

RED HAT
SUMMIT

Running RHV integrated with Cisco ACI

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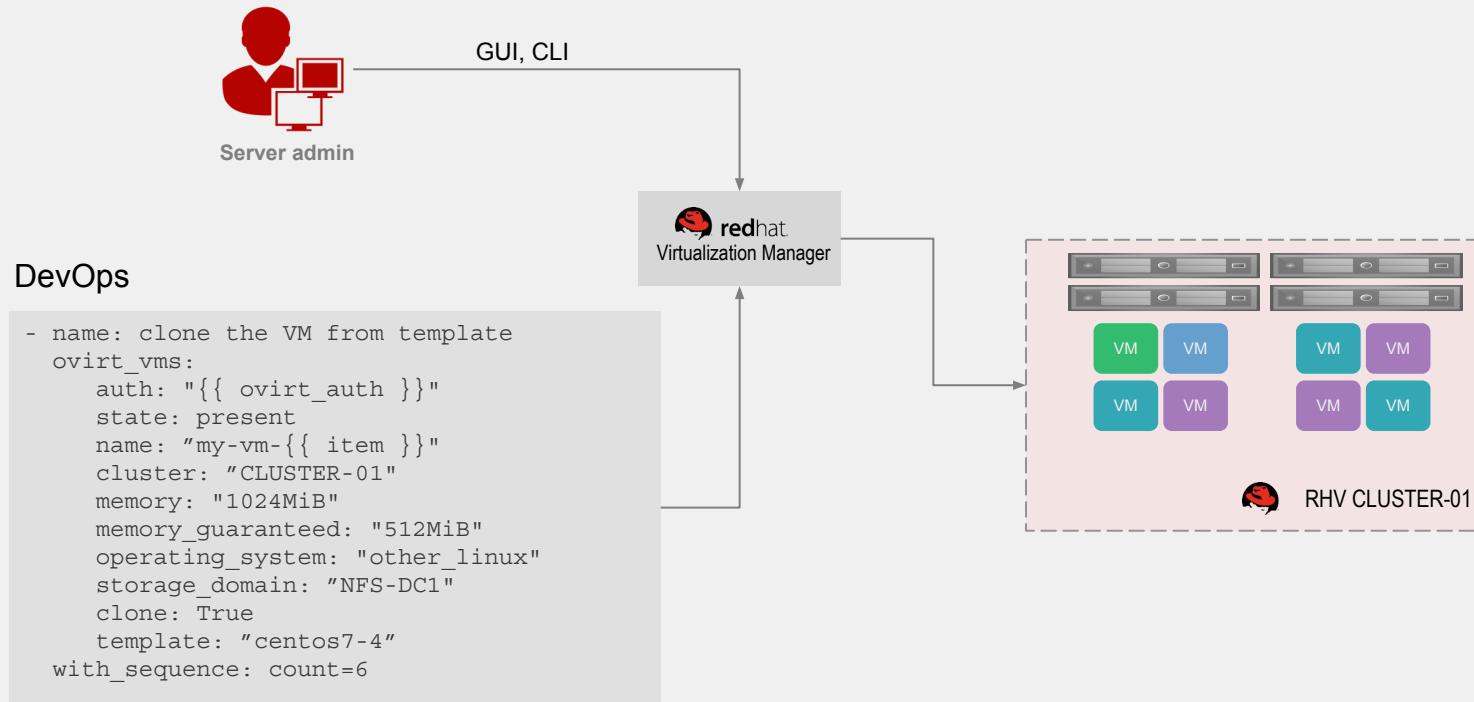
May 2018



Agenda

- Why we need SDN on the Data Center
 - What problem are we solving?
- Introduction to Cisco Application Centric Infrastructure (ACI)
- ACI and Red Hat Virtualization integration
- ACI and RHV Designs
- Q&A

Creating a Virtual Machine on RHV takes minutes ...



But to make a Virtual Machine useful ...

- It needs to connect to a network
- The network needs VLAN, Subnets, routing policies ...
- Security rules must be applied
- etc, ...

Traditionally this means
(manual) box-by-box
configurations by the network
admin, and then on RHVM

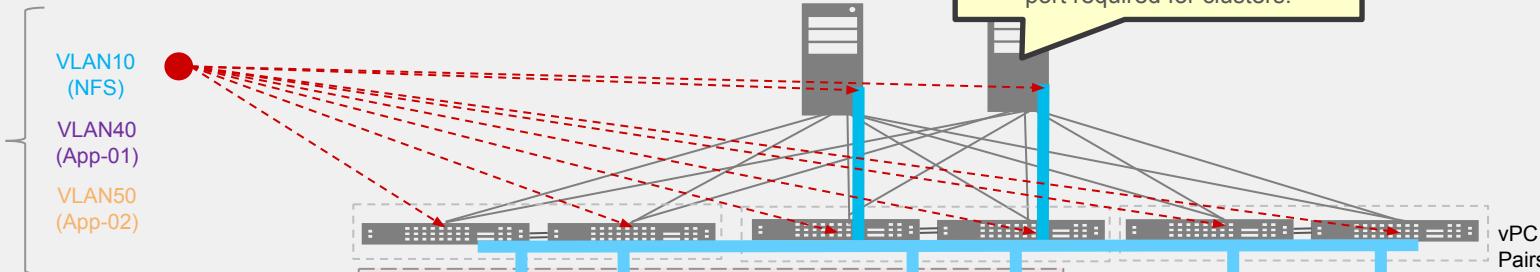
Every new network requires many provisioning touch points on the network, and on RHVM

1. Assign VLAN, subnets, routing, and configure them on each and every device and on every required port.



Fabric Admin

VLAN10
(NFS)
VLAN40
(App-01)
VLAN50
(App-02)



Every new Logical Network requires touching all network elements and knowledge of every port required for clusters.

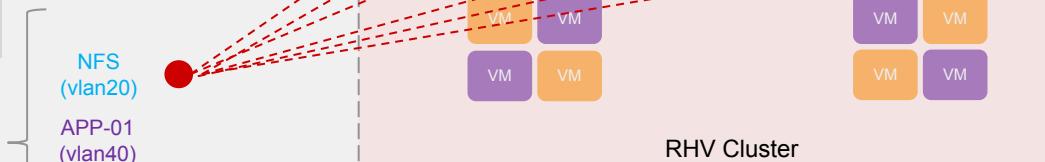


Red Hat Virtualization Manager



Server Admin

NFS
(vlan20)
APP-01
(vlan40)
APP-02
(vlan50)



2. Configure Logical Networks with given VLANs, and assign them to the NICs on each and every host in the Cluster

Lot's of repetitive tasks that are prone to errors and can be complicated to automate at scale

1. Assign VLAN, subnets, routing, and configure them on each and every device and on every required port.



Fabric Admin

VLAN10 (NFS)
VLAN40 (App-01)
VLAN50 (App-02)



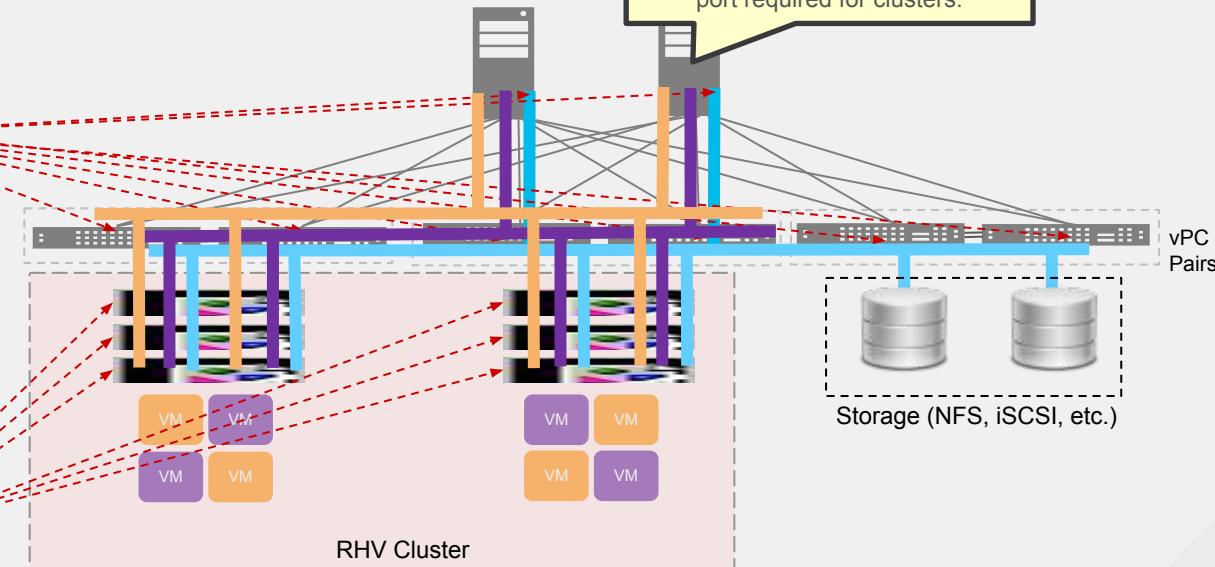
Every new Logical Network requires touching all network elements and knowledge of every port required for clusters.

redhat
Virtualization Manager



Server Admin

NFS (vlan20)
APP-01 (vlan40)
APP-02 (vlan50)



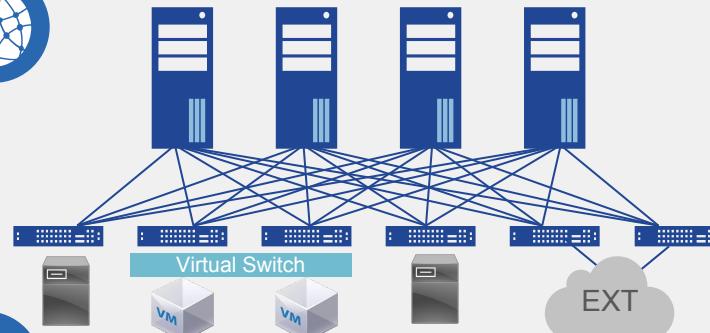
Introducing Cisco ACI

Application Centric Infrastructure

DC Fabric with a Single Point of Management with full FCAPS

Network Virtualization

- Distributed L2/L3 across the fabric, across different sites
- Seamless networking for bare metal, storage, VMs and Containers



Integrated Security

- Distributed Programmable L2-L4 security Policies
- Micro Segmentation
- L4-7 Service Chaining



Virtualization Integration



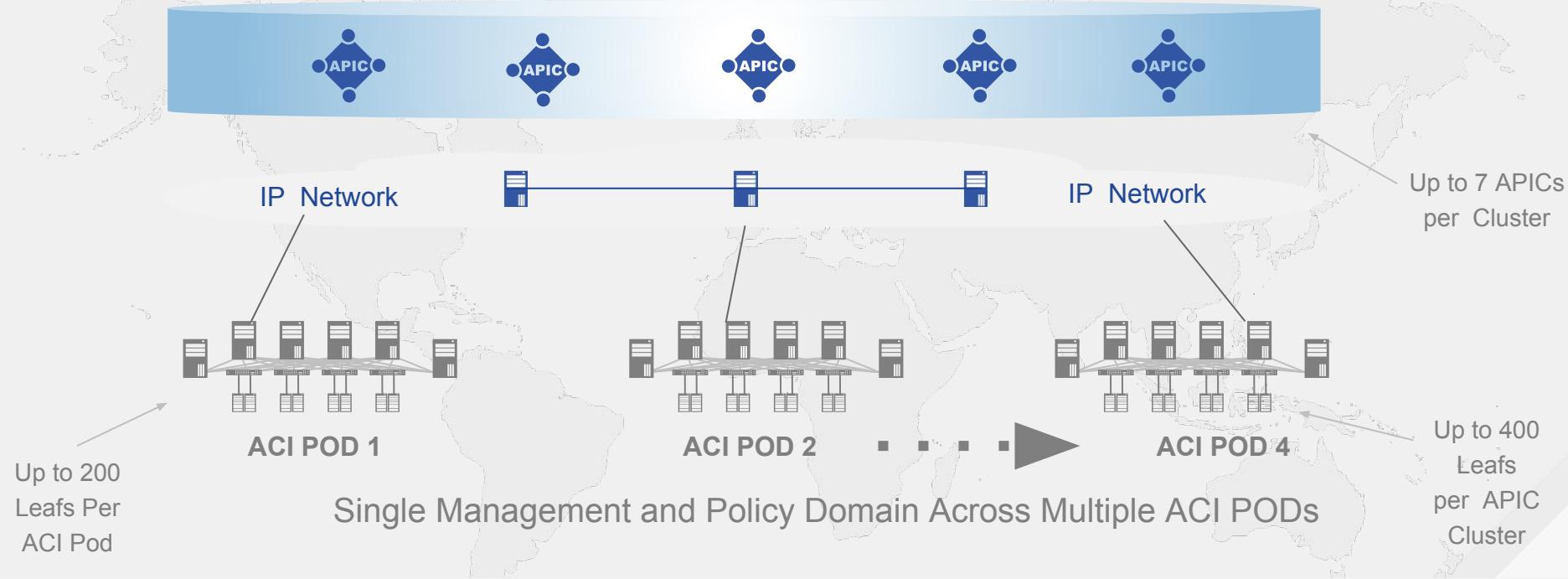
- Virtualization Managers: VMware vCenter, Microsoft SCVMM, Red Hat Virtualization
- OpenStack
- Kubernetes, OpenShift, Cloud Foundry

Ecosystem

- Cisco ACI App Center
- +65 Ecosystem Partners
- Cloud Management Integration



Application Centric Infrastructure – Seamless Services across data centers



Consistent
Policy

Centralized
Management

Isolated Fault
Domain By Pod

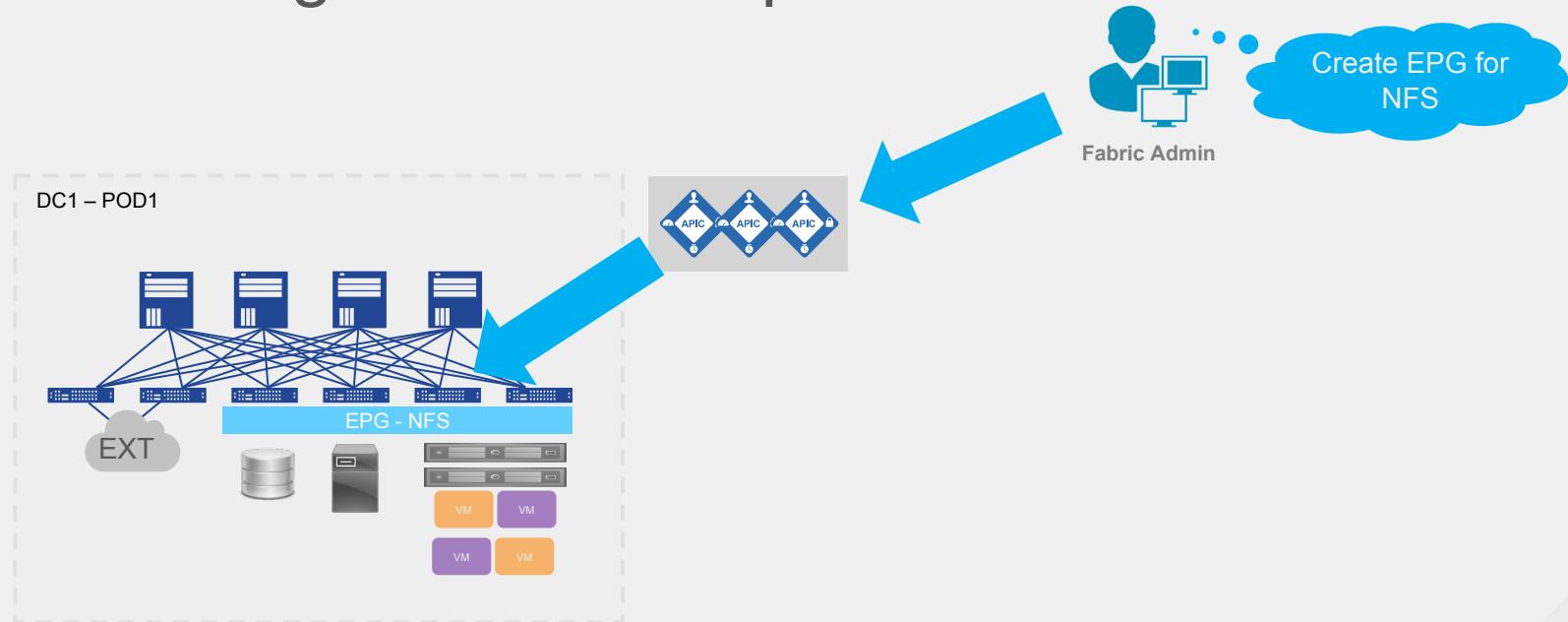
Scalability With
Simplicity

ACI provides network
virtualization and policy for
any type of endpoint

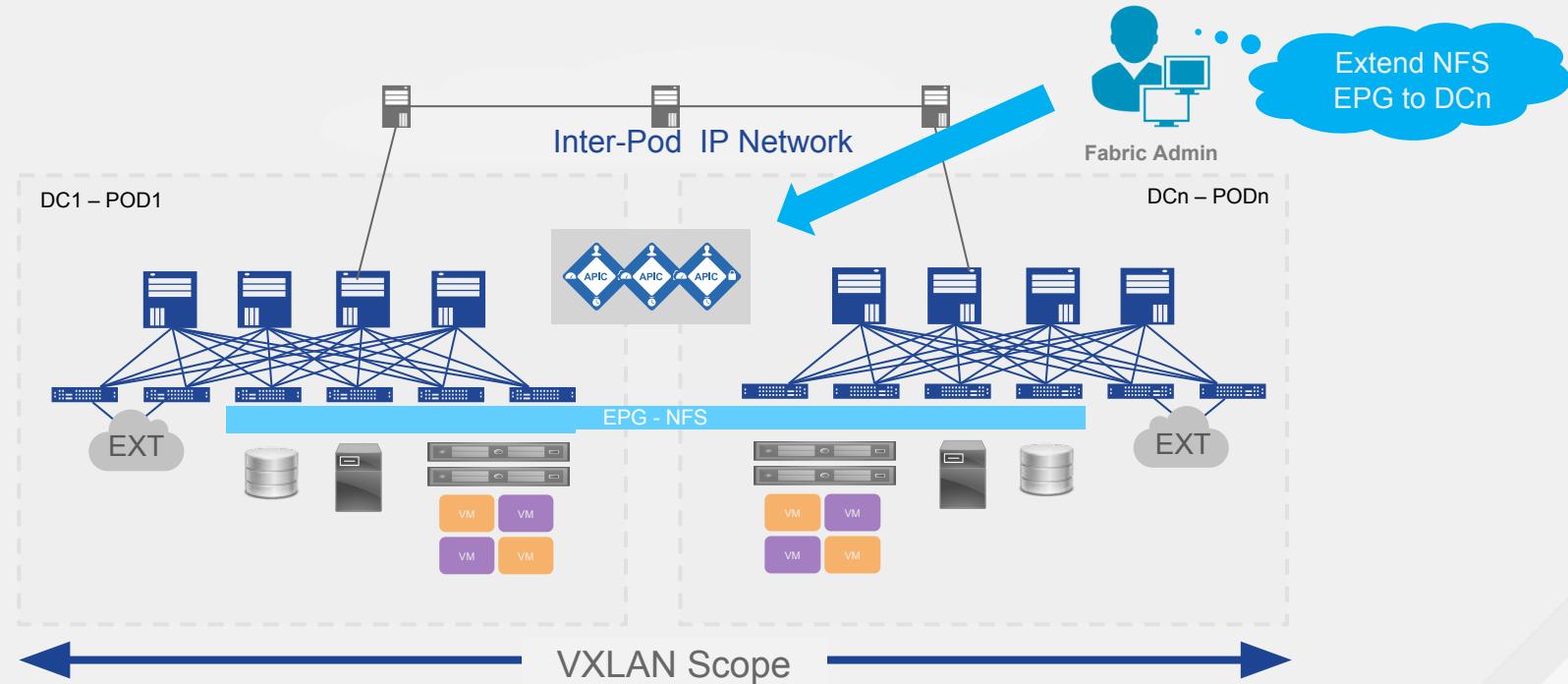
Networks are abstracted as
EndPoint Groups (EPG).

EPGs can group endpoints
based on encapsulation, IP,
MAC, VM attributes, containers
annotations, etc.

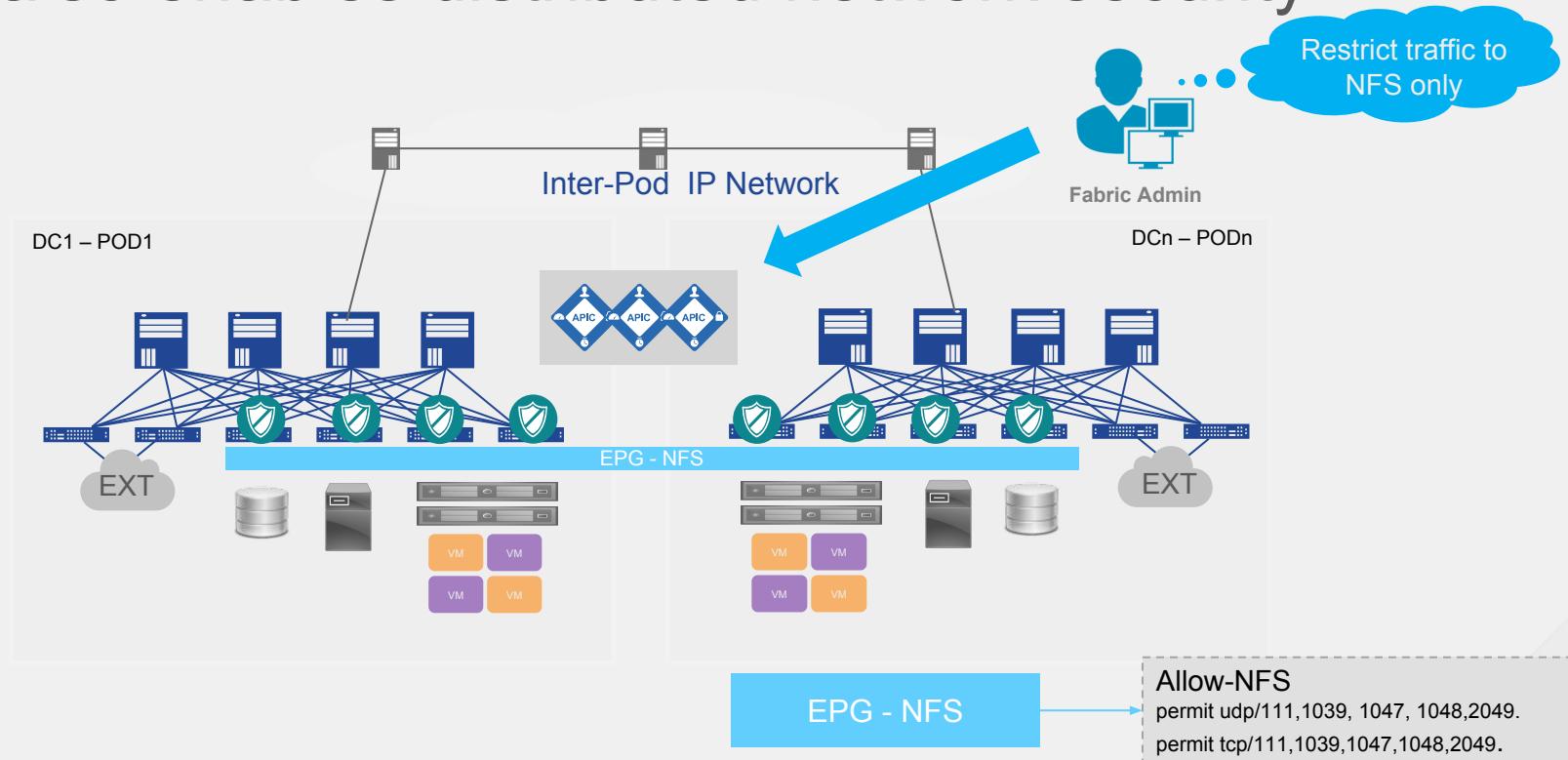
APIC provides a single point of management for all network configuration and operations



ACI provides automatic network extension leveraging its VXLAN integrated overlay



ACI also enables distributed network security



Cisco ACI Industry Leadership

5,000+

ACI Customers

50+%

ACI Attach Rate

65+

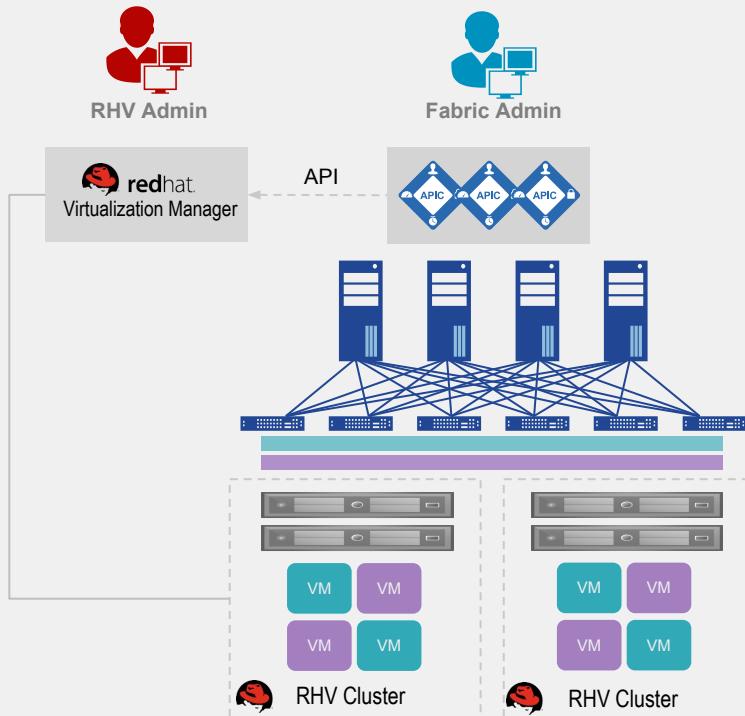
Ecosystem
Partners

Ecosystem Partners



ACI with VMM Domain for Red Hat Virtualization (since ACI 3.1 & RHV 4.1.7)

Cisco ACI and Red Hat Virtualization Integration



Key Benefits



Automate and accelerate provisioning
– APIC to provision Logical Networks



Enhance operations and team collaboration –
APIC visibility into RHV Domains



Enhanced security and segmentation
– ACI to implement distributed network policy



Simplify Migration from proprietary
hypervisors

APIC leverages RHVM Inventory for Virtual/Physical Correlation

The image shows two interface screenshots: the Red Hat Virtualization interface on the left and the APIC interface on the right. A red box highlights the 'Hosts' list in the RHVM interface, and a yellow box contains the text: 'Identify all hypervisors under RHVM administration.' A red arrow points from the RHVM 'Hosts' list to the APIC 'Inventory' interface. Another red box highlights the 'Hypervisors' list in the APIC interface, and a yellow box contains the text: 'Inventory and status of VM per hypervisor.' A red arrow points from the APIC 'Hypervisors' list to the detailed 'Virtual Machines' table in the APIC interface.

RED HAT VIRTUALIZATION

Host: cluster = Default

Hosts

Name	Comment	Hostname/IP	Cluster	Data Center	Status	Virtual Machines	Memory	CPU	Network	SPM
rhvh-01.nillo.net		5.0.7.112	Default	Default	Up	2	5%	0%	0%	SPM
rhvh-02.nillo.net		5.0.7.122	Default	Default	Up	0	3%	0%	0%	Normal

System

Expand All Collapse All

- System
- Data Centers
 - Default
 - Storage
 - Networks
 - Templates
- Clusters
 - Default
 - Hosts
 - rhvh-01.nillo.net
 - rhvh-02.nillo.net

APIC

System Tenants Fabric VM Networking L4-L7 Services Admin Operations Apps

Inventory

Hypervisor - rhvh-01.nillo.net

Properties

Name: rhvh-01.nillo.net
Type: Hypervisor Host
Status: Powered On

OPFLEX Status: DISCONNECTED
OPFLEX Version: n/a

Name	Status
app-server-01	Powered On
test-ubuntu-vm	Powered On
web-centos	Powered On
web-server-01	Powered On

Virtual Machines: Page 1 of 1 Objects Per Page: 15

Identify all hypervisors under RHVM administration.

Inventory and status of VM per hypervisor

APIC automatically creates Logical Networks



Fabric Admin

The screenshot shows the Cisco APIC interface. In the Tenant T1 section, the Application Profiles list contains 'AP1'. Under 'AP1', the 'Application EPGs' section is expanded, showing 'Web', 'App', and 'DB'. A red box highlights this section. A yellow callout box labeled '1. Create EPGs on APIC: Web, App, and DB' points to this area. To the right, the 'Application Profile - AP1' section shows various icons for different types of EPGs, including 'Contract', 'uEPG', 'uSeg EPG', 'Any EPG', 'Baremetal', 'VMWare', 'Microsoft', 'OpenStack/Kubernetes', 'Layer 2', 'Layer 3', and 'Layer 4-7'. A red box highlights this section. A yellow callout box labeled '2. Map EPGs to RHV VMM Domain (and other domains too if required)' points to this area.

The screenshot shows the Red Hat Virtualization interface. The 'Networks' table lists several networks, with the 'T1_AP1_App', 'T1_AP1_DB', and 'T1_AP1_Web' entries highlighted by a red box. A yellow callout box labeled 'APIC automatically configures the Web, App and DB Logical Networks with a dynamically assigned VLANs' points to these entries. The table has columns for Name, Comment, Data Center, Description, Role, VLAN tag, QoS Name, and Label. The 'T1_AP1_App' entry has a VLAN tag of 2035 and a label of 'aci_VMM-RHV-01'. The 'T1_AP1_DB' entry has a VLAN tag of 2068 and a label of 'aci_VMM-RHV-01'. The 'T1_AP1_Web' entry has a VLAN tag of 2000 and a label of 'aci_VMM-RHV-01'. The 'NFS-DC2' and 'ovirtmgmt' entries have VLAN tags of 2110 and no labels assigned.

Name	Comment	Data Center	Description	Role	VLAN tag	QoS Name	Label
T1_AP1_App		Default			2035	-	aci_VMM-RHV-01
T1_AP1_DB		Default			2068	-	aci_VMM-RHV-01
T1_AP1_Web		Default			2000	-	aci_VMM-RHV-01
NFS-DC2		Default	Network for NFS in DC2		2110	-	
ovirtmgmt		Default	Management Network		-	-	-

ACI RHV VMM Domain – Workflow with APIC 3.1

- An ACI VMM Domain associates with one RHV Data Center object
Multiple Data Centers are possible using different VMM Domains
- An ACI EPG maps to a RHVM Logical Network
The integration is supported with RHV networking using Linux bridge or Open vSwitch (OVS)
- When an EPG is associated with a RHV VMM Domain, APIC creates a corresponding Logical Network and **associates it with all clusters** in the RHVM Data Center

ACI performs distributed switching, routing and security between Logical Networks

Better network operations: the fabric admin can find RHV objects easily

Look for a hypervisor, or for a VM by its name, find where they are connected, etc.

RED HAT VIRTUALIZATION

Vms: cluster = Default

Virtual Machines

Name	Comment	Host	IP Address	FQDN	Cluster	Data Center	Memory
centos-server		rhvh-01.nillo.net	10.10.10.10	centos-server.nillo.net	Default	Default	11GB
test-ubuntu-vm		rhvh-02.nillo.net	10.10.10.25	test-server.nillo.net	Default	Default	15GB

System

Expand All Collapse All

System Data Centers Default Storage Networks

Search: VM Networking --> VM

test-ubuntu-vm

See Also

Access Policies

CISCO APIC

System Tenants Fabric VM Networking L4-L7 Services Admin Operations Apps

Inventory

Virtual Machine - test-ubuntu-vm

Properties

Name: test-ubuntu-vm	Status: Powered On			
Virtual Interfaces:				
Name	IP	MAC	State	Network
nic1	---	00:1A:4A:16:01:51	Up	T1_AP1_Web
Custom Attributes:				
Name	Value			

Verify VM IP, MAC, status and find EPG where it is connected

VMM-RHV-01

Controllers

rhvm-01

Hypervisors

rhvh-01.nillo.net

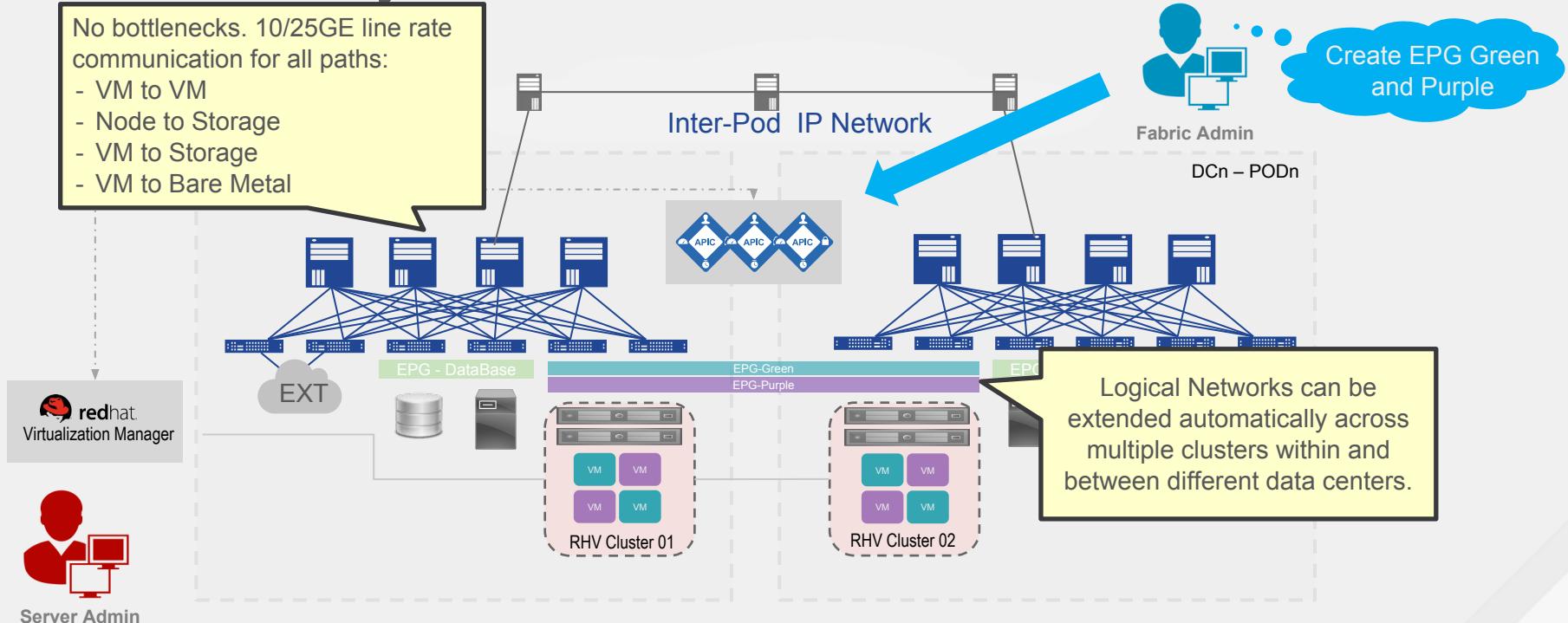
rhvh-02.nillo.net

Virtual Machines

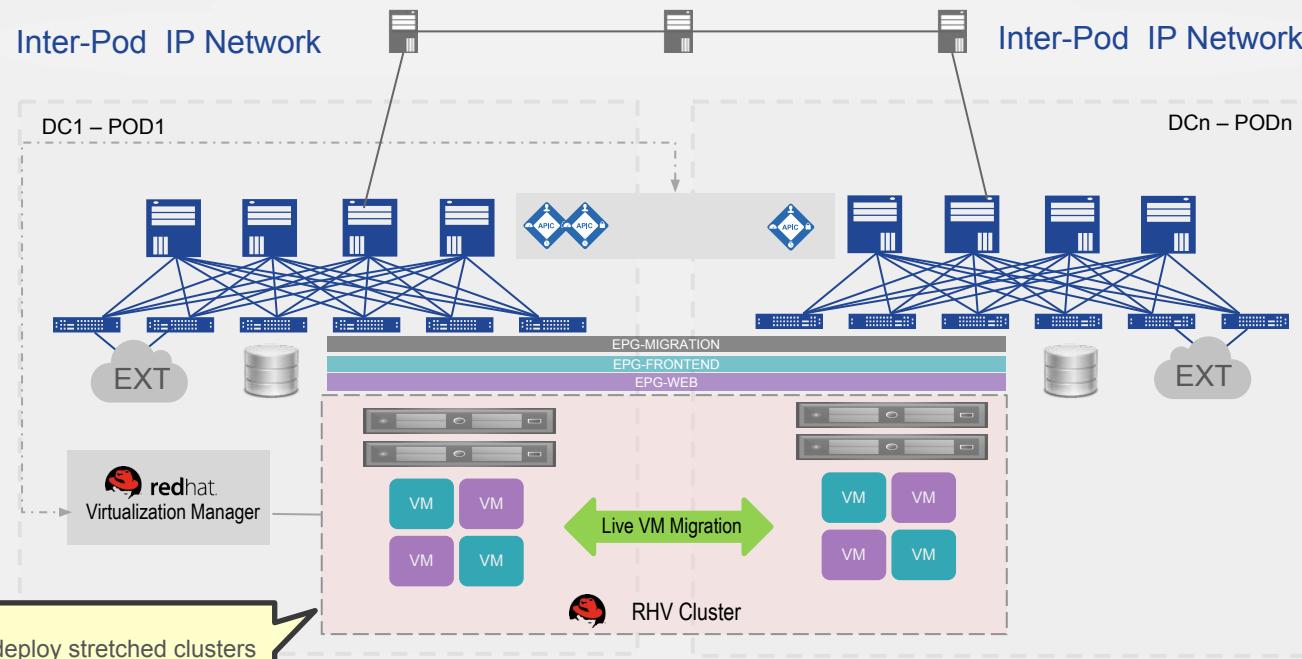
test-ubuntu-vm

ACI M-POD and RHV Cluster Design Options

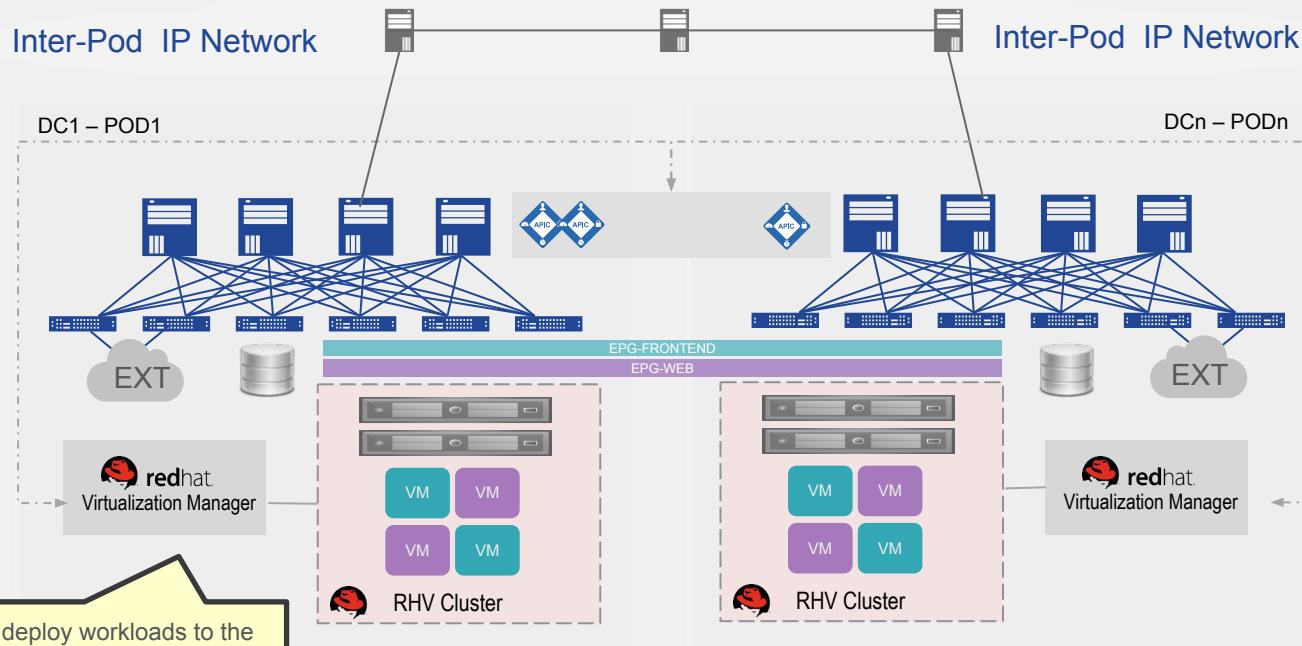
The fabric implements distributed routing, switching and security within and across DCs



ACI Multi-POD facilitates running stretched RHV Clusters



RHV and ACI Multi-POD – Independent RHV Managers



Customers can deploy workloads to the same networks on both RHV Managers. This scenario probably lends itself better to Multi-Site to match network and virtualization availability domains.

ACI native Ansible support

There are 50+ Ansible modules for ACI

http://docs.ansible.com/ansible/latest/scenario_guides/guide_aci.html

 Documentation

ANSIBLEFEST PRODUCTS COMMUNITY WEBINARS & TRAINING BLOG

Ansible 2.5
For previous versions, see the documentation archive.

Search docs

INSTALLATION, UPGRADE & CONFIGURATION

- Installation Guide
- Configuring Ansible
- Ansible Porting Guides

USING ANSIBLE

- User Guide

CONTRIBUTING TO ANSIBLE

- Ansible Community Guide

EXTENDING ANSIBLE

- Developer Guide

SCENARIO GUIDES

- Cisco ACI Guide**
- What is Cisco ACI ?
- Using the ACI modules
- ACI authentication

Docs » Cisco ACI Guide

 Edit on GitHub

Cisco ACI Guide

What is Cisco ACI ?

Application Centric Infrastructure (ACI)

The Cisco Application Centric Infrastructure (ACI) allows application requirements to define the network. This architecture simplifies, optimizes, and accelerates the entire application deployment life cycle.

Application Policy Infrastructure Controller (APIC)

The APIC manages the scalable ACI multi-tenant fabric. The APIC provides a unified point of automation and management, policy programming, application deployment, and health monitoring for the fabric. The APIC, which is implemented as a replicated synchronized clustered controller, optimizes performance, supports any application anywhere, and provides unified operation of the physical and virtual infrastructure.

The APIC enables network administrators to easily define the optimal network for applications. Data center operators can clearly see how applications consume network resources, easily isolate and troubleshoot application and infrastructure problems, and monitor and profile resource usage patterns.

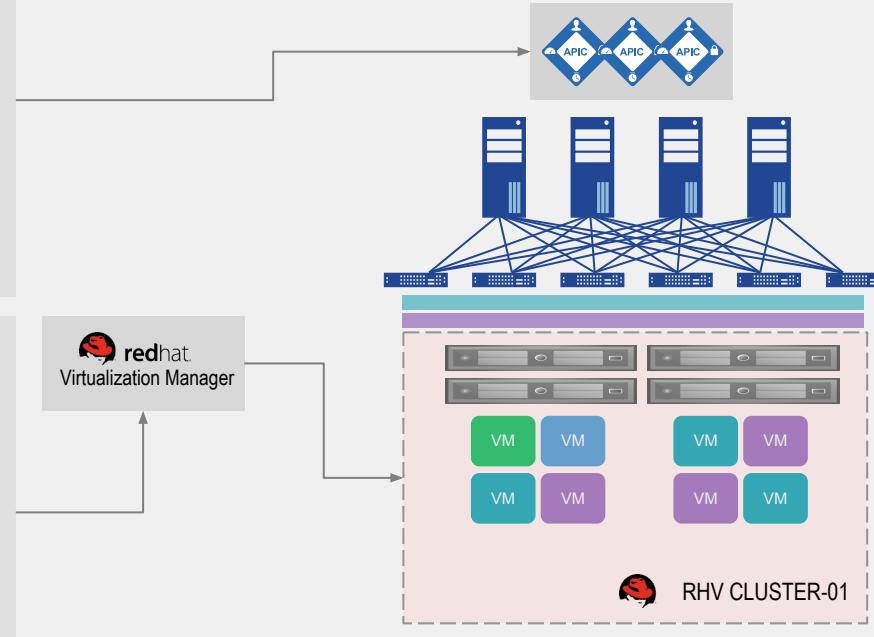
The Cisco Application Policy Infrastructure Controller (APIC) API enables applications to directly connect with a secure, shared, high-performance resource pool that includes network, compute, and storage capabilities.

ACI Fabric

Creating a network now takes less time than creating a Virtual Machine ...

```
- name: map EPG to RHV VMM
  Aci_epg_to_domain:
    hostname: apic-01
    private_key: /usr/me/admin.key
    tenant: "RHSummit"
    ap: "MyApp"
    epg: "{{ item }}"
    domain_type: vmm
    vm_provider: redhat
    domain: RHV-VMM-01
  with_items:
    - Green
    - Purple
```

```
- name: clone the VM from template
  ovirt_vms:
    auth: "{{ ovirt_auth }}"
    state: present
    name: "my-vm-{{ item }}"
    cluster: "CLUSTER-01"
    memory: "1024MiB"
    memory_guaranteed: "512MiB"
    operating_system: "other_linux"
    storage_domain: "NFS-DC1"
    clone: True
    template: "centos7-4"
  with_sequence: count=6
```



ACI and RHV VMM Domain Summary

Why ACI and Red Hat Virtualization

- Automate and accelerate provisioning – APIC automatically provisions Logical Networks and physical fabric.
- Line rate at 10/25GE for all server communications
- Extend networks to any cluster, any Data Center
- Implement Programmable, Distributed Network Security
- APIC visibility into RHV Domains to facilitate operations and team collaboration

Review online demos

ACI with RHV Intro - <https://youtu.be/HpFAyPgmaql>

ACI with RHV and Ansible - <https://youtu.be/W1oVzv8iRsk>

Simplify migrating from vCenter to RHV - <https://youtu.be/3qsi1G3hjMM>

Where to find more information

- ACI and Red Hat Virtualization White Paper:

<https://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/application-centric-infrastructure/white-paper-c11-740535.html>

- ACI Loves KVM and Red Hat Virtualization (Cisco Blog):

<https://blogs.cisco.com/datacenter/aci-loves-kvm-and-red-hat-virtualization>

- Cisco ACI and Red Hat Virtualization Configuration Guide:

https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/kb/b_Cisco_ACI_Red_Hat_Virtualization.html

RED HAT
SUMMIT



Session Abstract

Cisco ACI is a comprehensive SDN solution that provides integrated VXLAN overlays delivering network virtualization and distributed security policies for virtual and physical workloads. Cisco ACI integrates with many Red Hat technologies, including Red Hat Virtualization (RHV), OpenShift, and OpenStack. Red Hat Virtualization allows customers to virtualize mission-critical workloads while building a future foundation for cloud-native and container-based workloads. In this session, attendees will learn the benefits of deploying RHV with Cisco ACI , including:

- Scalable network virtualization
- Distributed security policies
- Micro-segmentation
- Automating Cisco ACI with RHV using Ansible

Join Dominik Holler of Red Hat and Juan Lage of Cisco as they present the current and future integration of Cisco ACI with Red Hat Virtualization and how it benefits customers.