Red Hat
Enterprise Linux

Melting together OpenStack, RHV and OpenShift

Run Mode 1 and Mode 2 Applications side-by-side

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- more than 25 years working with Linux
- 6 years experience with OpenStack
- 3.5 years at Red Hat

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AGENDA

Motivation

The Stack Layout

Baseline: OpenStack

Mode 1: RHV

Mode 2: OpenShift

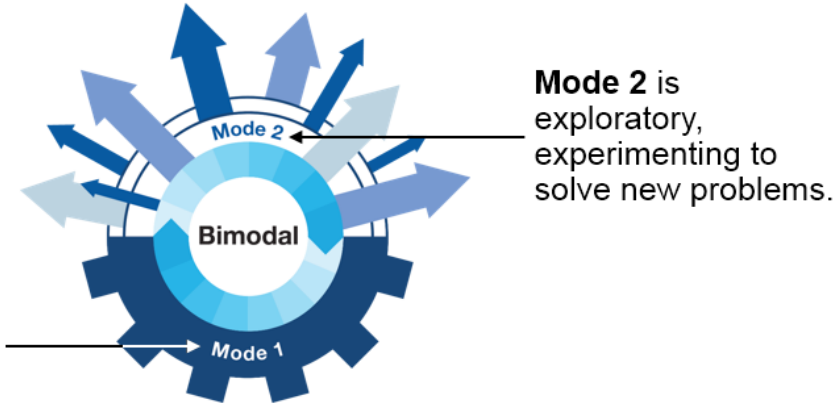
Q&A

Motivation

Bi-Modal IT

Gartner's definition

Bimodal is the practice of managing two separate but coherent styles of work — one focused on predictability and the other on exploration.



Mode 2 is exploratory, experimenting to solve new problems.

Mode 1 is predictable, improving and renovating in more well-understood areas.

"Bimodal IT is the practice of managing two separate, coherent modes of IT delivery, one focused on stability and the other on agility.
Mode 1 is traditional and sequential, emphasizing safety and accuracy. Mode 2 is exploratory and nonlinear, emphasizing agility and speed."

The Stack Layout

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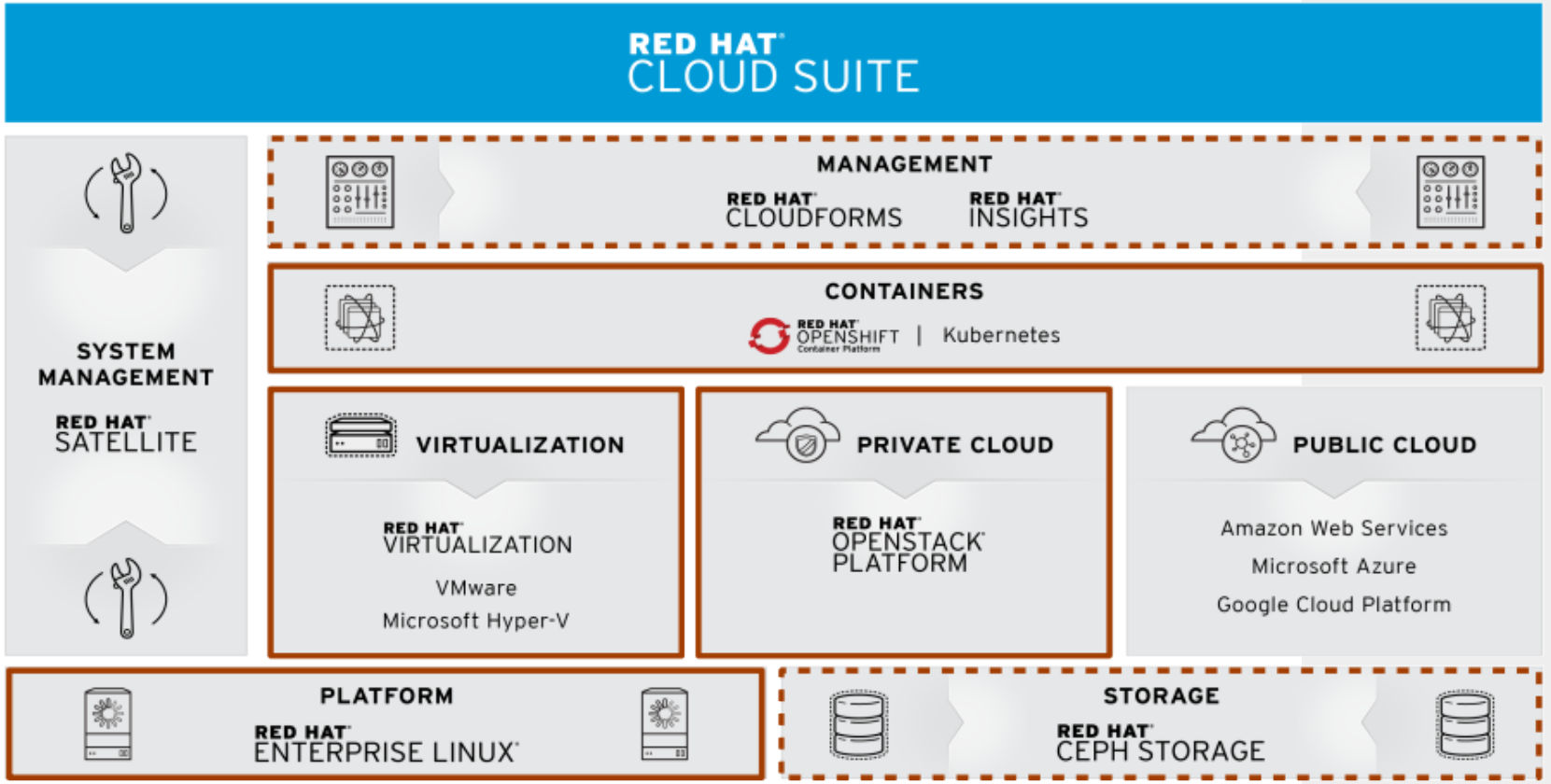

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Baseline: OpenStack

Baseline: OpenStack

IaaS Mode 2 Virtualizer

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Baseline: OpenStack

What to do here?

Just install it!

Ask your precious SSA for help if you struggle :-)

Mode 1: RHV

https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.3/html/administration_guide/sect-adding_external_providers

Mode 1: RHV Virtualizer

Integrating Network (Neutron)

- Integration is done on the RHV hosts with installing OVN, first.
- Easiest way here is to pre-install the hosts as “Networker Nodes” from RHOSP.
- Then install the hosts as you would do with pre-installed RHEL nodes for RHV:
  - Add required subs
  - Add to RHV-M or install the Hosted Engine
- Add the Neutron Network Provider to RHV like in the following slides.

https://access.redhat.com/documentation/en-us/red_hat_openstack_platform/13/html/advanced_overcloud_customization/roles

Mode 1: RHV Virtualizer

Creating the Networker Node

```
$ # 1. Create the Role
$ openstack overcloud roles generate -o ~/templates/roles_data.yaml --roles-path ~/roles Controller Compute \
  Networker

$ # 2. Create the Flavor
$ openstack flavor create --id auto --ram 6144 --disk 40 --vcpus 4 networker
$ openstack flavor set --property "cpu_arch"="x86_64" --property "capabilities:boot_option"="local" --property
"capabilities:profile"="Networker" networker
$ openstack flavor set --property resources:VCPU=0 --property resources:MEMORY_MB=0 --property resources:DISK_GB=0
--property resources:CUSTOM_BAREMETAL=1 networker

$ # 3. Tag the Baremetal Node to the new Flavor
$ openstack baremetal node set --property capabilities='profile:networker,boot_option:local' \
  58c3d07e-24f2-48a7-bbb6-6843f0e8ee13
```


https://access.redhat.com/documentation/en-us/red_hat_openstack_platform/13/html/advanced_overcloud_customization/roles

Mode 1: RHV Virtualizer

Creating the Networker Node

```
$ # 4. Create the Scaling environment
$ # snippet from ~/templates/node-count-flavor.yaml
parameter_defaults:
  OvercloudNetworkerFlavor: networker
  NetworkerCount: 3

$ # 5. Deploy
$ openstack overcloud deploy --templates -r ~/templates/roles_data.yaml -e ~/templates/node-count-flavor.yaml
```


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Mode 1: RHV Virtualizer

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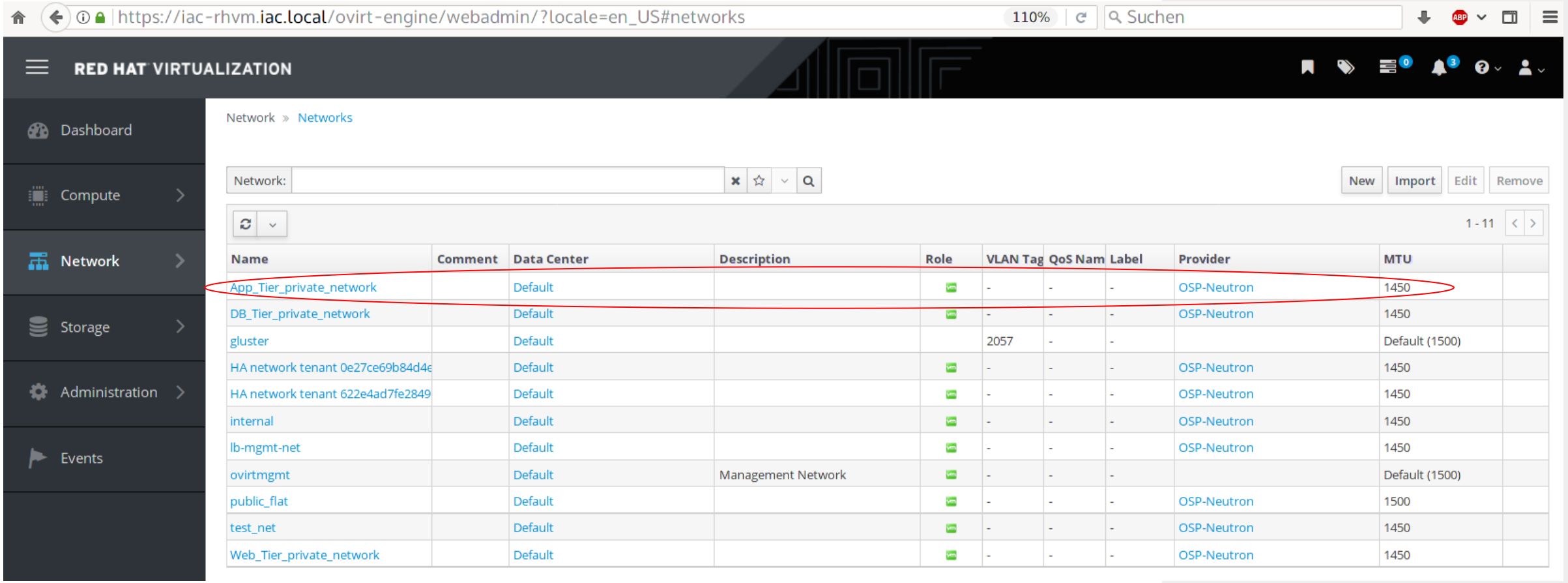

Name	Comment	Data Center	Description	Role	VLAN Tag	QoS Nam	Label	Provider	MTU
App_Tier_private_network		Default			-	-	-	OSP-Neutron	1450
DB_Tier_private_network		Default			-	-	-	OSP-Neutron	1450
gluster		Default			2057	-	-		Default (1500)
HA network tenant 0e27ce69b84d4e		Default			-	-	-	OSP-Neutron	1450
HA network tenant 622e4ad7fe2849		Default			-	-	-	OSP-Neutron	1450
internal		Default			-	-	-	OSP-Neutron	1450
lb-mgmt-net		Default			-	-	-	OSP-Neutron	1450
ovirtmgmt		Default	Management Network		-	-	-		Default (1500)
public_flat		Default			-	-	-	OSP-Neutron	1500
test_net		Default			-	-	-	OSP-Neutron	1450
Web_Tier_private_network		Default			-	-	-	OSP-Neutron	1450

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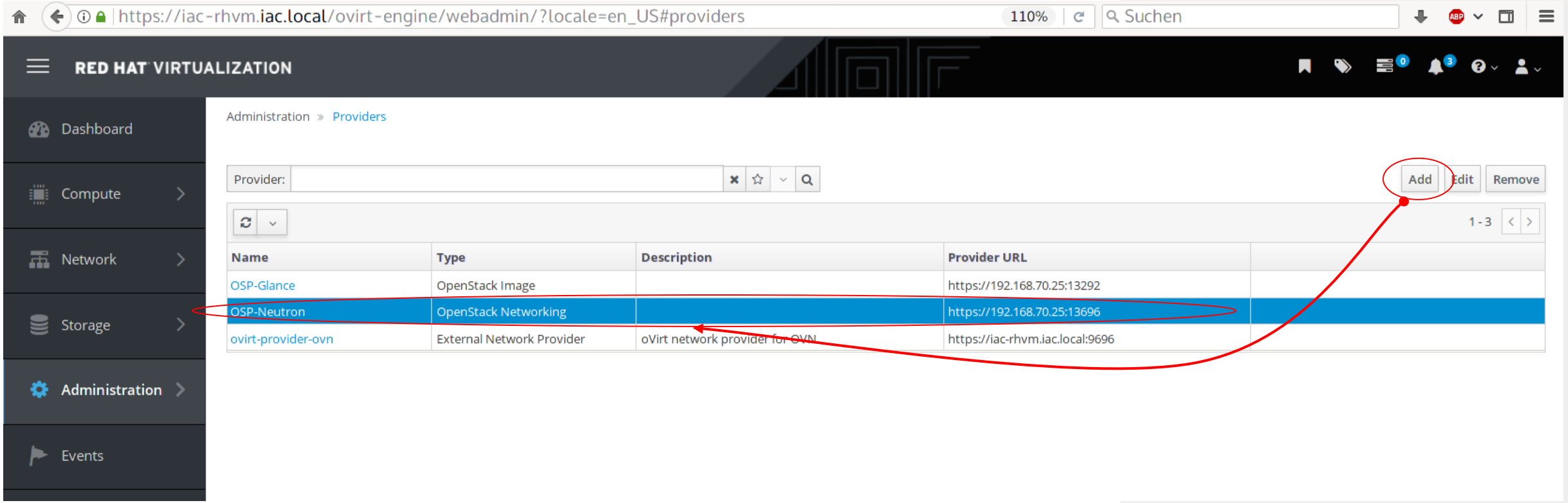

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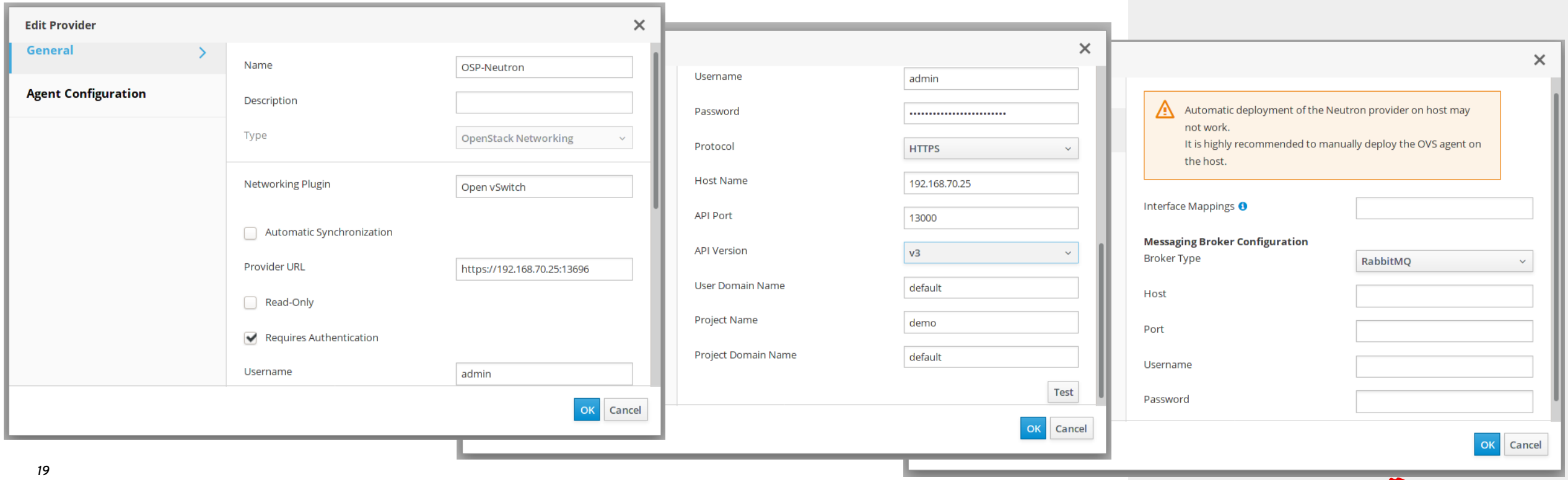
Mode 1: RHV Virtualizer

Integrating Network (Neutron)

```
(overcloud) [stack@iac-director ~]$ source overcloudrc
(overcloud) [stack@iac-director ~]$ openstack endpoint list |grep -i 192.168.70.25|grep -i neutron
| f20bd692ebf5473a9c1009e92353faa4 | regionOne | neutron      | network          | True    | public    | https://192.168.70.25:13696                |
```



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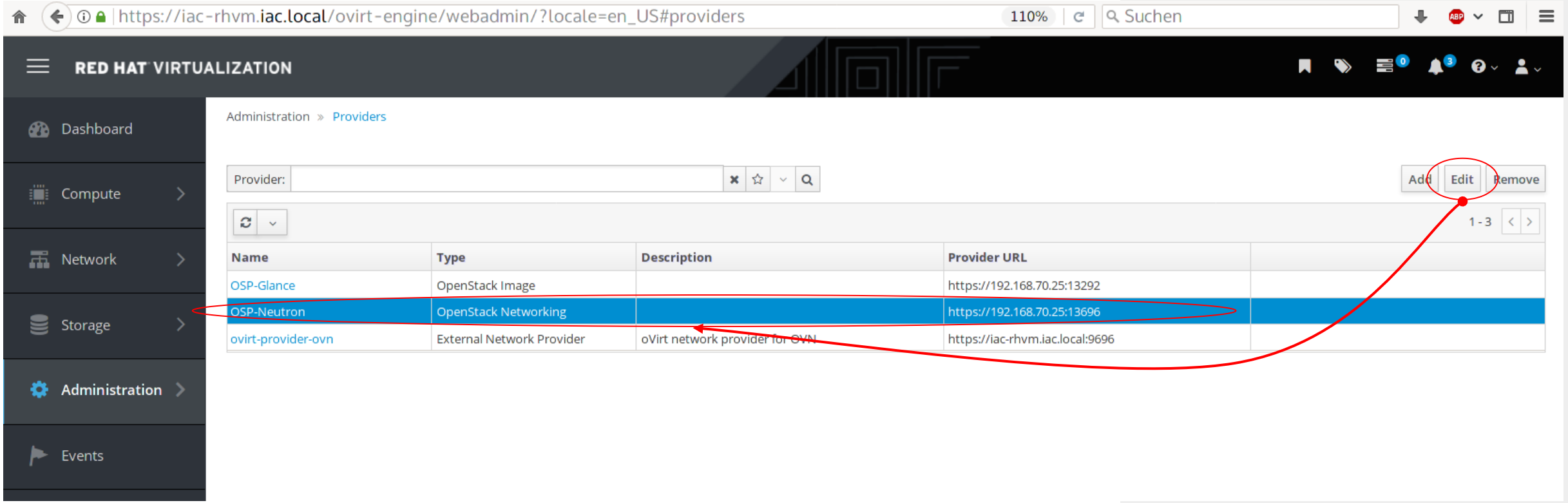

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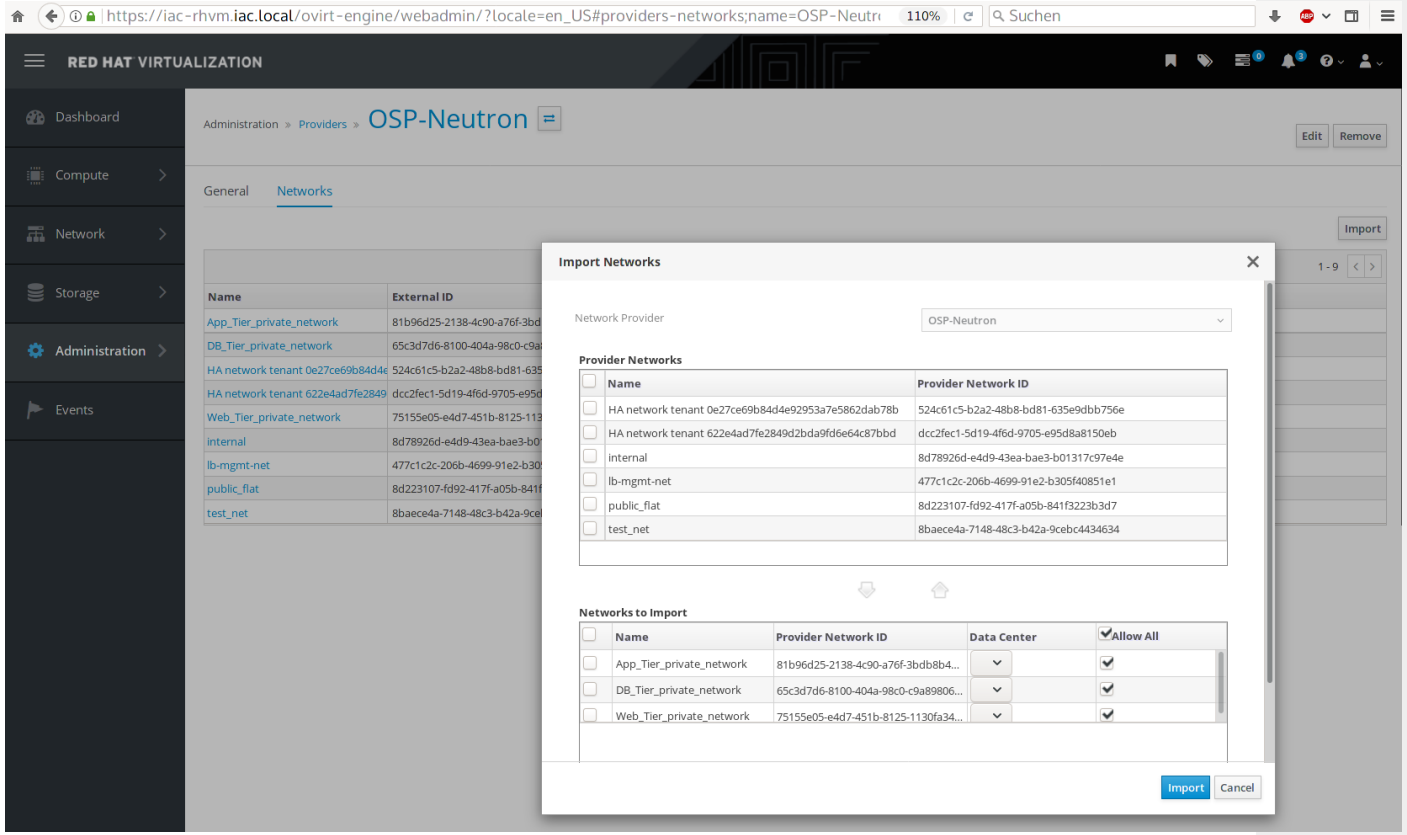

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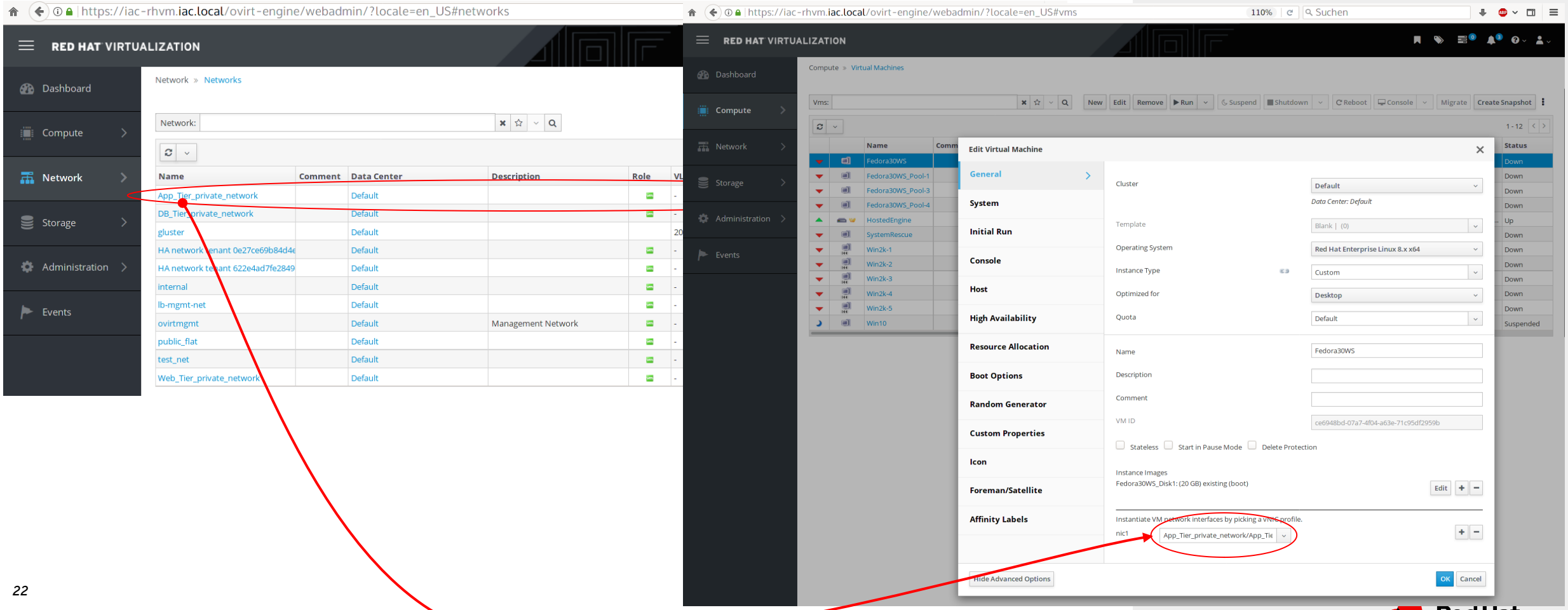

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Mode 1: RHV Virtualizer

Integrating Storage (Cinder + Glance)

- Cinder is Tech Preview as of 4.3
- Glance is Production Ready (in theory)

- **Still only keystone v2**

Mode 1: RHV Virtualizer

Pros and Cons

PRO

- **Enhanced Network (and other SDx) Capabitilies:**
  Support software defined networking (SDN) and other software defined modules (if keystone v3 i working in RHV) in virtualization along with overlay, encapsulation, and security groups.
- **Integrate Mode 1 and 2:**
  Support applications that require both scale up and scale out technologies simultaneously for different segments of the application.
- **Unified Network Management:**
  Manage the network topology from a single management platform for both the virtualization environment and the OpenStack environment.
- **Efficiency and reduced Complexity:**
  Using a unified Storage access method means better usage of resources (man and machine).

- **CONTRA**

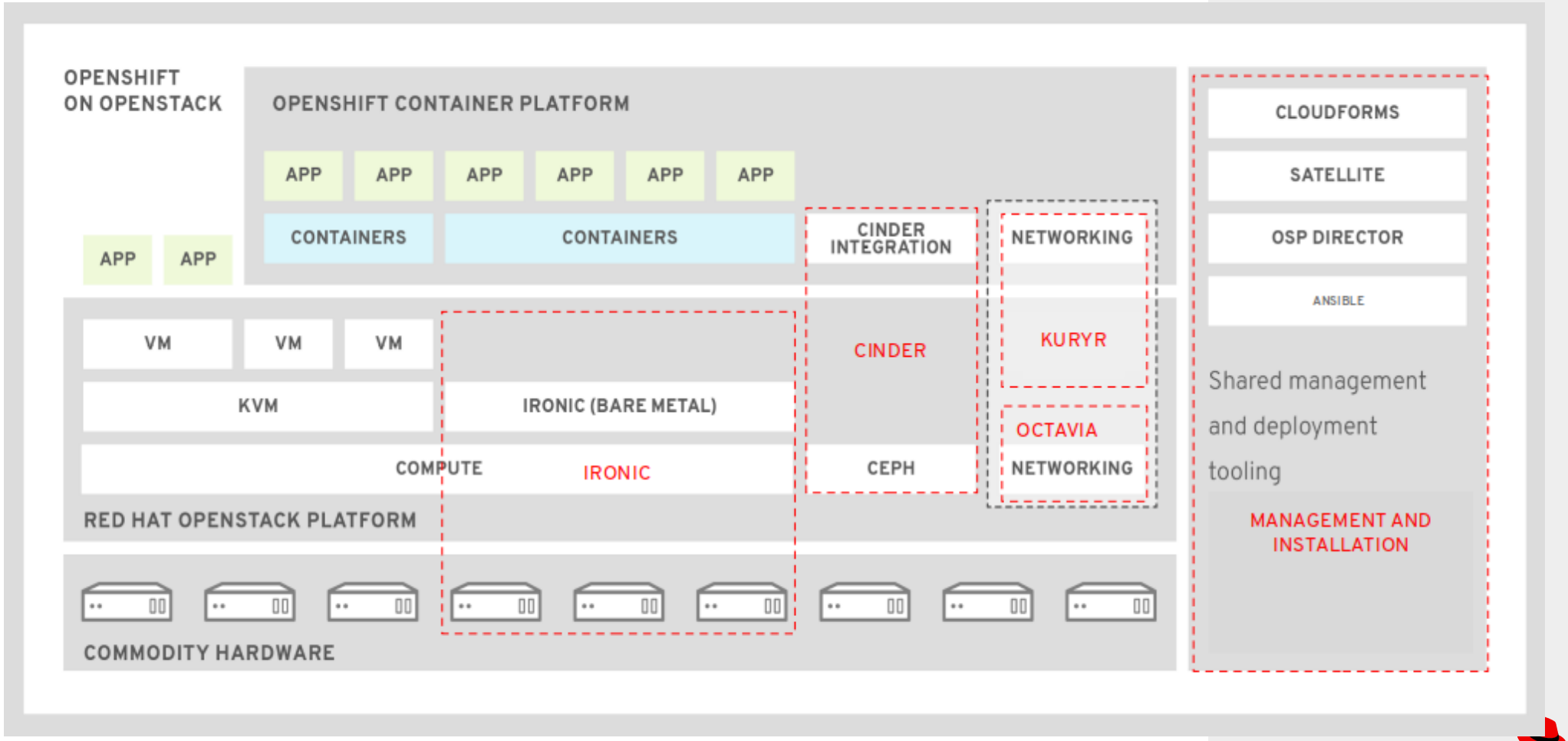
- **api stabilities**
  Apis must remain stable or at least downward compatible, to be able to always upgrade.
- **authentication method stability**
  This is as 1), but mentioned here separately because of latest keystone V2 -> V3 movement and deprecation of the former.
- **SPOF**
  OpenStack is the pivotal point. A major incident here might bring down other, non-osp parts, as well.
  To mitigate, at least the following is needed:
  - clean SOPs
  - fully automated and audited installation procedures
  - fully automated and audited operation procedures
  - Monitoring
  - DR procedures
  - **more than one Network Provider!**

Mode 2: OpenShift

https://access.redhat.com/documentation/en-us/reference_architectures/2019/html-single/deploying_red_hat_openshift_container_platform_3.11_on_red_hat_openstack_platform_13/index

Mode 2: OpenShift

Integration Parts



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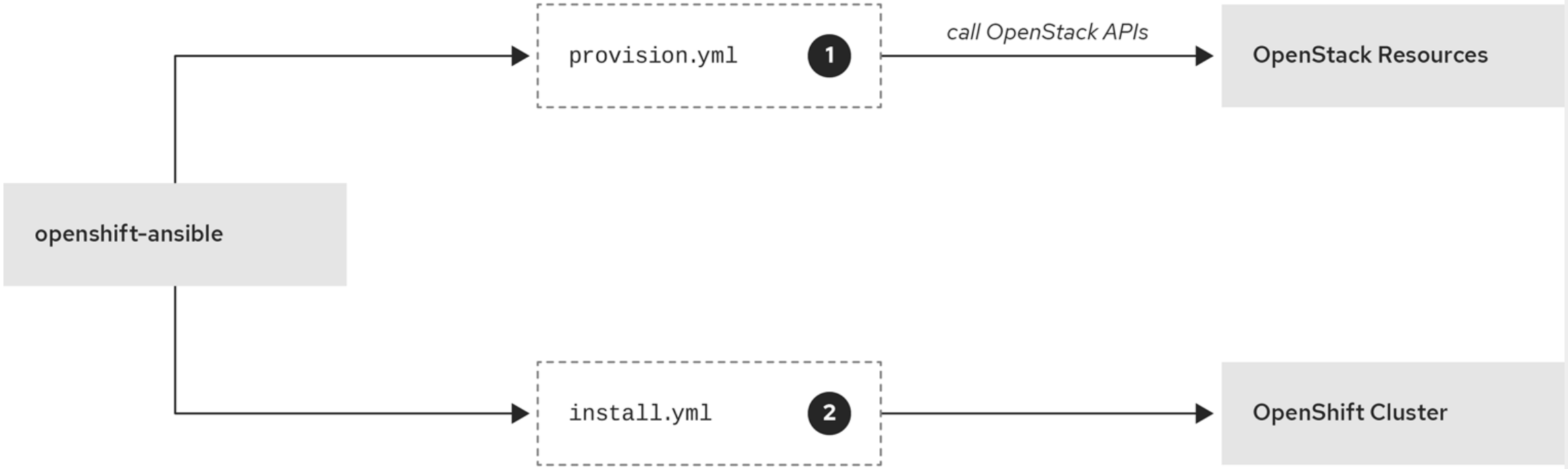
Mode 2: OpenShift

General Installation Procedure



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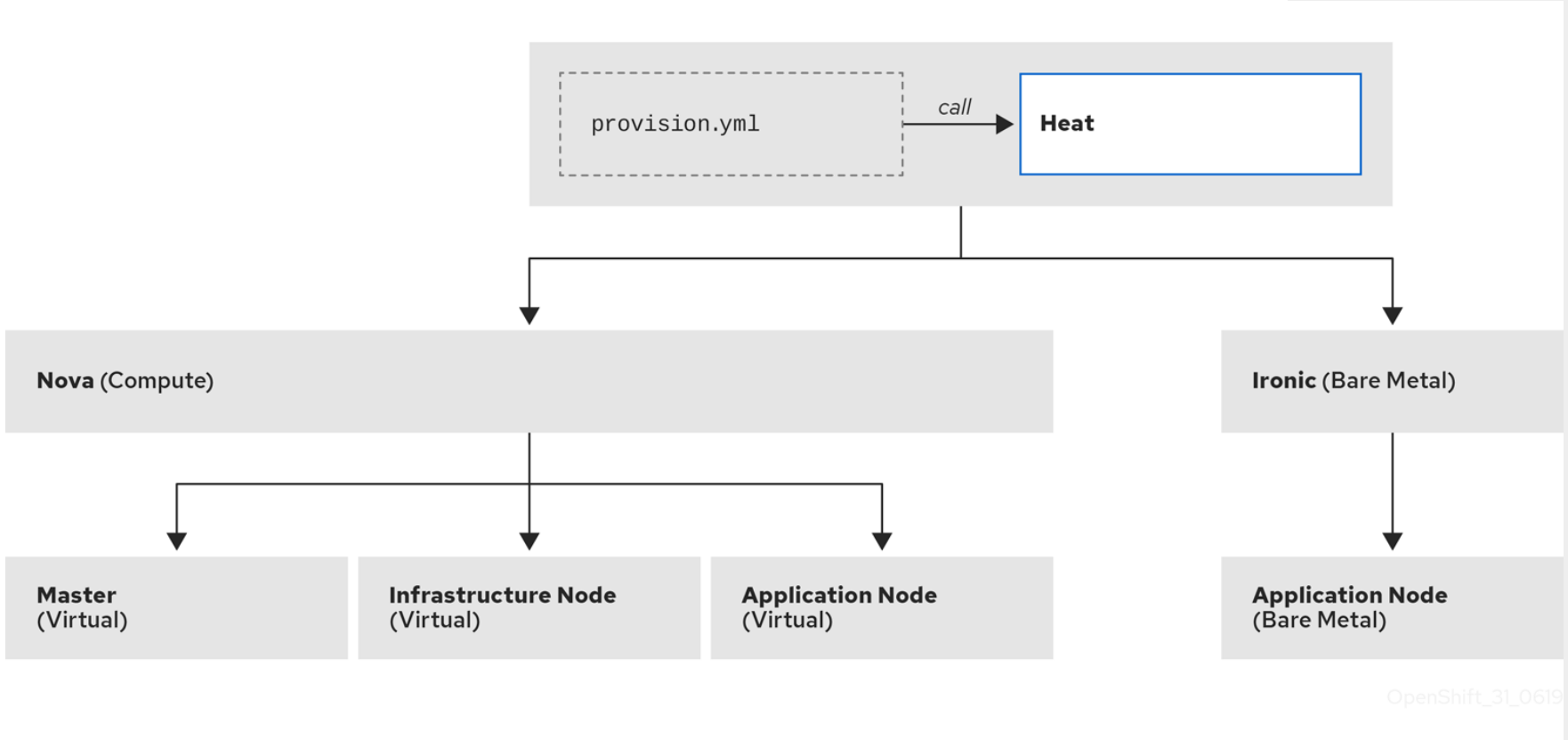
Mode 2: OpenShift

Sequence of Integration

- openshift-ansible is the driver
  - creating the infrastructure on OpenStack
    - using Nova to create VMS for running various OpenShift roles based on predefined flavors and images)
    - Ironic can also be used to push operating system images to bare metal servers
  - configuring the container runtime environment on virtual machines
  - provisioning storage for an internal registry
  - configuring the OpenShift SDN
  - connecting to authentication systems

Mode 2: OpenShift

Integrating Compute (Nova)



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Mode 2: OpenShift

Advantages

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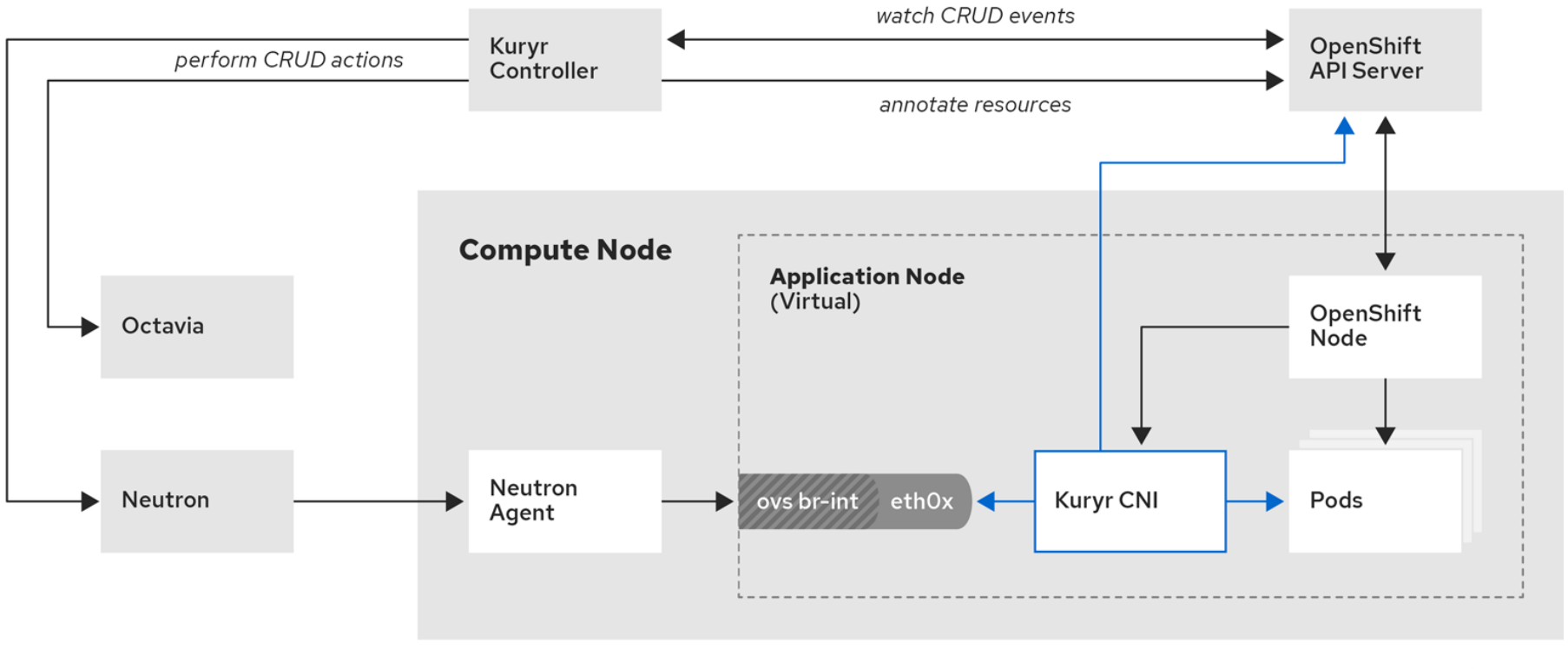
- Administrators do not have to learn Heat or any other OpenStack tools to deploy OpenShift on OpenStack
- OpenStack administrators familiar with Heat can use the tools they are already familiar with the examine and manage the deployed stack
- reliable interface for automating OpenShift installations

Mode 2: OpenShift

Integrating the OpenStack network via KURYR



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Mode 2: OpenShift

Integrating Network via Kuryr (Neutron)

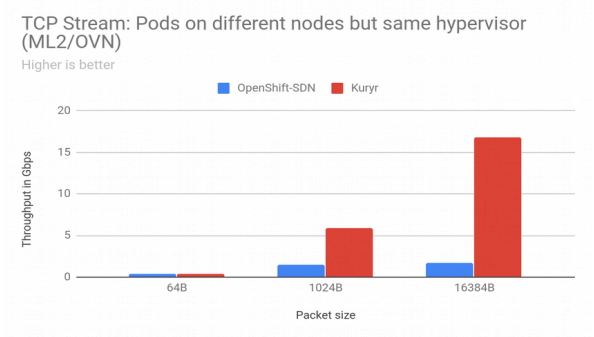
- Installed by openshift-ansible
- Kuryr is a CNI plugin that uses OpenStack Neutron and Octavia to provide networking for pods and services
  - *deployed as pods in the kuryr namespace*
  - *kuryr-cni container installs kuryr CNI driver on OpenShift masters, infrastructure and compute nodes as a daemonset*
  - *kuryr controller maps OCP API CRUD events to Neutron and Octavia objects.*
  - *kuryr avoids double encapsulation of OCP on OSP*
  - *only use when not using provider networks or third party SDN integrations*

Mode 2: OpenShift

Pros and Cons

PRO

- **Kuryr with Neutron is faster than OCP SDN:**



- **Integrate VMs and Container workloads**
  - Seamless integration
  - no double network encapsulation
  - no usage of network breakouts.

CONTRA

- **Octavia Loadbalancer is created for each pod in use**
  - Duplication of resources
  - we are working on this :-)

Questions? Remarks?

Thank you

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