Running RHV integrated with Cisco ACI

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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 ...

- 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
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.

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

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

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

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

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

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

Virtual Switch
Application Centric Infrastructure – Seamless Services across data centers

- Consistent Policy
- Centralized Management
- Isolated Fault Domain By Pod
- Scalability With Simplicity

Single Management and Policy Domain Across Multiple ACI PODs

ACI POD 1

ACI POD 2

ACI POD 4

Up to 200 Leafs Per ACI Pod

Up to 7 APICs per Cluster

Up to 400 Leafs per APIC Cluster

IP Network
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

Extend NFS EPG to DCn

Fabric Admin

Inter-Pod IP Network

VM
VM
VM
VM

VM
VM
VM
VM

Inter-Pod IP Network

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Inter-Pod IP Network

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Inter-Pod IP Network

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Inter-Pod IP Network

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Inter-Pod IP Network

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VM
ACI also enables distributed network security

Restrict traffic to NFS only

<table>
<thead>
<tr>
<th>Fabric Admin</th>
<th>Inter-Pod IP Network</th>
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<tbody>
<tr>
<td>DC1 – POD1</td>
<td>DCn – PODn</td>
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EPG - NFS

VM | VM | VM | VM | VM | VM | VM | VM

Allow-NFS
permit udp/111,1039, 1047, 1048,2049.
permit tcp/111,1039,1047,1048,2049.
Cisco ACI Industry Leadership

- **5,000+** ACI Customers
- **50+%** ACI Attach Rate
- **65+** Ecosystem Partners

Ecosystem Partners:

- NetQoS
- CA
- AVI
- CFEngine
- Intel
- Splunk
- VMware
- radware
- Check Point
- cloudstack
- Turbonomic
- Microsoft
- redhat
- IBM
- Panduit
- Netscout
- MapR
- A10 Networks
- Fortinet
- Puppet
- One Convergence
- VCE
- NetApp
- Symantec
- BMC
- ScienceLogic
- EMC
- Emulex
- Sourcefire
- Canonical
- DatanTorrent
- Datatools
- KillerIT
- Vnomic
- Zensess
- apprenda
- ServiceNow
- OpenStack
- SAP
- OpenStack
- OPSCODE
- CATBIRD
- Python
- Infoblox
- VERITAS
- NIKSUN
- VMware
- Palo Alto
- 3rd place INTEROP 2015 Awards
- N3N
- algosec
- Tufin
- Infupsys
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

Identify all hypervisors under RHVM administration.
APIC automatically creates Logical Networks

1. Create EPGs on APIC: Web, App, and DB
2. Map EPGs to RHV VMM Domain (and other domains too if required)

Fabric Admin

APIC automatically configures the Web, App and DB Logical Networks with a dynamically assigned VLANs
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.

Verify VM IP, MAC, status and find EPG where it is connected.
ACI M-POD and RHV Cluster Design Options
The fabric implements distributed routing, switching and security within and across DCs

No bottlenecks. 10/25GE line rate communication for all paths:
- VM to VM
- Node to Storage
- VM to Storage
- VM to Bare Metal

Logical Networks can be extended automatically across multiple clusters within and between different data centers.

Create EPG Green and Purple

Fabric Admin
ACI Multi-POD facilitates running stretched RHV Clusters

Customers can deploy stretched clusters (assuming storage solution support)
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
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:

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

- Cisco ACI and Red Hat Virtualization Configuration Guide:
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.