Red Hat Virtualization (RHV) Integration with Cisco Application Centric Infrastructure (ACI)

Contents

Introduction:

Red Hat Virtualization is an end-to-end virtualization solution. This is a virtualization suite that enables network and system administrators to reduce the complexity of large deployments. The key components of RHV include the Red Hat Virtualization Hosts (RHVH), the Red Hat Virtualization Manager (RHVM), and the Storage Domains.

RHVM is a server that provided management of datacenter and KVM (Kernel Virtual Machine) cluster hosts, similar to vCenter.

RHVM is a physical compute KVM based hypervisors to deploy virtual machines.

From 3.1 onwards APIC supports RedHat Virtualization Integration. Cisco Application Centric Infrastructure (ACI) controller integrates with RHV and automates provisioning of Logical Networks on RHV. Together ACI and RHV enhance the network management capabilities of the platform.

This article is based on ACI software version 4.2(3n) and RHV manager/host software version 4.2

Prerequisites

Before starting RHV integration, make sure you have RHV Manager installed and pingable from APIC. And perform the following tasks on Red Hat Virtualization Manager:

1. Create a data center.
2. Create storage domains.
3. Create clusters.
4. Attach Red Hat Virtualization hosts to the clusters.

ACI and RHV Integration workflow:

Once the RHV datacenter is ready with one or more hosts connected, perform the following setup to integrate it with ACI fabric.

1. Create an AAEP and also assign it to the interface policy group created for leaf interfaces connecting to host.

Fabric --> Access Policy --> Policies --> Global --> Attachable Access Entity Profiles-->(Right Click) Create Attachable Access Entity Profile

2. VLAN pool used by the virtual machines to connect with ACI.

Fabric --> Access Policy --> Pools --> Vlan --> (Right Click) Create VLAN Pool

Pools - VLAN

Create VLAN Pool

Name: rhv_vlanpool

Description: optional

Allocation Mode: **Dynamic Allocation** | Static Allocation

Encap Blocks:

| VLAN Range | Description | Allocation Mode | Role |

Create Ranges

Type: VLAN

Description: optional

Range: VLAN | 3501 - VLAN | 3510

Allocation Mode: Dynamic Allocation | **Inherit allocMode from parent** | Static Allocation

Role: **External or On the wire encapsulations** | Internal
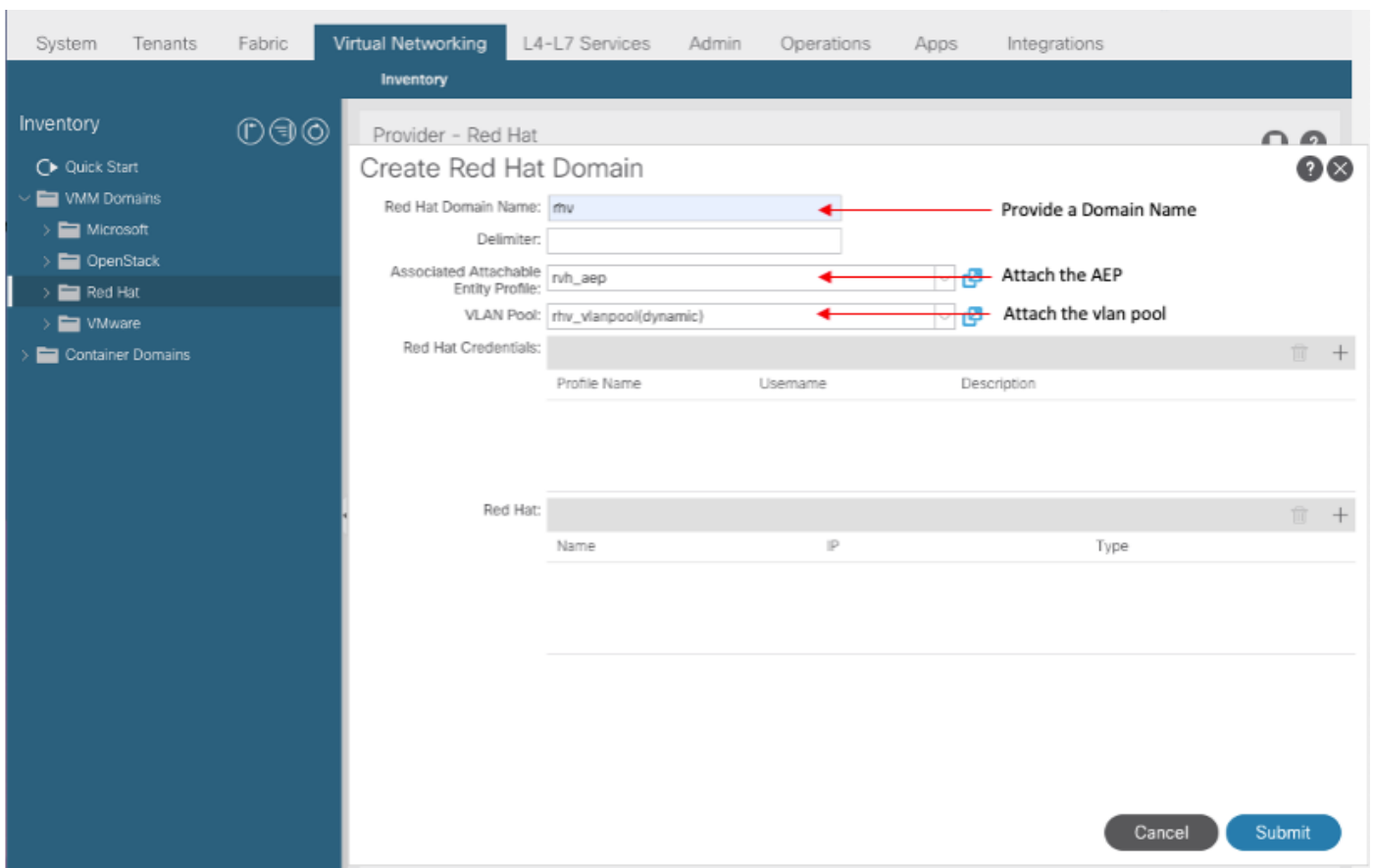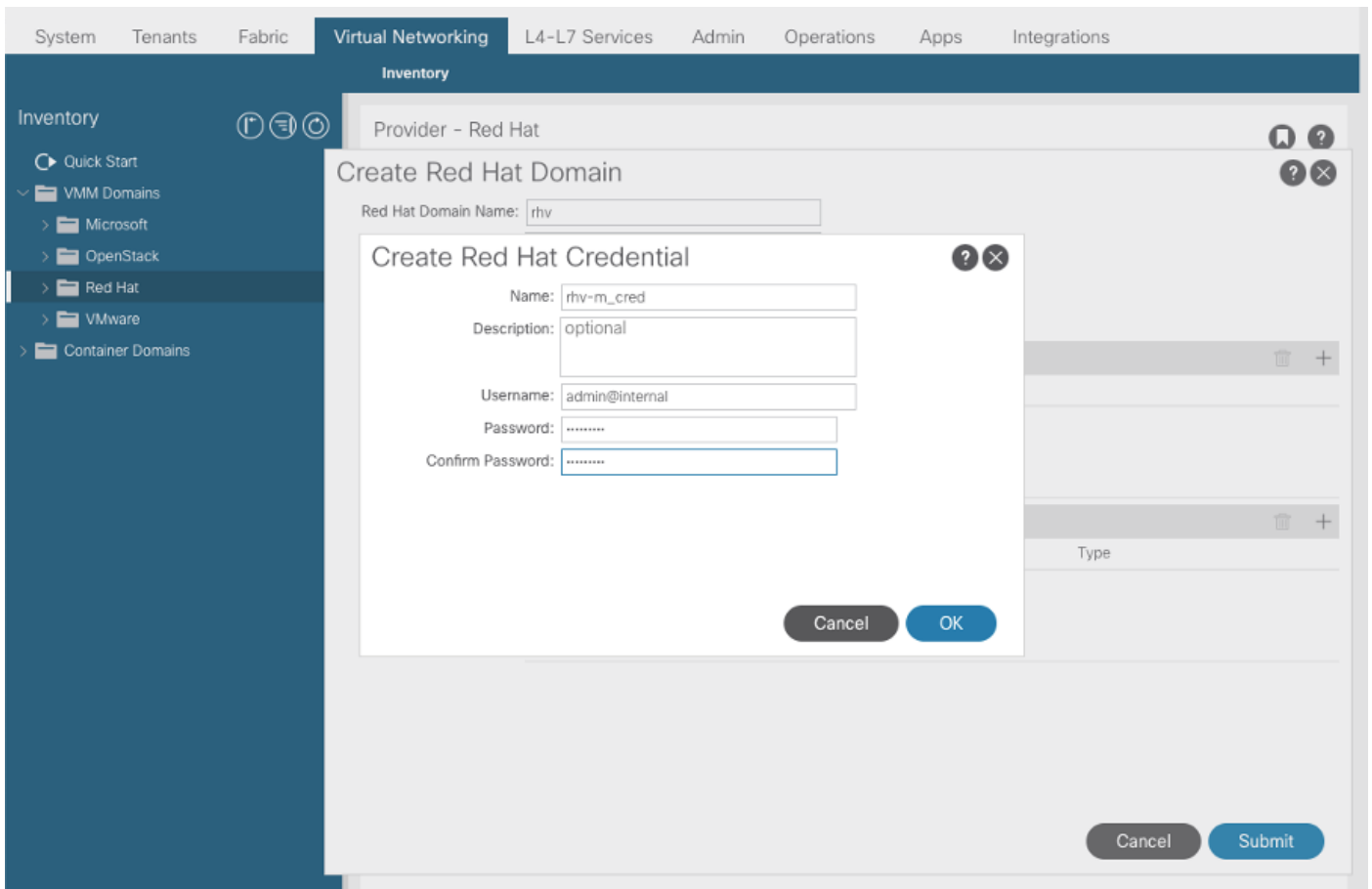
Cancel | OK

3. Create a RedHat VMM domain under the VMM integration and associate the VLAN pool and AAEP(Associated Attachable Entity Profile) created above.

 Virtual Networking -->VMM Domain--> RedHat (Right Click)--> Create a RedHat Domain

System | Tenants | Fabric | **Virtual Networking** | L4-L7 Services | Admin | Operations | Apps | Integrations

Inventory

Inventory

- Quick Start
- VMM Domains
  - Microsoft
  - OpenStack
  - Red Hat
  - VMware
- Container Domains

Provider - Red Hat

Create Red Hat Domain

Red Hat Domain Name: rhv ← Provide a Domain Name

Delimiter:

Associated Attachable Entity Profile: rvh_aep ← Attach the AEP

VLAN Pool: rhv_vlanpool(dynamic) ← Attach the vlan pool

Red Hat Credentials:

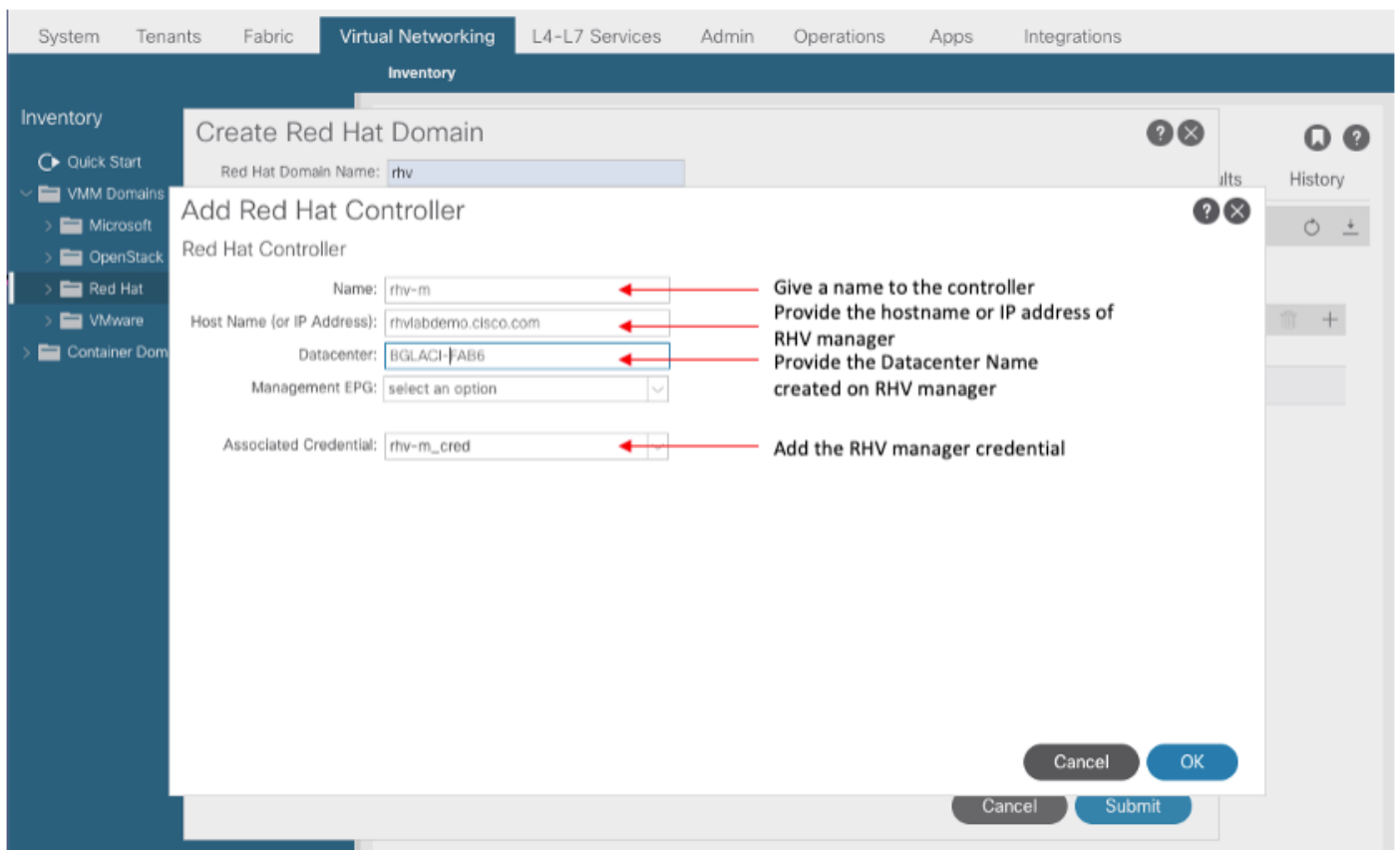| Profile Name | Username | Description |

Red Hat:

| Name | IP | Type |

Cancel | Submit

4.

4. Add credentials for RedHat Virtualization Manger used by APIC to connected RHV-M.

5. Create an RHV controller with a name, ip address, datacenter and associate credentials created in above step.

6. APIC now should get connected to the RHV Manager and pulls inventory consists of hosts, VMs, and logical networks in the datacenter
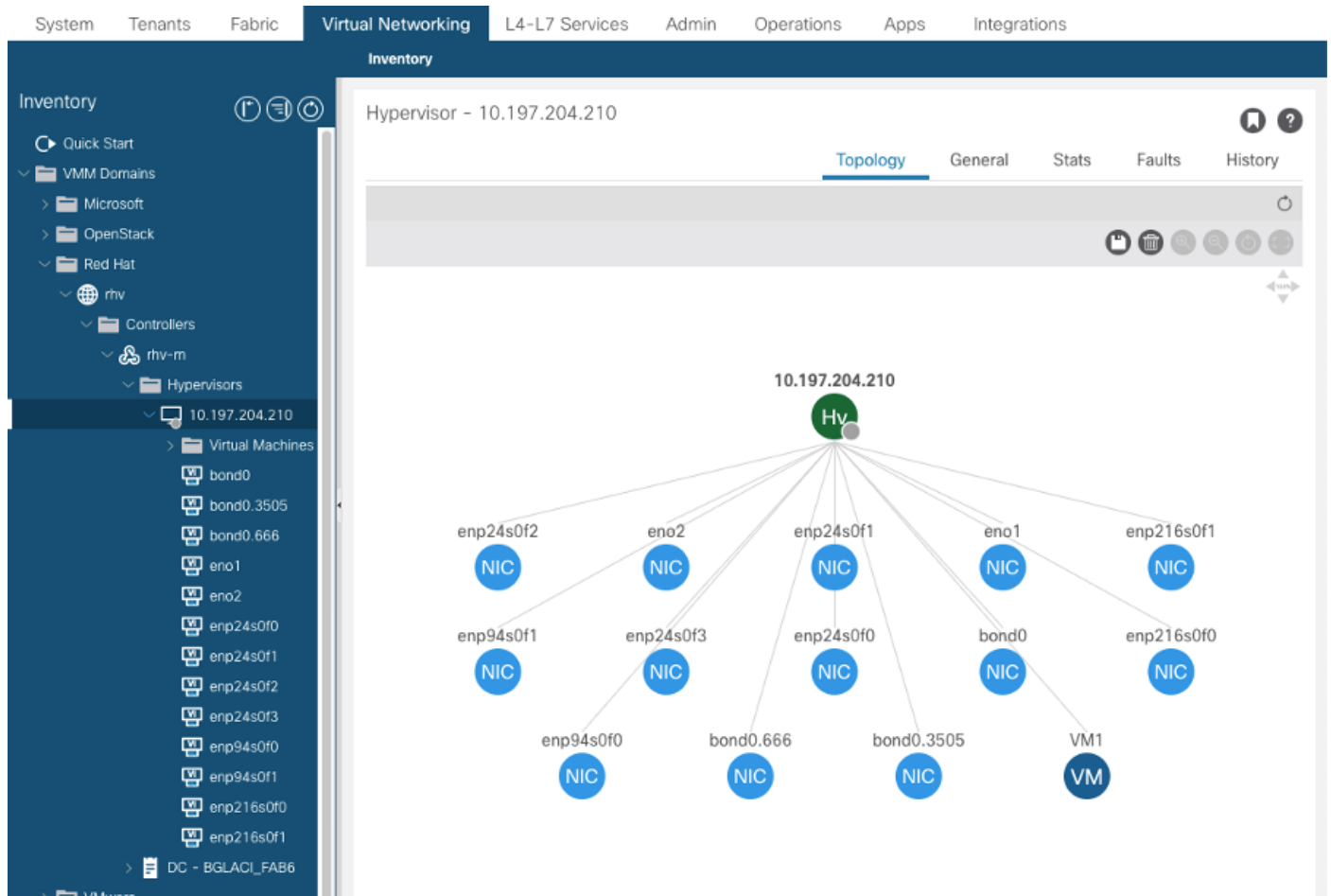
**7. Create a tenant, application profile, EPG and associate it with the above created RedHat Domain.**

Resolution Immediacy: Pre-Provision (pre-provision only supported as of 4.2(3n))

Deployment Immediacy: Immediate or On-demand

8. APIC pushes epg as a logical network with a label aci_<domainName> to RHV Manager and associate with all clusters in datacenter. Assign the label to host uplinks (one-time configuration)
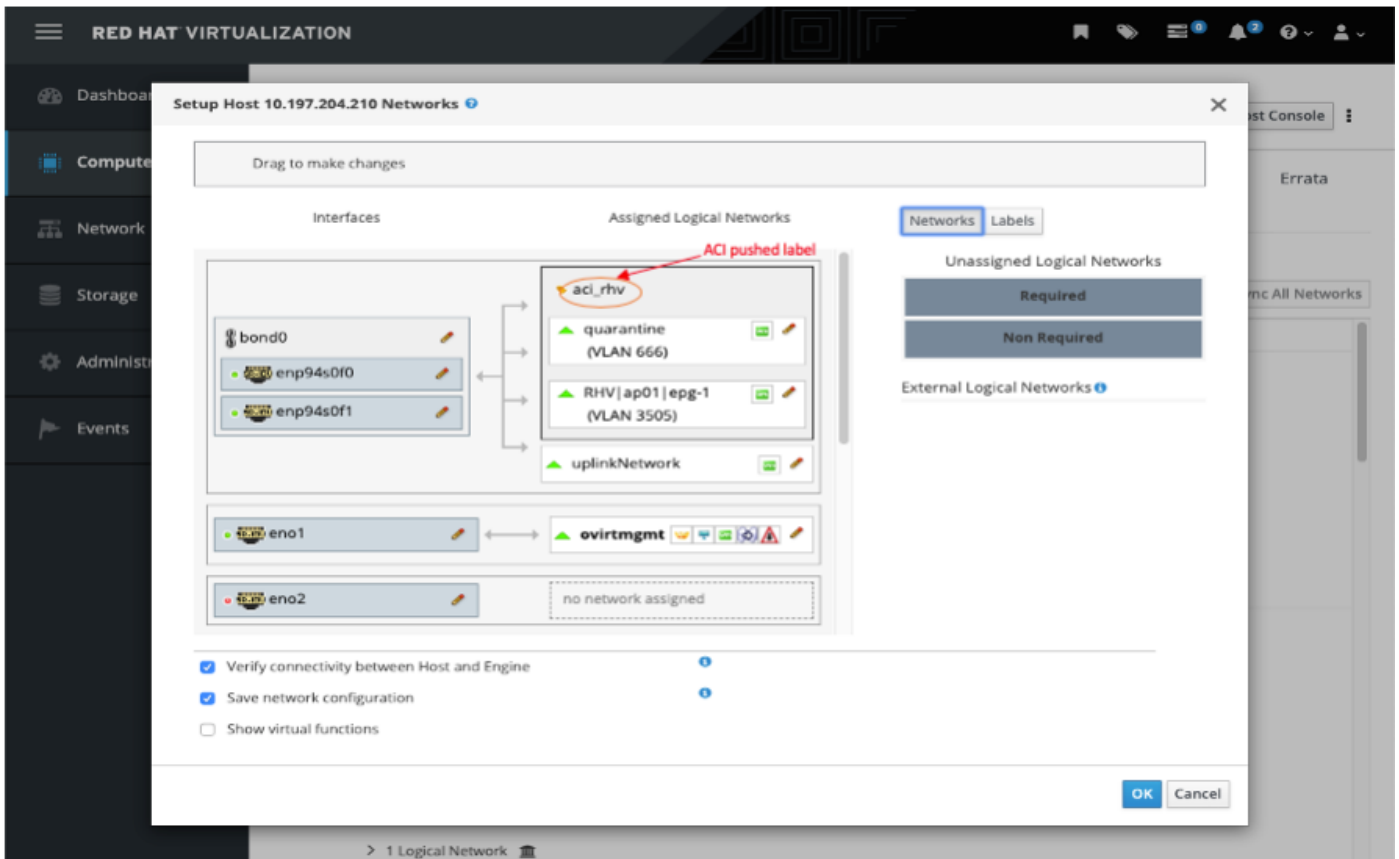
10.

9. By Default, APIC will dynamically assign VLAN encapsulation from the associated pool. Assign the network to the VM to make the VM part of ACI EPG.
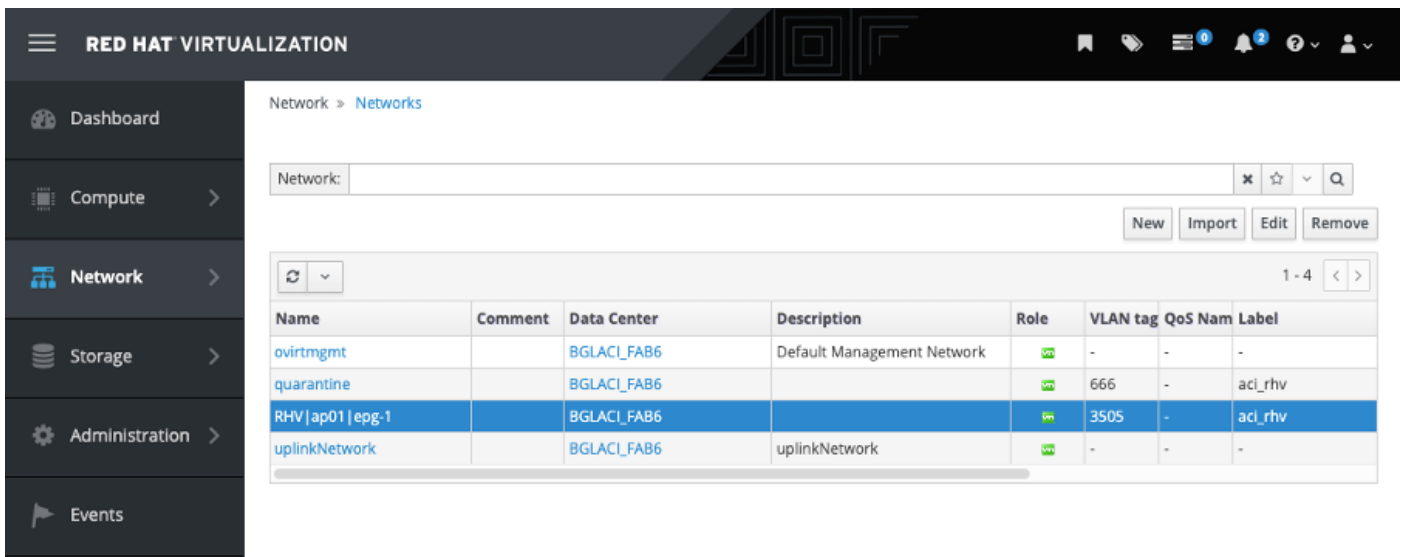
Verification:

1. Verify the created RHV domain and apic leader responsible to establish connection with RHV Manager

```
bgl-aci06-apic1# show redhat domain name rhv
Domain Name        : rhv
Virtual Switch Mode : rhev
Number of EPGs      : 1
```

```
Faults by Severity  : 0, 0, 0, 0


APIC Owner:
 Controller    APIC      Ownership
 -----------   -------   ---------------
 rhv-m         bgl-aci0  Leader
               6-apic3
 rhv-m         bgl-aci0  NonLeader
               6-apic2
 rhv-m         bgl-aci0  NonLeader
               6-apic1
rhev:
Faults: Grouped by severity (Critical, Major, Minor, Warning)
 rhev                Type      Datacenter           Status    RHVHs  VMs    F
aults
 ------------------  --------  -------------------  --------  -----  -----  -
--------------
 10.197.204.33       rhev      BGLACI_FAB6          online    1      1      0
,0,0,0
bgl-aci06-apic1#
```

2. Verify associated epg and vlan assigned

```
bgl-aci06-apic1# show redhat domain name rhv epg
Encap: (P):Primary VLAN, (S):Secondary VLAN
 Name                            Encap           AllocMode
 ------------------------------  --------------  ----------
 RHV|ap01|epg-1                  vlan-3505       dynamic

bgl-aci06-apic1#
```

3. Verify the connected hosts.

```
bgl-aci06-apic1# show redhat domain name rhv rhev 10.197.204.33
Hostname or IP      : 10.197.204.33
Datacenter          : BGLACI_FAB6
Status              : online
Last Inventory Sync : 2020-05-03 17:03:20
Last Event Seen     : -
Username            : admin@internal
Number of RHV Hosts : 1
Number of VMs       : 1
Faults by Severity  : 0, 0, 0, 0
Leader              : bgl-aci06-apic3

Hosts:
 RHVH            VMs
 --------------  --------
 10.197.204.210  1
```

4. Below moquery's can also be used to verify the RHV integaration

```
-To verify connected Hosts/Hypervisors
 moquery -c compHv

-To verify Controller parameters and operational status
 moquery -c compCtrlr
```

-To verify the vmm Domain
moquery -c vmmDomP

5. Verify network on host:

Following vrish commands can be used to verify VM networking on host (for linux bridges only)

- To list all the networks present on the host:

```
virsh# iface-
list


 Name                   State       MAC Address


------------------------------------------------------


 lo                     active     00:00:00:00:00:00


 on60f6acb34a7a4        active     3c:fd:fe:d6:00:dc


 ovirtmgmt              active     2c:f8:9b:f8:18:1e


 quarantine             active     3c:fd:fe:d6:00:dc


 uplinkNetwork          active     3c:fd:fe:d6:00:dc
```

- List all the VM on the host

```
virsh # list Id Name State -------------------------------------------------------- 1 VM1 running -
```
Check the interface used to connect VM1. Here on60f6acb34a7a4 is the bridge pushed by ACI.
```
virsh # domiflist VM1


Interface  Type        Source      Model       MAC

                       --------------------------------------------------------


vnet0      bridge      on60f6acb34a7a4 virtio        56:6f:72:bd:00:03
```

                                                 - To dump bridge
on60f6acb34a7a4 details,bond0.3505 is uplink interface of the bridge and will tag the VM traffic
with ACI provided VLAN(3505 in this case). virsh # iface-
dumpxml on60f6acb34a7a4

```
<interface type='bridge' name='on60f6acb34a7a4'>

  <bridge>
```

```
    <interface type='vlan' name='bond0.3505'>

      <link speed='20000' state='up'/>

      <vlan tag='3505'>

        <interface name='bond0'/>

      </vlan>

    </interface>

    <interface type='ethernet' name='vnet0'>

      <link state='unknown'/>

      <mac address='fe:6f:72:bd:00:03'/>

    </interface>

  </bridge>

                                        </interface>
```

Other Resources:

1) [**Cisco ACI for RedHat Virtualization Environments White Paper**](#)

2) [**Cisco ACI and Red Hat Virtualization Config Guide**](#)