenter you need: [attach a different vCenter](#)

Select vCenter and vSphere Network:

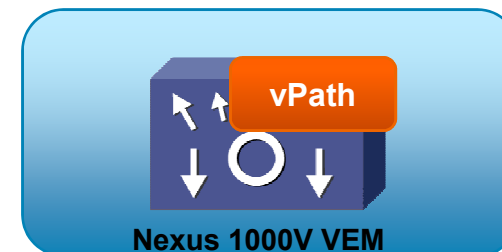
vCenter Name	vSphere Network	VLAN	Datacenter
SL-TME-vCenter	N1KV_Provider_VLAN170	-1	SL-TME-DC-2
sfish-233-154.cisco.com			
sfish-233-105.cisco.com			
PrashvCenter			

Previously Defined Port-Profile

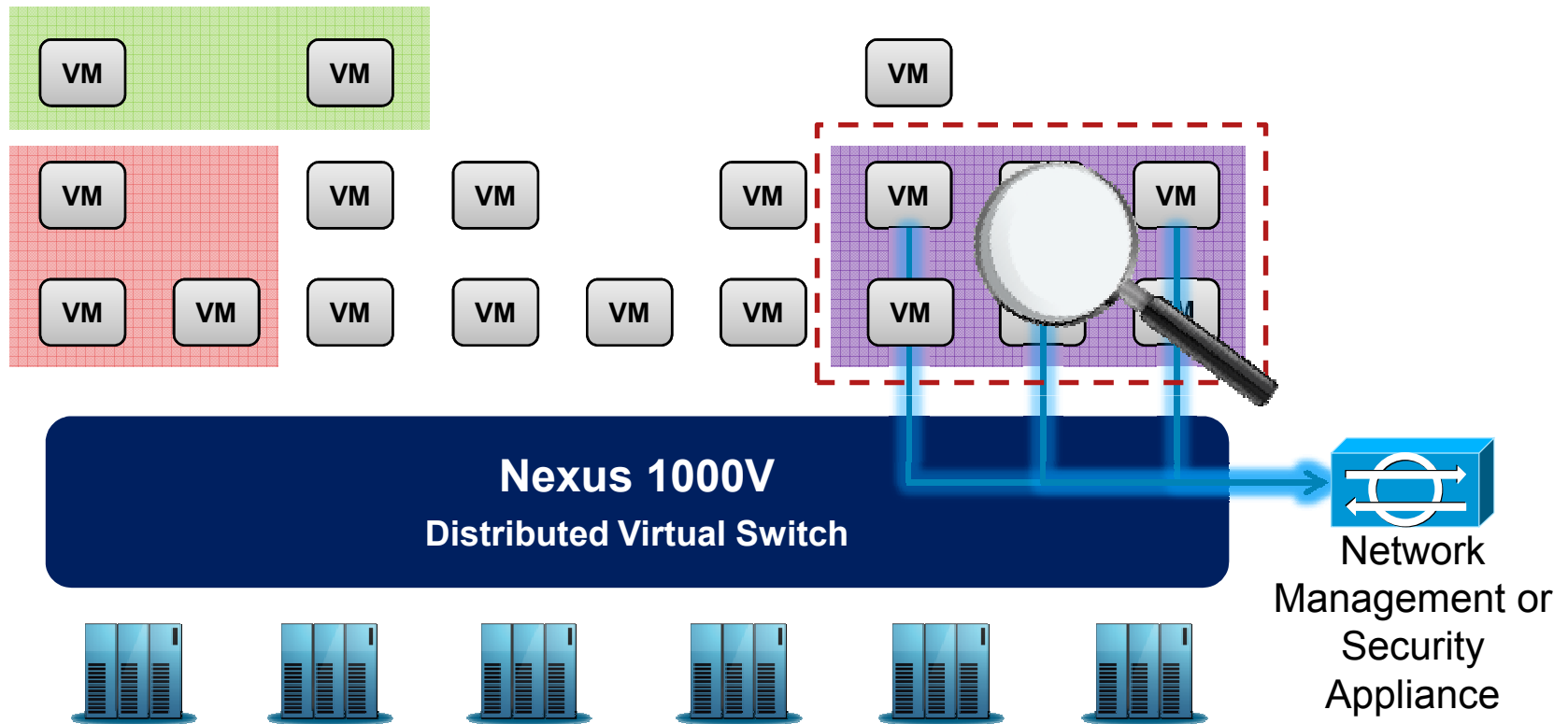
Virtual Service Datapath (vPath)

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



Policy Based ERSPAN



- ERSPAN all interfaces by sourcing session with port-profile
 - veth, eth and port-channels
- Troubleshoot applications in the cloud

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 jsmith
```

```
port-profile allaccess2
```

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

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

Other Features

- Updated Installer
 - Installs L2 or L3 communications between VSM and VEM
 - Configures active/standby VSM for HA
- Access Control List on the VSM management interface
- Ephemeral Port Binding
 - Port ID is set and released upon VM power on/off
 - Support virtual desktop deployments and vCloud Director
- Hardware iSCSI Multipathing
 - Leverage NIC based iSCSI multipathing

Installation of 4.2(1)SV1(4)

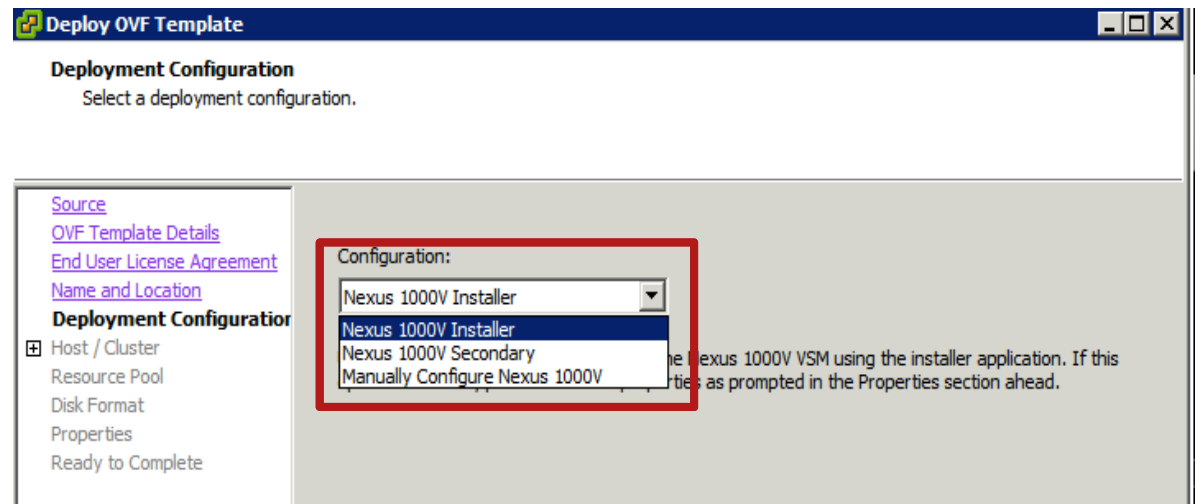
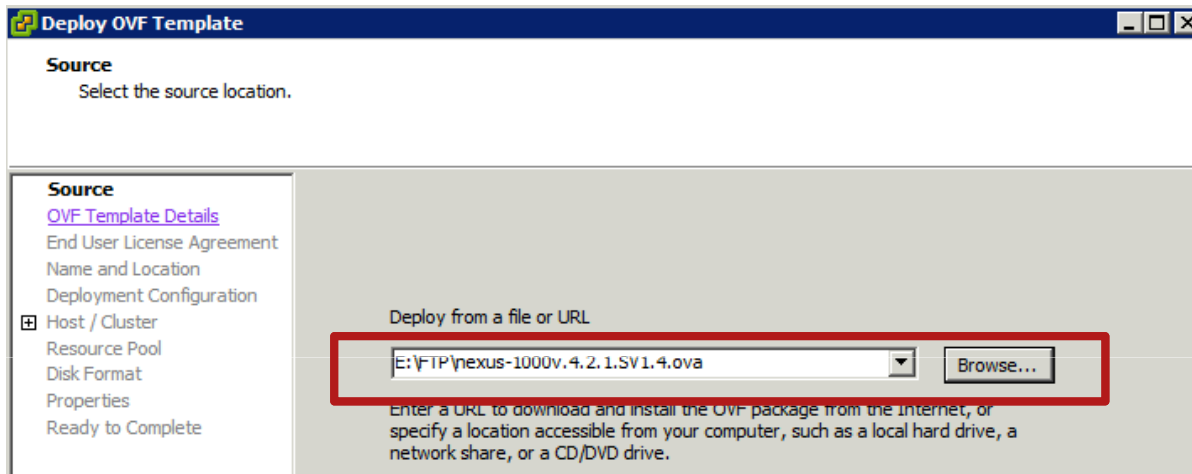
- Same process as version 4.0(4)SV1(3x) with OVA (Virtual Appliance)
- Virtual Appliance deployment now has option to install full HA pair of VSMS (Secondary)
- Installation Application supports using L3 control
- Installation Screencasts (use them, they're good!)

http://www.cisco.com/en/US/docs/switches/datacenter/nexus1000/sw/4_2_1_sv1_4/upgrade/screencast/guide/n1000v_upgrade_screencasts.html#wp42576

- Install VSM on Nexus 1010 the same as previous version

Installation VSM using OVA

Available in the .zip file from Cisco.com



Installation Using the new Installer Application

Launched from the VSM home

Cisco Nexus 1000V

Following files are available for download :

- **Cisco Nexus 1000V Installer Application**
[Launch Installer Application](#)
- Cisco Nexus 1000V Extension
 - [cisco_nexus_1000v_extension.xml](#)
- VEM Software

Steps

1. Enter VSM Credentials
2. Enter vCenter Credentials
3. Select the VSM's host
- 4. Select the VSM VM & Port groups**
5. Provide VSM Config Options
6. Summary: Please Review Configurations
7. Configure DVS Migration Options
8. Summary: Migrate DVS

Select the VSM VM & Port groups

Choose VSM Virtual Machine: Nexus1000V-4.2.1.SV1.4

Please choose a configuration option:

- Default L2: Choose the Management vlan for all port groups.
- Advanced L2: Configure each port group individually.**
- Advanced L3: Configure configure through L3

Control Port Group: Choose Control Port Group: Create Control Port Group:

Port Group: VM Network, VLAN: 0 Port Group Name: Control
VLAN id: 200
Vswitch: vSwitch0, pnics: vmnic0 Vswitch: vSwitch0, pnics: vm...

Management Port Group: Choose Management Port Group: Create Management Port Group:

Port Group: VM Network, VLAN: 0 Port Group Name: Management
VLAN id: 170
Vswitch: vSwitch0, pnics: vmnic0 Vswitch: vSwitch0, pnics: vm...

Packet Port Group: Choose Packet Port Group: Create Packet Port Group:

Port Group: VM Network, VLAN: 0 Port Group Name: Packet
VLAN id: 200
Vswitch: vSwitch0, pnics: vmnic0 Vswitch: vSwitch0, pnics: vm...

< Prev Next > Finish Cancel

Upgrade to 4.2(1)SV1(4)

- For this release, must upgrade VEM first, then VSM
- Must disable HA, FT and DPM on cluster
- Hosts should be at a min of ESX/ESXi 4.0 Update 1
- Must run Pre-Upgrade Utility to avoid known issues
- Highly recommended to use Upgrade Application
 - Available only in 4.0(4)SV1(3) and later
 - Simplifies the many steps to upgrade
 - Higher initial success rate with this App vs. manual upgrade
- Only use the manual upgrade method if Upgrade App can't be used
 - More steps
 - Not as clean as App to manage overall upgrade flow
- When upgrading VSM on N1010, start by making Secondary VSM the Active system switchover

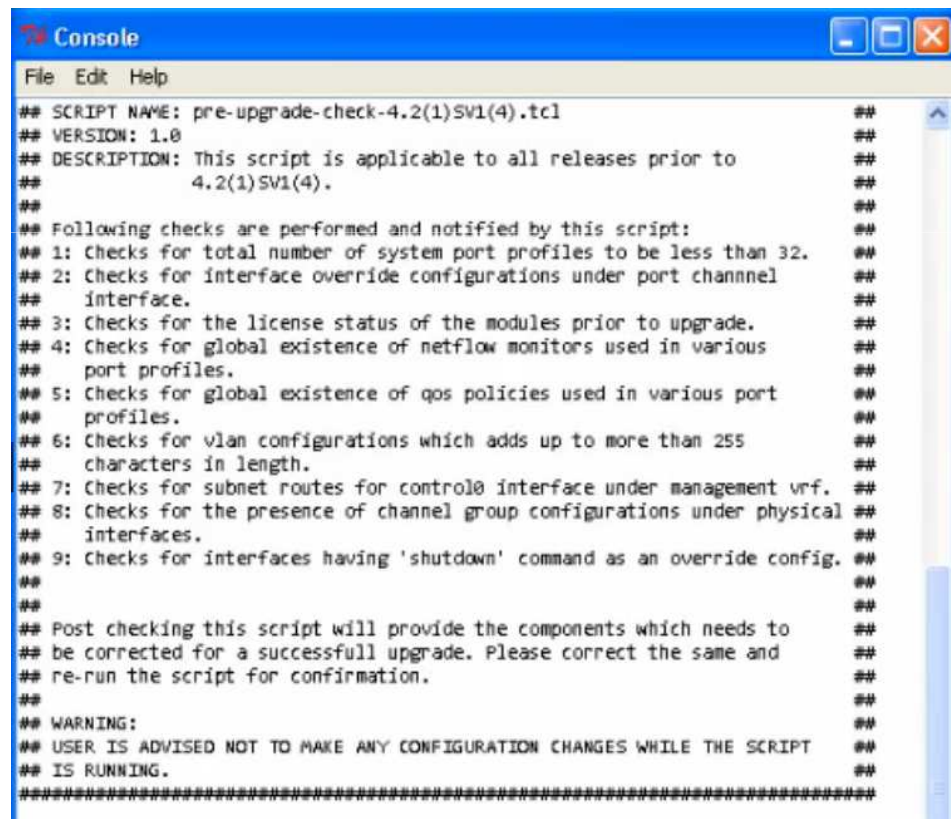
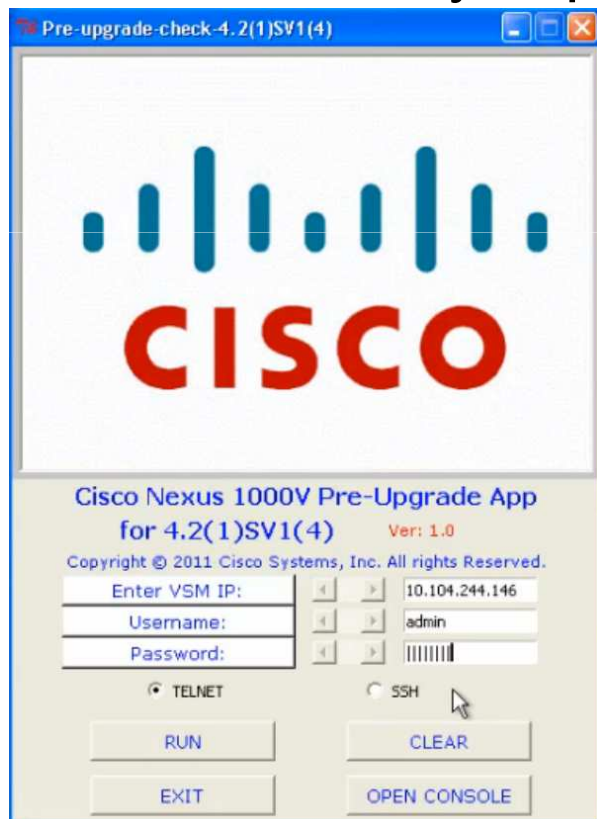
Upgrade Path to 4.2(1)SV1(4)

- Upgrading from 4.0(4)SV1(3, 3a, or 3b) to Release 4.2(1)SV1(4)
 - Upgrade VEM to 4.2(1)SV1(4) VEM
 - Upgrade VSM to 4.2(1)SV1(4) VSM (non-disruptive)
- Upgrading from Release 4.0(4)SV1(2) to Release 4.2(1)SV1(4)
 - Upgrade VSM to 4.0(4)SV1(3x) VSM (non-disruptive)
 - Upgrade VEM to 4.2(1)SV1(4) VEM
 - Upgrade 4.0(4)SV1(3x) VSM to 4.2(1)SV1(4) VSM (non-disruptive)
- Upgrading from Release 4.0(4)SV1(1) to Release 4.2(1)SV1(4)
 - Upgrade VSM to 4.0(4)SV1(3x) VSM (disruptive)
 - Upgrade VEM to 4.2(1)SV1(4) VEM
 - Upgrade 4.0(4)SV1(3x) VSM to 4.2(1)SV1(4) VSM

Run the Pre-Upgrade Utility

Executed on Windows or Linux

- Searches for potential configuration issues and notifies of any important tasks



Upgrade the VEM First

VUM or Manual VEM Upgrade

1. Download new image zip file from CCO
2. Copy vem-release_final.tar.gz to VSM bootflash
3. Notify vCenter Server and update bundle repository

```
vmware vem upgrade update-vibs bootflash:vem-release_final.tar.gz
```
4. Check Status

```
show vmware vem upgrade status
```
5. Notify vCenter Server and Server Admin

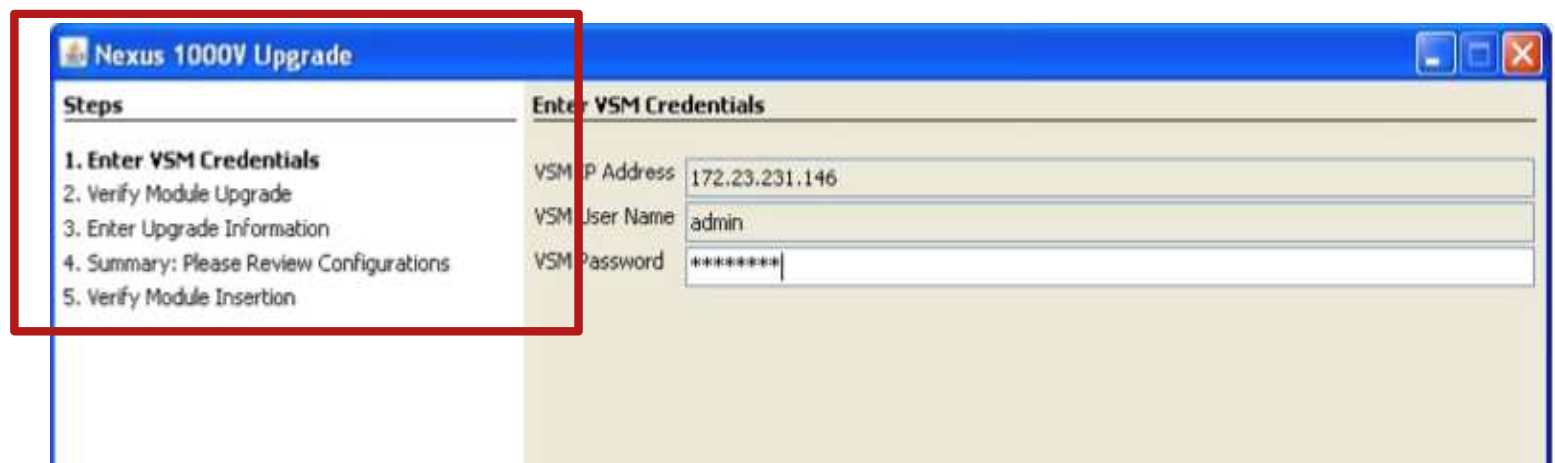
```
vmware vem upgrade notify
```
6. Server Admin must apply upgrade in vCenter
Done Under Networking Summary tab
7. Proceed with the upgrade(VUM will automatically update hosts and DRS migrates VMs)

```
vmware vem upgrade proceed
```
8. Complete after all hosts are upgraded

```
vmware vem upgrade complete
```

Upgrading the VSM with the Upgrade Application

- Must be downloaded from VSM website
- Only visible after at least 1 VEM is upgraded



Upgrade Application

4.0(4)SV1(3x) to 4.2(1)SV1(4)

Upgrade Flow (Slide 1 of 2)

1. Upgrade application link appears on the VSM homepage when at least one module with version (4.2*) attaches.
2. A list of *.bin files in the bootflash are passed as a parameter to the app.
3. Authenticate the VSM admin user.
4. The application verifies the following:
 - VSM has a connected SVS connection
 - VSM is in a HA pair
 - SSH is enabled on the VSM
5. Prompt for appropriate additional IP addresses
 - Based on “show svcs domain”, Prompt can ask for up to 3 additional IP Addresses (1 needed for temp mgmt address)
 - Both IPv4 and IPv6 are supported for the upgrade.

Upgrade Application

4.0(4)SV1(3x) to 4.2(1)SV1(4)

Upgrade Flow (Slide 2 of 2)

6. Select the new system/kickstart image
7. Verify a summary of the information that was input.
8. Start the upgrade process
 - The app will execute the manual CLI steps over XML API.
9. After the standby VSM is reloaded, a prompt is shown comparing the “show module” information from both VSMs.
 - The VEMs will be connected to the 2 VSMs to avoid service disruption.
 - The user has the option to either override and proceed with the upgrade or fix any pending problems / wait until all modules attach.
10. Proceed / Finish the upgrade process
11. Restore initial VSM IP configuration (by overwriting the current config with the saved configuration file)

Upgrade Documentation

- Software Upgrade Guide

http://www.cisco.com/en/US/docs/switches/datacenter/nexus1000/sw/4_2_1_sv_1_4/upgrade/software/guide/n1000v_upgrade_software.html

- Upgrade Screenscasts (Use them, they're good!)

http://www.cisco.com/en/US/docs/switches/datacenter/nexus1000/sw/4_2_1_sv_1_4/upgrade/screencast/guide/n1000v_upgrade_screencasts.html#wp42616

For More Information

See the following Resources

- Nexus 1000V Configuration, Installation and Upgrade Guides
- Nexus 1000V Deployment Guide Version 3.0
- QoS Queuing for Nexus 1000V Whitepaper
- Nexus 1000V Integration with vCloud Director Technical Whitepaper
- VSG Deployment Guide



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.

