Red Hat Cloud Infrastructure:
Deploying an On-Premise, Infrastructure-as-a Service, Private Cloud with Platform-as-a-Service Integration

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# Table of Contents

1 Executive Summary...................................................................................................................... 1

2 Components Overview.................................................................................................................. 2

2.1 Red Hat Cloud Infrastructure.................................................................................................. 2
2.2 Red Hat Enterprise Virtualization.......................................................................................... 3
2.3 Red Hat Enterprise Linux OpenStack Platform....................................................................... 4
2.4 Red Hat Satellite..................................................................................................................... 4
2.5 Red Hat CloudForms................................................................................................................ 5
2.6 Red Hat OpenShift Enterprise.................................................................................................. 6

3 Environment.................................................................................................................................. 8

3.1 Software...................................................................................................................................... 10

3.1.1 Red Hat Satellite.................................................................................................................. 10
3.1.2 Red Hat Enterprise Virtualization........................................................................................ 10
3.1.3 Red Hat Enterprise Linux OpenStack Platform................................................................... 11
3.1.4 Red Hat OpenShift Enterprise............................................................................................. 12
3.1.5 Red Hat CloudForms............................................................................................................ 12
3.1.6 Red Hat Identity Management............................................................................................... 12

3.2 Systems....................................................................................................................................... 13

3.2.1 Server Hardware.................................................................................................................... 13
3.2.2 Red Hat Enterprise Virtualization Virtual Machines............................................................ 13

3.3 Storage....................................................................................................................................... 15

4 Red Hat Satellite 6 Configuration................................................................................................. 15

4.1 Capsule Settings....................................................................................................................... 15

4.1.1 Capsule................................................................................................................................ 15
4.1.2 Domain................................................................................................................................ 16
4.1.3 Subnet.................................................................................................................................. 16

4.2 IdM Integration (optional)........................................................................................................ 17

4.2.1 LDAP Provider...................................................................................................................... 17
4.2.2 LDAP Users and Roles........................................................................................................ 19

4.3 Organization, Location and Lifecycle Environments.................................................................. 24

4.3.1 Organization and Location Creation..................................................................................... 24
4.3.2 Lifecycle Environment Creation........................................................................................... 29

4.4 Manifest Creation and Import................................................................................................... 31
4.5 Repository, Product, and Content Management ............................................................ 33
  4.5.1 Red Hat Repository Selection and Synchronization .................................................. 35
  4.5.2 Custom Product Creation .................................................................................. 37
  4.5.3 Content View Creation and Promotion ...................................................................... 39
  4.6 Activation Keys ........................................................................................................ 43
  4.7 Host Groups ............................................................................................................... 46
  4.8 Provisioning Templates .......................................................................................... 50

5 Deploying Red Hat Enterprise Virtualization 3.5 ......................................................... 52
  5.1 NFS Configuration ...................................................................................................... 52
  5.2 Deploy RHEV Self-Hosted Engine ......................................................................... 52
  5.3 IdM Integration (optional) ................................................................................. 56
  5.4 Satellite 6 Compute Resource ............................................................................ 56

6 Deploying Red Hat Enterprise Linux OpenStack Platform 6 ....................................... 58
  6.1 Deploy RHEL OSP Installer .............................................................................. 58
  6.2 Pre-Deployment Preparation and rhel-osp-installer Execution .................................... 60
  6.3 Deploy RHEL OSP ............................................................................................ 62

7 Deploying OpenShift Enterprise 2.2 ............................................................................ 66
  7.1 Pre-deployment Preparation ................................................................................ 66
  7.2 Deployment ........................................................................................................... 68
  7.3 Post Deployment Testing ................................................................................ 70
  7.4 Scaling an Application ..................................................................................... 74
  7.5 Moving Gears Between Nodes ........................................................................ 75

8 Deploying Red Hat CloudForms 3.1 ............................................................................ 78
  8.1 CloudForms Deployment .................................................................................. 78
  8.2 CloudForms Discovery .................................................................................... 79
  8.3 Satellite Registration .......................................................................................... 80
  8.4 IdM Integration (optional) ................................................................................ 82

9 Conclusion .................................................................................................................. 84

Appendix A: Revision History ...................................................................................... 85

Appendix B: Contributors ........................................................................................... 85
Appendix C: Satellite 6 Install Settings ............................................................... 85
Appendix D: iptables and firewalld .................................................................... 85
Appendix E: Scripts and Configuration Files ..................................................... 92
Appendix F: kickstarts and snippets .................................................................. 96
Appendix G: Troubleshooting ............................................................................. 105
  G.1 Time Synchronization ................................................................................ 105
  G.2 Log files ..................................................................................................... 107
1 Executive Summary

On-premise cloud deployments continue to increase in popularity and demand. As demand increases, IT leaders look for ways to reduce time to deploy, configure, and implement management capabilities for deployed environments. Red Hat Cloud Infrastructure 5 delivers on all fronts to include:

- Red Hat Satellite 6 for deployment, configuration, and lifecycle management
- Red Hat Enterprise Virtualization for hosting virtual infrastructure with enterprise applications
- Red Hat Enterprise Linux OpenStack Platform for creating repeatable, quickly deployable virtualized environments
- Red Hat CloudForms to provide best in class cloud management platform features such as lifecycle management, self-service capabilities, provider integration, chargeback reporting, and service automation

The focus of this reference architecture is to demonstrate deploying Red Hat Cloud Infrastructure technologies in an on-premise, Infrastructure-as-a-Service (IaaS) environment along with integrating Red Hat OpenShift Enterprise providing Platform-as-a-Service (PaaS) capabilities targeting the following detailed use cases:

- Configure Satellite 6 to support deploying RHCI components
- Deploy a self-hosted RHEV environment from Satellite 6
- Deploy a RHEL OSP environment from Satellite 6
- Deploy OpenShift Enterprise using OpenShift Origin puppet modules onto RHEV
- Deploy CloudForms and demonstrate discovery and management of RHCI on-premise cloud
2 Components Overview

2.1 Red Hat Cloud Infrastructure

Red Hat Cloud Infrastructure is a flexible private cloud solution that allows organizations to move to varying cloud infrastructure options on their timeline as their business and infrastructure needs dictate.

A single subscription product, Red Hat Cloud Infrastructure tightly integrates:

- Red Hat Enterprise Virtualization, a robust end-to-end enterprise virtualization solution
- Red Hat Enterprise Linux OpenStack Platform, a massively-scalable public cloud-like infrastructure based on the most popular open source cloud project ever
- Red Hat Satellite, a robust systems management tool
- Red Hat CloudForms, the award-winning Cloud Management Platform that unifies operations for multiple hypervisor technologies and cloud technologies, enabling enterprise to deploy workloads to private clouds, public clouds, and the traditional datacenter as one cohesive environment.

In addition, Red Hat Cloud Infrastructure also includes Red Hat Enterprise Linux, both as the basis for Red Hat Enterprise Linux OpenStack Platform and Red Hat Enterprise Virtualization, as well as RHEL unlimited guests, should the customer select this option, for use with virtual machines.

Figure 2.1.1: Red Hat Cloud Infrastructure
2.2 Red Hat Enterprise Virtualization

Red Hat Enterprise Virtualization is a complete virtualization management solution for virtualized servers and desktops. Created by the people who delivered Red Hat Enterprise Linux, Red Hat Enterprise Virtualization takes one beyond bare metal to meet critical business demands. It provides the performance advantages, competitive pricing, and the trusted, stable environment you expect from Red Hat. Red Hat Enterprise Virtualization provides common underlying services and management technologies for traditional virtualization workloads while also providing an on-ramp to high-level cloud functionality based on OpenStack (tech preview).

With Red Hat Enterprise Virtualization, one can:

• Take advantage of existing people skills and investments
• Decrease TCO and accelerate ROI
• Automate time-consuming and complicated manual tasks
• Standardize storage, infrastructure, and networking services on OpenStack

![Diagram of Red Hat Enterprise Virtualization](image)

Figure 2.2.1: Red Hat Enterprise Virtualization
2.3 Red Hat Enterprise Linux OpenStack Platform

With Red Hat Enterprise Linux OpenStack Platform, each consumer receives all the benefits expected from Red Hat Enterprise Linux, plus the fastest-growing cloud infrastructure platform from OpenStack—both co-engineered to work seamlessly together because OpenStack is dependent on its underlying Linux operating system for everything from service operation and access, to hardware resources, to system performance, stability, and security. Red Hat Enterprise Linux OpenStack Platform delivers the next-generation core IaaS and secondary IaaS+ infrastructure for a private or public cloud.

![Figure 2.3.1: Red Hat Enterprise Linux OpenStack Platform](image)

2.4 Red Hat Satellite

Red Hat Satellite is a systems management platform that makes Linux easier to deploy, scale, and manage. It provides lower total cost of ownership (TCO) in life cycle management, and scales to an IT environment as it grows. The latest release of Red Hat's systems management solution, Red Hat Satellite 6, delivers dramatic improvements across system provisioning, configuration management, content management, and overall scalability and security.

Red Hat Satellite improves the ability to deploy and update hosts and securely manage an environment. A flexible and scalable architecture means that a Satellite deployment can grow along with an organization.
Red Hat Satellite 6 introduces new capabilities across system provisioning, configuration management, and content and life cycle management, along with improved Red Hat subscription management.

2.5 Red Hat CloudForms

Gain control of a virtualization environment, and build and manage a private or hybrid cloud. Red Hat CloudForms can do both with a comprehensive management platform. As needs change, CloudForms evolves, protecting investments and providing a continuum of capabilities as IT progresses toward Infrastructure-as-a-Service (IaaS) models.

CloudForms can transform existing virtual environments into private clouds, hybrid clouds, or both. Seamlessly add new infrastructure platforms to expand the cloud model and take advantage of better cost, performance, density, innovation, or whatever the need.

Figure 2.4.1: Red Hat Satellite
Dynamically and automatically ensure the most efficient use of resources, including the ability to:

- Discover and track resource changes
- Provision and de-provision resources based on policies and demand
- Identify the current condition of resources and the best fit for new workloads across compute, storage, and network resources
- Anticipate and plan for future resource requirements based on capacity, trending, data, and analytics

CloudForms also allows anticipation and planning for future resource requirements based on capacity, trending, data, and analytics.

2.6 Red Hat OpenShift Enterprise

OpenShift Enterprise by Red Hat is a cloud computing Platform-as-a-Service (PaaS) solution designed for on-premise or private cloud deployments.

While Infrastructure-as-a-Service (IaaS) provides on-demand access to raw compute resources, and Software-as-a-Service (SaaS) provides on-demand access to a complete application, OpenShift Enterprise PaaS enables on-demand access to a cloud-based application platform. This lets enterprises easily build the applications they need and run them...
in a cloud architecture.

OpenShift Enterprise automates much of the provisioning and systems management of the application platform stack. This allows IT operations teams to more easily meet the growing demand for new application services coming from the business.

OpenShift Enterprise provides on-demand, elastic, scalable, and fully configured application development, testing, and hosting environment for application developers so they can focus on coding those new application services. Once installed in a datacenter or a private cloud, OpenShift Enterprise provides a self-service capability to developers. This allows developers to easily create scalable applications in the PaaS environment with their choice of programming languages and middleware, and begin coding applications from their favorite development environments.

![Figure 2.6.1: Red Hat OpenShift Enterprise](image-url)
3 Environment

The reference environment consists of the following:

Red Hat Enterprise Virtualization (self-hosted):
- One NFS server configured to use iSCSI backed storage for the self-hosted Red Hat Enterprise Virtualization Manager virtual machine
- One Red Hat Enterprise Virtualization Hypervisor attached to iSCSI storage for the data domain

Red Hat Enterprise Virtualization (infrastructure):
- One Red Hat Enterprise Virtualization Manager hosted from the NFS server via KVM
- Two Red Hat Enterprise Virtualization Hypervisors attached to iSCSI storage for the data domain

Red Hat Enterprise Linux OpenStack Platform
- One Red Hat Enterprise Linux OpenStack Platform installer
- One Red Hat Enterprise Linux OpenStack Platform controller node
- One Red Hat Enterprise Linux OpenStack Platform compute node with Nova networking

Red Hat Satellite
- One Red Hat Satellite 6 virtual machine hosted within a Red Hat Enterprise Virtualization environment with integrated capsule service DNS, DHCP, puppet, PXE and TFTP services

Red Hat Identity Management
- One Red Hat Identity Management virtual machine to provide single sign on capabilities hosted within a Red Hat Enterprise Linux environment

Red Hat CloudForms
- One Red Hat CloudForms appliance hosted within the self-hosted Red Hat Enterprise Virtualization environment

Red Hat OpenShift Enterprise
- One OpenShift Broker and several OpenShift Nodes hosed within the self-hosted Red Hat Enterprise Virtualization environment
The following diagram depicts the reference environment configuration.

Figure 3.1: Reference Architecture Components
3.1 Software
The following section details the software versions used in the reference environment.

3.1.1 Red Hat Satellite
The following table lists the software version used for Red Hat Satellite Server.

<table>
<thead>
<tr>
<th>System</th>
<th>Software Version</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite Server (rhci-sat6)</td>
<td>6.0.8</td>
<td>DNS, DHCP, Provisioning, Puppet</td>
</tr>
</tbody>
</table>

Table 3.1.1-1: Satellite Server – Software Versions

3.1.2 Red Hat Enterprise Virtualization
The reference environment utilizes two Red Hat Enterprise Virtualization 3.5 configurations. One for deployment from Satellite and hosting OpenShift Enterprise and a second for hosting infrastructure machines.

<table>
<thead>
<tr>
<th>Systems</th>
<th>Configuration</th>
<th>Software Versions</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Virtualization self-hosted</td>
<td>RHEV 3.5 environment</td>
<td>• RHEV Manager (3.5):</td>
<td>OpenShift Enterprise hosting</td>
</tr>
<tr>
<td>(rhci-rhevm)</td>
<td>• One RHEL Hypervisor</td>
<td>• 3.5.0-0.32.el6ev</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RHEL Hypervisor – 7.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• libvirt-1.1.1-29.el7_0.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VDSM Version:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vdsm-4.16.8.1-6.el7ev</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1.2-1: RHEV Environment: Self-Hosted – Software Versions

<table>
<thead>
<tr>
<th>Systems</th>
<th>Configuration</th>
<th>Software Versions</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Virtualization (cf-rhevm-32)</td>
<td>RHEV 3.5 environment</td>
<td>• RHEV Manager (3.5):</td>
<td>Infrastructure hosting</td>
</tr>
<tr>
<td></td>
<td>• Two RHEV Hypervisors</td>
<td>• 3.5.0-0.32.el6ev</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RHEV Hypervisor - 6.6 -</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20150128.0.el6ev</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VDSM Version:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vdsm-4.16.8.1-6.el6ev</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1.2-2: RHEV Environment: Infrastructure – Software Versions
### 3.1.3 Red Hat Enterprise Linux OpenStack Platform

The following table lists the software version used for RHEL OSP 6.0.

<table>
<thead>
<tr>
<th>Systems</th>
<th>Software</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>qpid-cpp-server</td>
<td>0.22-50</td>
</tr>
<tr>
<td>Glance, Cinder, Horizon, Ceilometer</td>
<td>openstack-keystone</td>
<td>2014.2.2-1</td>
</tr>
<tr>
<td></td>
<td>openstack-nova-{api,cert,common,conductor,scheduler,console, novncproxy}</td>
<td>2014.2.2-19</td>
</tr>
<tr>
<td></td>
<td>openstack-glance</td>
<td>2014.2.2-1</td>
</tr>
<tr>
<td></td>
<td>openstack-cinder</td>
<td>2014.2.2-2</td>
</tr>
<tr>
<td></td>
<td>openstack-dashboard</td>
<td>2014.2.2-2</td>
</tr>
<tr>
<td></td>
<td>openstack-utils</td>
<td>2014.2-1</td>
</tr>
<tr>
<td></td>
<td>openstack-selinux</td>
<td>0.6.27-1</td>
</tr>
<tr>
<td></td>
<td>openstack-ceilometer-{common,collector,central,alarm,api}</td>
<td>2014.2.2-2</td>
</tr>
<tr>
<td>Compute</td>
<td>openstack-nova-{common,compute}</td>
<td>2014.2.2-19</td>
</tr>
<tr>
<td>Nova compute</td>
<td>openstack-utils</td>
<td>2014.2-1</td>
</tr>
<tr>
<td>Nova networking</td>
<td>openstack-selinux</td>
<td>0.6.27-1</td>
</tr>
<tr>
<td></td>
<td>openstack-nova-network</td>
<td>2014.2.2-19</td>
</tr>
<tr>
<td></td>
<td>openstack-ceilometer-compute</td>
<td>2014.2.2-2</td>
</tr>
<tr>
<td>Installer</td>
<td>foreman-proxy</td>
<td>1.6.0.30-5</td>
</tr>
<tr>
<td></td>
<td>foreman-selinux</td>
<td>1.6.0.14-1</td>
</tr>
<tr>
<td></td>
<td>foreman</td>
<td>1.6.0.49-6</td>
</tr>
<tr>
<td></td>
<td>foreman-discovery-image</td>
<td>7.0-20140905.0.2</td>
</tr>
<tr>
<td></td>
<td>puppet</td>
<td>3.6.2-2</td>
</tr>
<tr>
<td></td>
<td>rhel-osp-installer-client</td>
<td>0.5.5-5</td>
</tr>
<tr>
<td></td>
<td>rhel-osp-installer</td>
<td>0.5.5-5</td>
</tr>
</tbody>
</table>

*Table 3.1.3-1: RHEL OSP – Software Versions*
### 3.1.4 Red Hat OpenShift Enterprise

The following table lists the software versions used for OSE 2.2 to include the OpenShift Origin puppet modules.

<table>
<thead>
<tr>
<th>Systems</th>
<th>Software</th>
<th>Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat OpenShift Enterprise Broker</td>
<td>openshift-origin-broker</td>
<td>1.16.2.2-1</td>
</tr>
<tr>
<td></td>
<td>openshift-origin-broker-util</td>
<td>1.32.1.1-1</td>
</tr>
<tr>
<td></td>
<td>rubygem-openshift-origin-dns-nsupdate</td>
<td>1.16.3.0-1</td>
</tr>
<tr>
<td></td>
<td>rubygem-openshift-origin-msg-broker-mcollective</td>
<td>1.31.1.1-1</td>
</tr>
<tr>
<td></td>
<td>rubygem-openshift-origin-auth-remote-user</td>
<td>1.21.1.0-1</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise Node</td>
<td>openshift-origin-node-util</td>
<td>1.32.4.1-1</td>
</tr>
<tr>
<td></td>
<td>openshift-origin-cartridge-php</td>
<td>1.29.1.0-1</td>
</tr>
<tr>
<td></td>
<td>openshift-origin-msg-node-mcollective</td>
<td>1.27.1.1-1</td>
</tr>
<tr>
<td></td>
<td>rubygem-openshift-origin-node</td>
<td>1.33.2.1-1</td>
</tr>
<tr>
<td>OpenShift Origin Puppet Module</td>
<td>openshift-openshift_origin</td>
<td>4.1.2</td>
</tr>
</tbody>
</table>

*Table 3.1.4-1: OpenShift Enterprise – Software Versions*

### 3.1.5 Red Hat CloudForms

The following table lists the software version used for Red Hat CloudForms.

<table>
<thead>
<tr>
<th>System</th>
<th>Software Version</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CloudForms Management Engine</td>
<td>rhci-cfme</td>
<td>Orchestration and Management</td>
</tr>
<tr>
<td></td>
<td>5.3.3.2.20150217120931_a465215</td>
<td></td>
</tr>
</tbody>
</table>

*Table 3.1.5-1: CloudForms Management Engine – Software Versions*

### 3.1.6 Red Hat Identity Management

The following table lists the software version used for Red Hat IdM.

<table>
<thead>
<tr>
<th>System</th>
<th>Software Version</th>
<th>Role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity Management</td>
<td>ipa-server-3.3.3-28.el7_0.3</td>
<td>Authentication</td>
</tr>
<tr>
<td>(rhci-idm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 3.1.6-1: Identity Management – Software Versions*
3.2 Systems
The following describes the physical and virtual machine configurations used in the reference environment.

3.2.1 Server Hardware
All seven physical systems use the same hardware platform type:

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade Chassis</td>
<td>IBM BladeCenter H - 8852HC1</td>
</tr>
<tr>
<td>Blade Server</td>
<td>IBM BladeServer – HS22 - 70870</td>
</tr>
<tr>
<td>CPU</td>
<td>(2) Intel Xeon X5680 (6 core @3.33 GHz)</td>
</tr>
<tr>
<td>Memory</td>
<td>52 GB</td>
</tr>
<tr>
<td>Network</td>
<td>(2) Broadcom Corporation NetXtreme II BCM5709S Gigabit Ethernet</td>
</tr>
<tr>
<td></td>
<td>(2) Emulex Virtual Fabric Adapter (CFFh) 10GB Ethernet</td>
</tr>
<tr>
<td>Disk</td>
<td>2 x 146 GB SAS</td>
</tr>
</tbody>
</table>

Table 3.2.1-1: Server Hardware Configuration

3.2.2 Red Hat Enterprise Virtualization Virtual Machines
The following virtual machines provide infrastructure resources.

CloudForms Management Engine

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>4</td>
</tr>
<tr>
<td>Memory</td>
<td>6144 MB</td>
</tr>
<tr>
<td>Network</td>
<td>1 bridged virtIO</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk 1 – 40 GB (OS)</td>
</tr>
<tr>
<td></td>
<td>Disk 2 – 20 GB (CFME database)</td>
</tr>
</tbody>
</table>

Table 3.2.2-1: CFME – Virtual Machine Configuration
### Red Hat Satellite Server

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>2</td>
</tr>
<tr>
<td>Memory</td>
<td>8192 MB</td>
</tr>
<tr>
<td>Network</td>
<td>1 bridged virtIO</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk 1 – 120GB (OS and Satellite)</td>
</tr>
</tbody>
</table>

*Table 3.2.2-2: Satellite Server – Virtual Machine Configuration*

### Red Hat IdM Server

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>4096 MB</td>
</tr>
<tr>
<td>Network</td>
<td>1 bridged virtIO</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk 1 – 15 GB (OS)</td>
</tr>
</tbody>
</table>

*Table 3.2.2-3: IdM Server – Virtual Machine Configuration*

### RHEV Manager – Self-Hosted

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>8192 MB</td>
</tr>
<tr>
<td>Network</td>
<td>1 bridged virtIO</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk 1 – 15 GB (OS)</td>
</tr>
</tbody>
</table>

*Table 3.2.2-4: RHEV-M – Virtual Machine Configuration*

### Red Hat OpenShift Enterprise – Broker and Nodes

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>4096 MB</td>
</tr>
<tr>
<td>Network</td>
<td>1 bridged virtIO</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk 1 – 15 GB (OS)</td>
</tr>
</tbody>
</table>

*Table 3.2.2-5: OSE Broker and Nodes – Virtual Machine Configuration*
3.3 Storage
Non-local storage is provided by an EMC Celerra NS-120.

<table>
<thead>
<tr>
<th>System</th>
<th>Disk Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEV Infrastructure</td>
<td>1.15 TB</td>
</tr>
<tr>
<td>RHEV self-hosted</td>
<td>500 GB</td>
</tr>
<tr>
<td>NFS for self-hosted RHEVM</td>
<td>100 GB</td>
</tr>
</tbody>
</table>

*Table 3.3-1: Storage Configuration*

4 Red Hat Satellite 6 Configuration

Red Hat Satellite 6 is the foundation for deploying Red Hat Cloud Infrastructure. This section describes the details and steps needed in order to successfully deploy the RHCI components to also include Red Hat OpenShift Enterprise. However, the assumption made is that Red Hat Satellite 6 is already deployed whereas those steps are not covered.

Red Hat Satellite 6 installation and Deployment steps are found in the *Red Hat Satellite 6.0 Installation Guide*.

**Note:** The reference environment configuration and settings are meant to serve for guidance only. There are many ways to configure Satellite 6 depending upon environment requirements.

4.1 Capsule Settings

For the reference environment the built-in capsule is configured to provide DHCP, DNS, TFTP, PXE, Pulp, and puppet services. Refer to *Appendix C: Satellite 6 Install Settings*, for Satellite 6 install options used via *katello-installer*.

4.1.1 Capsule

Login to the Satellite 6 portal using the *admin* account. Navigate to *Infrastructure -> Capsules* and verify the capsule is present with the desired features.

<table>
<thead>
<tr>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFTP, DNS, DHCP, Puppet, Puppet CA, and Pulp</td>
</tr>
</tbody>
</table>

*Figure 4.1.1.1: Capsule Settings*

---

4.1.2 Domain

Next navigate to Infrastructure -> Domains and click New Domain. Under the Domain tab provide DNS Domain and on the drop down for DNS Capsule, select the FQDN of the Satellite server.

![Domain Settings Table]

Click Submit to save changes.

4.1.3 Subnet

Navigate to Infrastructure -> Subnets and click New Subnet. Under the Subnet tab provide desired settings for Name, Network address, Network mask, Gateway address, Primary DNS server, Secondary DNS server, Start of IP range, End of IP range, and VLAN ID. For the reference environment the following settings are used:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>syseng</td>
</tr>
<tr>
<td>Network address</td>
<td>10.19.10.0</td>
</tr>
<tr>
<td>Network mask</td>
<td>255.255.254.0</td>
</tr>
<tr>
<td>Gateway address</td>
<td>10.19.11.254</td>
</tr>
<tr>
<td>Primary DNS server</td>
<td>10.19.11.51 (IP address of Satellite Server)</td>
</tr>
<tr>
<td>Start of IP range</td>
<td>10.19.11.100</td>
</tr>
<tr>
<td>End of IP range</td>
<td>10.19.11.200</td>
</tr>
</tbody>
</table>

Table 4.1.3-1: Subnet Settings
Select the **Domain** tab and place a check mark next to the **Domain** created in a previous step.

![Figure 4.1.3.1: Subnet – Domain Settings](image)

Select the **Capsules** tab and for **DHCP Capsule**, **TFTP Capsule**, and **DNS Capsule** drop downs, select the FQDN of the Satellite server for each.

![Figure 4.1.3.2: Subnet – Capsules Settings](image)

Observe that no selections are made for **Locations** or **Organizations**.

Click **Submit** to save the changes.

### 4.2 IdM Integration (optional)

Satellite 6 supports integration with Lightweight Directory Access Protocol\(^2\) (LDAP) server to provide single-sign on capabilities. This integration allows for user and group mappings into built-in Satellite 6 role-based access control (RBAC) along with realm support.

For the reference environment Red Hat Identity Management is configured as an LDAP provider.

#### 4.2.1 LDAP Provider

To add an LDAP provider, as the **admin** user, navigate to **Administer -> LDAP Authentication**. Click **New LDAP Source**.

---

Under the **LDAP server** tab provide a **Name**, **Server**, **Port**, and chose TLS if configured.

<table>
<thead>
<tr>
<th>LDAP server</th>
<th>Account</th>
<th>Attribute mappings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>rhci-idm.refarch.bos.redhat.com</td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>10.19.11.22</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>389</td>
<td></td>
</tr>
<tr>
<td>TLS</td>
<td>□</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.2.1.1: LDAP – LDAP Server**

On the **Account** tab provide **Account username**, **Account password**, **Base DN**, **LDAP filter**, and choose to **Automatically create accounts in Foreman**. For the reference environment the following settings are used:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account username</td>
<td>uid=admin,cn=users,cn=accounts,dc=refarch,dc=bos,dc=redhat,dc=com</td>
</tr>
<tr>
<td>Account password</td>
<td>&lt;REDACTED&gt;</td>
</tr>
<tr>
<td>Base DN</td>
<td>cn=users,cn=accounts,dc=refarch,dc=bos,dc=redhat,dc=com</td>
</tr>
<tr>
<td>Automatically create accounts in Foreman</td>
<td>checked</td>
</tr>
</tbody>
</table>

**Table 4.2.1-1: LDAP – Account Settings**

On the **Attribute mappings** tab default settings are used.

Click **Submit** to save the changes.
4.2.2 LDAP Users and Roles

With an LDAP provider configured, use a LDAP provided user account to login to the Satellite 6 user interface. For the reference environment, an LDAP user named test is used.

Upon logging in with the test user, a permission denied message is shown as this user has not been assigned to any roles, organizations, or locations.

```
Permission denied
You are not authorized to perform this action
Please request the required privileges from a Satellite 6 administrator
```

Figure 4.2.2.1: New LDAP User
As the admin user, login to the Satellite 6 user interface and navigate to Administer -> Users. The test LDAP user account appears under Users.

Select the test account and verify the settings under the User tab. Attributes should be mapped over from the LDAP provider. Authorized by should automatically be populated with the LDAP provider.

Figure 4.2.2.2: LDAP test User

Figure 4.2.2.3: LDAP – User Settings
Under the **Locations** tab select the location desired. For the reference environment *Boston* is selected.

**Figure 4.2.2.4: LDAP – User Location**

Under the **Organizations** tab select the desired organization. For the reference environment *Systems Engineering* is selected.

**Figure 4.2.2.5: LDAP – User Organization**
Under the **Roles** tab, select the desired roles. For the reference environment *Manager* is selected.

Click **Submit** to save the changes.
Permissions for the default roles can be modified by navigating to Administer -> Roles. For the Manager role, the following permissions are assigned under the Filters tab:

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>access_dashboard</td>
</tr>
<tr>
<td></td>
<td>configuration</td>
</tr>
<tr>
<td>Host Group</td>
<td>view_hostgroup</td>
</tr>
<tr>
<td></td>
<td>create_hostgroup</td>
</tr>
<tr>
<td></td>
<td>edit_hostgroup</td>
</tr>
<tr>
<td></td>
<td>destroy_hostgroup</td>
</tr>
<tr>
<td>Content Host</td>
<td>view_content_hosts</td>
</tr>
<tr>
<td></td>
<td>create_content_hosts</td>
</tr>
<tr>
<td></td>
<td>edit_content_hosts</td>
</tr>
<tr>
<td></td>
<td>destroy_content_hosts</td>
</tr>
<tr>
<td>Content Views</td>
<td>view_content_views</td>
</tr>
<tr>
<td></td>
<td>create_content_views</td>
</tr>
<tr>
<td></td>
<td>edit_content_views</td>
</tr>
<tr>
<td></td>
<td>destroy_content_views</td>
</tr>
<tr>
<td></td>
<td>publish_content_views</td>
</tr>
<tr>
<td></td>
<td>promote_or_remove_content_views</td>
</tr>
</tbody>
</table>

**Table 4.2.2-1: Manager Role Permissions**

Under the Organizations Systems Engineering is selected.

Click Submit to save changes.
Once the test user and role are configured, login to the Satellite 6 user interface with the test user to verify the permissions. Hover over the Content tab and note only Content Views and Content Search are available.

<table>
<thead>
<tr>
<th>RED HAT SATELLITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems Engineering@Boston ↓ Monitor ↓ Content ↓ Hosts ↓</td>
</tr>
</tbody>
</table>

Hosts

![Figure 4.2.2.8: test User Permissions](image)

### 4.3 Organization, Location and Lifecycle Environments

For the reference environment a single organization, location, and multiple lifecycle environments are created.

#### 4.3.1 Organization and Location Creation

As the admin user, login to the Satellite 6 user interface and navigate to Any Context and select Manage Organizations.
Click **New Organization** and provide a **Name**, **Label**, and **Description**.

![New Organization Form](image)

**Figure 4.3.1.2: New Organization**

- **Name**: Systems Engineering
- **Label**: Systems Engineering
- **Description**: Systems Engineering group.
Assign hosts as desired and/or click **Proceed to Edit.** Within **Edit Properties**, provide the desired inputs for each entry. For the reference environment the following entries are provided:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td>Clark Jones</td>
</tr>
<tr>
<td>Capsules</td>
<td>(integrated capsule; FQDN of Sat 6 server)</td>
</tr>
<tr>
<td>Subnets</td>
<td>(configured subnet for network)</td>
</tr>
<tr>
<td>Compute Resources</td>
<td>N/A</td>
</tr>
<tr>
<td>Media</td>
<td>RHEL 6 and 7 Server kickstarts</td>
</tr>
<tr>
<td>Templates</td>
<td>Kickstart default PXELinux, Kickstart default iPXE, OSE, PXELinux global default, RHEL OSP, RHEV Hosted, RHEVM Hosted, Satellite Finish Default, Satellite Kickstart Default, Satellite User Data Default, freeipa_register, idm_register, puppet.conf, subscription_manager_registration</td>
</tr>
<tr>
<td>Domains</td>
<td>(DNS domain for reference environment)</td>
</tr>
<tr>
<td>Realms</td>
<td>N/A</td>
</tr>
<tr>
<td>Puppet Environments</td>
<td>All minus <em>production</em></td>
</tr>
<tr>
<td>Host Groups</td>
<td>Broker, Nodes, RHEL OSP 6, RHEV 3.5, RHEV 3.5 Manager</td>
</tr>
<tr>
<td>Locations</td>
<td>N/A</td>
</tr>
<tr>
<td>Parameters</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Table 4.3.1-1: Organization Settings**

Click **Submit** when finished.
Additionally a location can also be created to provide further granularity for management. To create a new location navigate to Any Context and select Manage Locations. 

Click New Location and provide a Name. Click Submit to continue.

Choose to assign hosts or or Proceed to Edit.
Within **Edit Properties**, provide the desired inputs for each entry. For the reference environment the following entries are provided:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td>N/A</td>
</tr>
<tr>
<td>Capsules</td>
<td>(integrated capsule; FQDN of Sat 6 server)</td>
</tr>
<tr>
<td>Subnets</td>
<td>(configured subnet for network)</td>
</tr>
<tr>
<td>Compute Resources</td>
<td>N/A</td>
</tr>
<tr>
<td>Media</td>
<td>RHEL 6 and 7 Server kickstarts</td>
</tr>
<tr>
<td>Templates</td>
<td>N/A</td>
</tr>
<tr>
<td>Domains</td>
<td>(DNS domain for reference environment)</td>
</tr>
<tr>
<td>Realms</td>
<td>N/A</td>
</tr>
<tr>
<td>Puppet Environments</td>
<td>All minus <em>production</em></td>
</tr>
<tr>
<td>Host Groups</td>
<td>Broker, Nodes, RHEL OSP 6, RHEV 3.5, RHEV 3.5 Manager</td>
</tr>
<tr>
<td>Organizations</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Parameters</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Table 4.3.1-2: Location Settings*

Click **Submit** when finished.
4.3.2 Lifecycle Environment Creation

Lifecycle Environments\(^3\) are important to promote various content versions throughout the managed environment. For the reference environment the following lifecycle environment paths are created:

<table>
<thead>
<tr>
<th>Lifecycle Environment Paths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Path</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>CloudForms 3.1</td>
</tr>
<tr>
<td>+</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>devel</td>
</tr>
<tr>
<td>test</td>
</tr>
<tr>
<td>prod</td>
</tr>
<tr>
<td>+</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>RHEL OSP 5</td>
</tr>
<tr>
<td>RHEL OSP 6</td>
</tr>
<tr>
<td>+</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>RHEV 3.4</td>
</tr>
<tr>
<td>RHEV 3.5</td>
</tr>
<tr>
<td>+</td>
</tr>
</tbody>
</table>

**Figure 4.3.2.1: Lifecycle Environments**

---

To create a new Lifecycle Environment navigate to Content > Lifecycle Environments. Click on New Environment Path. Under Create Environment, provide a Name, Label, and Description.

Click Save to complete. Continue completing the necessary lifecycle environment paths.
4.4 Manifest Creation and Import

Create a manifest for the necessary Red Hat subscriptions. Log into the Red Hat Customer Portal at [https://access.redhat.com](https://access.redhat.com). Navigate to My Subscriptions > Subscription Management Applications > Satellite.

**Subscription Management Applications**

<table>
<thead>
<tr>
<th>Name</th>
<th>Subscriptions Attached</th>
</tr>
</thead>
<tbody>
<tr>
<td>se-sat6</td>
<td>1393</td>
</tr>
<tr>
<td>rhci-sat61</td>
<td>22</td>
</tr>
</tbody>
</table>

*Figure 4.4.1: Subscription Management Applications*

Click on Register a Satellite, provide a Name and select Satellite 6.0 from the drop down list. Click Register to continue.

**Register a New Satellite**

Name: [rhci-sat6]

Satellite version: [Satellite 6.0]

REGISTER or Cancel

*Figure 4.4.2: Register Satellite Server*
On the right click **Attach a Subscription**. From the list select the appropriate subscriptions. For the reference environment the following subscriptions are chosen:

<table>
<thead>
<tr>
<th>Subscription</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux Server, Standard (8 sockets)</td>
<td></td>
</tr>
<tr>
<td>(Unlimited guests)</td>
<td>35</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux Server, Standard (1 Virtual</td>
<td></td>
</tr>
<tr>
<td>Machine up to 8 vCPUs)</td>
<td>20</td>
</tr>
<tr>
<td>Red Hat Cloud Infrastructure, Standard (8-sockets)</td>
<td>10</td>
</tr>
<tr>
<td>*OpenShift Employee Subscription</td>
<td>10</td>
</tr>
</tbody>
</table>

*Table 4.4-1: Subscriptions*

*Refer to *OpenShift Enterprise 2 Deployment Guide: Installing and Configuring OpenShift Enterprise* for necessary subscriptions.

With the desired subscriptions attached, click **Download Manifest**. Save the *manifest.zip* to a desired location.

*Figure 4.4.3: Manifest Download*

---

Once the manifest is created with the proper subscriptions attached, the next step is importing into the Satellite server.

As the admin user, login to the Satellite 6 user interface and select the appropriate Organization and Location. Navigate to Content > Red Hat Subscriptions. Under Upload New Manifest browse to the location of the downloaded manifest. To complete click the Upload button.

4.5 Repository, Product, and Content Management

The reference environment synchronizes a set of repositories and custom content based on OpenShift Origin puppet modules. The following Red Hat repositories are selected for synchronization.

<table>
<thead>
<tr>
<th>Repository</th>
<th>Product Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux 6 Server RPMs x86_64 6Server</td>
<td>RHEV, OpenShift, CloudForms</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server - Supplementary RPMs x86_64 6Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server Kickstart x86_64 6.6</td>
<td>RHEV, OpenShift</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Manager 3.5 RPMs x86_64 6Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Repository</td>
<td>Product Requirement</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server - RH Common RPMs x86_64 6Server</td>
<td>Satellite, RHEV, OpenShift</td>
</tr>
<tr>
<td>JBoss Enterprise Application Platform 6 RHEL 6 Server RPMs x86_64 6Server</td>
<td>RHEV, OpenShift</td>
</tr>
<tr>
<td>JBoss Enterprise Application Platform 6 RHEL 7 Server RPMs x86_64 7Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor RPMs x86_64 6Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Software Collections RPMs for Red Hat Enterprise Linux 6 Server x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 Infrastructure RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 Application Node RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 Client Tools RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>JBoss Enterprise Web Server 2 RHEL 6 Server RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 JBoss EAP add-on RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 JBoss A-MQ add-on RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat OpenShift Enterprise 2.2 JBoss FUSE add-on RPMs x86_64 6Server</td>
<td>OpenShift</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server RPMs x86_64 7Server</td>
<td>Satellite, RHEV, RHEL OSP</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server Kickstart x86_64 7.1</td>
<td>RHEV, RHEL OSP</td>
</tr>
<tr>
<td>Red Hat OpenStack 6.0 for RHEL 7 Platform Installer RPMs x86_64 7Server</td>
<td>RHEL OSP</td>
</tr>
<tr>
<td>Red Hat OpenStack 6.0 for RHEL 7 RPMs x86_64 7Server</td>
<td>RHEL OSP</td>
</tr>
<tr>
<td>Red Hat CloudForms Management Engine 5.3 RPMs x86_64</td>
<td>CloudForms</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server - RH Common RPMs x86_64 7Server</td>
<td>Satellite, RHEV, RHEL OSP</td>
</tr>
<tr>
<td>Red Hat Software Collections RPMs for Red Hat Enterprise Linux 7 Server x86_64 7Server</td>
<td>RHEL OSP</td>
</tr>
</tbody>
</table>
### 4.5.1 Red Hat Repository Selection and Synchronization

To select the necessary Red Hat repositories, navigate to Content > Red Hat Repositories. Under each tab, expand the necessary product and place a check next to the desired version.

**Table 4.5-1: Red Hat Repositories**

<table>
<thead>
<tr>
<th>Repository</th>
<th>Product Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux 7 Server - Optional RPMs x86_64 7Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server - Supplementary RPMs x86_64 7Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Agents for RHEL 6 Server RPMs x86_64 6Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor 7 RPMs x86_64 7Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Management Agents RPMs x86_64 7Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Management Agents RPMs x86_64 6Server</td>
<td>RHEV</td>
</tr>
<tr>
<td>Red Hat CloudForms Management Engine RPMs x86_64</td>
<td>CloudForms</td>
</tr>
</tbody>
</table>

**Note:** 6Server or 7Server of a repository contains the latest version of that particular repo. This is desirable if a specific version of a product is not desired. When selecting a kickstart repository, choose a specific version of the operating system.
Once the needed Red Hat Repositories are selected, repository synchronization downloads the content to the Satellite server. Navigate to **Content > Sync Status**, click **Select All** and click the **Synchronize Now** button. A status bar appears indicating the progress of the synchronization. It may take several hours to complete the initial content sync.

Additionally a sync plan can be created to run the repository sync on a predetermined schedule. To create a sync plan navigate to **Content > Sync Plans** and click **New Sync Plan**. Provide a **Name**, **Interval**, **Start Date**, and **Start Time**. Click **Save** to complete.

**Figure 4.5.1.2: Red Hat Repository Sync**

**Figure 4.5.1.3: Sync Plan Creation**
Add products to the newly created sync plan by navigating to Content > Products. Place a check mark next to Name to select all and click the Bulk Actions button.

Under Bulk Actions select Alter Sync Plans. Select the sync plan listed and click the Update Sync Plan button.

4.5.2 Custom Product Creation

For the reference environment a custom product is created for the OpenShift Origin puppet modules.

To create a custom product repository, navigate to Content > Products and click New Products. Provide a Name and Label. Optionally, a Sync Plan can be selected.

Click Save to complete.
Next create a repository by selecting the newly created product and clicking the **Repository** tab. Click **Create Repository** and provide a **Name**, **Label**, and **Type**. Ensure a check mark is placed next to **Publish via HTTP**.

Click **Save** to continue.

**Note**: In a typical scenario a URL path is provided for the custom product and its associated repo are synced to import content. Due to the following bugs:

https://bugzilla.redhat.com/show_bug.cgi?id=1146916

https://bugzilla.redhat.com/show_bug.cgi?id=1167788

...it is necessary to perform the following tasks:

1. Edit `vi /etc/puppet/rack/config.ru` and add the following to the file:

   ```ruby
   #Ensure UTF-8 is our default (sadly Ruby 1.9 sets to US-ASCII)
   Encoding.default_external = Encoding::UTF_8 if defined? Encoding
   ```

   Upon completion restart the necessary services:

   ```shell
   #katello-service restart
   #systemctl restart puppet
   ```

2. Use the **big_hammer.sh** Appendix E: Scripts and Configuration Files script to download and import the OpenShift Origin puppet modules.

   ```shell
   #./big_hammer.sh
   ```

The mentioned issues are to be resolved in a future Satellite 6 release.
Upon completing the download and import of the OpenShift Origin puppet modules, ten puppet modules are listed within the custom `openshift` product, repo, content.

![Figure 4.5.2.3: Custom Product – Repository - Content](image)

### 4.5.3 Content View Creation and Promotion

With repositories and custom products synchronized and created, the next step is to create content views and promote to the desired lifecycle environments.

To create a content view, navigate to Content > Content Views and click Create New View. Provide a Name, Label, and click Save to complete.

![Figure 4.5.3.1: Create Content View](image)
Select the newly created content view, click the **Content** tab, and choose **Add** to add the needed repositories. For the reference environment the following content views are created with associated repositories and puppet modules:

<table>
<thead>
<tr>
<th>Content View</th>
<th>Repository</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEV 3.5</td>
<td></td>
</tr>
<tr>
<td>JBoss Enterprise Application Platform 6 RHEL 6 Server RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>JBoss Enterprise Application Platform 6 RHEL 7 Server RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server Kickstart x86_64 6.6</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server - RH Common RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6 Server - Supplementary RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server Kickstart x86_64 7.1</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server - Optional RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server - RH Common RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7 Server - Supplementary RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Agents for RHEL 6 Server RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor 7 RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Management Agents for RHEL 7 RPMs x86_64 7Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Management Agents RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Manager 3.5 RPMs x86_64 6Server</td>
<td></td>
</tr>
<tr>
<td>Content View</td>
<td>Repository</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>RHEL OSP 6</td>
<td>Red Hat Enterprise Linux 7 Server Kickstart x86_64 7.1</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 7 Server - RH Common RPMs x86_64 7Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 7 Server RPMs x86_64 7Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenStack 6.0 for RHEL 7 Platform Installer RPMs x86_64 7Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenStack 6.0 for RHEL 7 RPMs x86_64 7Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat Software Collections RPMs for Red Hat Enterprise Linux 7 Server x86_64 7Server</td>
</tr>
<tr>
<td>RHEL 6 w/OSE</td>
<td>JBoss Enterprise Application Platform 6 RHEL 6 Server RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>JBoss Enterprise Web Server 2 RHEL 6 Server RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server Kickstart x86_64 6.6</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server - RH Common RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 Application Node RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 Client Tools RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 Infrastructure RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 JBoss A-MQ add-on RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 JBoss EAP add-on RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat OpenShift Enterprise 2.2 JBoss FUSE add-on RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat Software Collections RPMs for Red Hat Enterprise Linux 6 Server x86_64 6Server</td>
</tr>
<tr>
<td>CloudForms</td>
<td>Red Hat Enterprise Linux 6 Server RPMs x86_64 6Server</td>
</tr>
<tr>
<td></td>
<td>Red Hat CloudForms Management Engine RPMs x86_64</td>
</tr>
<tr>
<td>Content View</td>
<td>Puppet Module</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>RHEL 6 w/OSE</td>
<td>haproxy</td>
</tr>
<tr>
<td></td>
<td>ntp</td>
</tr>
<tr>
<td></td>
<td>stdlib</td>
</tr>
<tr>
<td></td>
<td>sysctl</td>
</tr>
<tr>
<td></td>
<td>java_ks</td>
</tr>
<tr>
<td></td>
<td>lokkit</td>
</tr>
<tr>
<td></td>
<td>selinux_types</td>
</tr>
<tr>
<td></td>
<td>concat</td>
</tr>
<tr>
<td></td>
<td>keepalived</td>
</tr>
<tr>
<td></td>
<td>openshift_origin</td>
</tr>
</tbody>
</table>

**Table 4.5.3-1: Content Views – Repos and Puppet Modules**

With the repositories and puppet modules chosen, publish the content by clicking **Publish New Version**. Enter a comment if desired and click **Save** to begin the content view publication.

**RHEV 3.5**

<table>
<thead>
<tr>
<th>Versions</th>
<th>Content</th>
<th>Puppet Modules</th>
<th>History</th>
<th>Details</th>
<th>Tasks</th>
</tr>
</thead>
</table>

**Publish New Version**

A new version of RHEV 3.5 and promoted to the Library environment. It can be promoted to other environments from the Versions tab of this Content View.

**Version Details**

- **Version**: 5
- **Comment**: Additional content added.

[Figure 4.5.3.2: Content View Publication]
Promote the newly published content to a desired lifecycle environment by clicking **Promote** for the newly published content.

Select the appropriate lifecycle environment and click **Promote Version**.

Perform the same steps for each content view created.

### 4.6 Activation Keys

Activation keys allow for system registration to selected Red Hat repositories and products. For the reference environment, the following activation keys are created:

<table>
<thead>
<tr>
<th>Activation key</th>
<th>Subscriptions</th>
<th>Environment</th>
<th>Content View</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEL 6 w/OSE</td>
<td>OpenShift Employee Subscription</td>
<td>devel</td>
<td>RHEL 6 w/OSE</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux Server, Standard (1 Virtual Machine up to 8 vCPUs)</td>
<td>openshift</td>
<td></td>
</tr>
<tr>
<td>RHEL OSP</td>
<td>Red Hat Cloud Infrastructure, Standard (8-sockets)</td>
<td>RHEL OSP 6</td>
<td>RHEL OSP 6</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux Server, Standard (8 sockets) (Unlimited guests)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation key</td>
<td>Subscriptions</td>
<td>Environment</td>
<td>Content View</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>RHEV Hypervisor</td>
<td>Red Hat Cloud Infrastructure, Standard (8-sockets)</td>
<td>RHEV 3.5</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux Server, Standard (8 sockets) (Unlimited guests)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHEV Manager</td>
<td>Red Hat Cloud Infrastructure, Standard (8-sockets)</td>
<td>RHEV 3.5</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux Server, Standard (1 Virtual Machine up to 8 vCPUs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CloudForms</td>
<td>Red Hat Cloud Infrastructure, Standard (8-sockets)</td>
<td>CloudForms 3.1</td>
<td>CloudForms</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux Server, Standard (1 Virtual Machine up to 8 vCPUs)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.6-1: Activation Keys – Subscriptions, Products, and Environments**

To create an activation key navigate to **Content > Activation keys** and click **New Activation Key**. Provide a **Name**, determine **Content Host Limit, Description**, select the appropriate lifecycle **Environment**, and choose a **Content View** associated with the lifecycle **Environment**. Click **Save** to complete.
Once a content view is created and subscriptions attached, the next step is to enable the **Product Content**. Within the activation key, select the **Product Content** tab and set **Enabled** option to **Yes** for the desired items. For the reference environment the following products are enabled for each activation key:

<table>
<thead>
<tr>
<th>Activation key</th>
<th>Enabled Products</th>
</tr>
</thead>
</table>
| **RHEL 6 w/OSE** | Red Hat Software Collections RPMs for Red Hat Enterprise Linux 6 Server  
Red Hat OpenShift Enterprise 2.2 JBoss EAP add-on (RPMs)  
Red Hat OpenShift Enterprise 2.2 JBoss FUSE add-on (RPMs)  
Red Hat OpenShift Enterprise 2.2 Application Node (RPMs)  
Red Hat OpenShift Enterprise 2.2 Client Tools (RPMs)  
JBoss Enterprise Web Server 2 (RHEL 6 Server) (RPMs)  
JBoss Enterprise Application Platform 6 (RHEL 6 Server) (RPMs)  
Red Hat Enterprise Linux 6 Server (Kickstart)  
Red Hat Enterprise Linux 6 Server - RH Common (RPMs)  
Red Hat Enterprise Linux 6 Server (RPMs)  
Red Hat OpenShift Enterprise 2.2 Infrastructure (RPMs)  
openshift  
Red Hat OpenShift Enterprise 2.2 JBoss A-MQ add-on (RPMs) |
| **RHEL OSP** | Red Hat Software Collections RPMs for Red Hat Enterprise Linux 7 Server  
Red Hat Enterprise Linux 7 Server (Kickstart)  
Red Hat Enterprise Linux 7 Server - RH Common (RPMs)  
Red Hat Enterprise Linux 7 Server (RPMs)  
Red Hat OpenStack 6.0 for RHEL 7 (RPMs)  
Red Hat OpenStack 6.0 for RHEL 7 Platform Installer (RPMs) |
| **RHEV Hypervisor** | Red Hat Enterprise Virtualization Manager 3.5 (RPMs)  
Red Hat Enterprise Virtualization Hypervisor 7 (RPMs)  
Red Hat Enterprise Virtualization Management Agents for RHEL 7 (RPMs)  
Red Hat Enterprise Linux 7 Server - Optional (RPMs)  
Red Hat Enterprise Linux 7 Server (Kickstart)  
Red Hat Enterprise Linux 7 Server - RH Common (RPMs)  
Red Hat Enterprise Linux 7 Server (RPMs) |
### Table 4.6-2: Activation Keys – Enabled Products

<table>
<thead>
<tr>
<th>Activation key</th>
<th>Enabled Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEV Hypervisor</td>
<td>Red Hat Enterprise Linux 7 Server - Supplementary (RPMs)</td>
</tr>
<tr>
<td>RHEV Manager</td>
<td>Red Hat Enterprise Virtualization Hypervisor (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Virtualization Manager 3.5 (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Virtualization Management Agents (RPMs)</td>
</tr>
<tr>
<td></td>
<td>JBoss Enterprise Application Platform 6 (RHEL 6 Server) (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Virtualization Agents for RHEL 6 Server (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server (Kickstart)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server - RH Common (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server - Supplementary (RPMs)</td>
</tr>
<tr>
<td>CloudForms</td>
<td>Red Hat CloudForms Management Engine 5.3 (RPMs)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6 Server (RPMs)</td>
</tr>
</tbody>
</table>

### 4.7 Host Groups

Host groups provide a template-like function when deploying hosts with Satellite 6. This reduces the amount of time to deploy hosts that require similar settings. For the reference environment the following host groups are created:

![Host Groups](image)

*Figure 4.7.1: Host Groups*
To create a new host group, navigate to **Configure > Host groups** and click on **New Host Group**. For the reference environment the following settings for each host group are configured:

<table>
<thead>
<tr>
<th><strong>Host Group</strong></th>
<th><strong>Tab</strong></th>
<th><strong>Option</strong></th>
<th><strong>Value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Broker</strong></td>
<td><strong>Host Group</strong></td>
<td>Name</td>
<td>Broker</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifecycle Environment</td>
<td>devel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puppet Environment</td>
<td>RHEL_6_w_OSE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content Source</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puppet CA</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puppet Master</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td><strong>Puppet Classes</strong></td>
<td>Included Classes</td>
<td>openshift_origin</td>
</tr>
<tr>
<td></td>
<td><strong>Network</strong></td>
<td>Domain</td>
<td>refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subnet</td>
<td>syseng(10.19.10.0/23)</td>
</tr>
<tr>
<td></td>
<td><strong>Operating System</strong></td>
<td>Architecture</td>
<td>x86_64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating system</td>
<td>RHEL Server 6.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media</td>
<td>RHSE/Library/Red_Hat_6_Server_Kickstart_x86_64_6_6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partition table</td>
<td>Kickstart default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Root password</td>
<td>&lt;REDACTED&gt;</td>
</tr>
<tr>
<td></td>
<td><strong>Parameters</strong></td>
<td>All</td>
<td>Defaults</td>
</tr>
<tr>
<td></td>
<td><strong>Locations</strong></td>
<td>Selected items</td>
<td>Boston</td>
</tr>
<tr>
<td></td>
<td><strong>Organizations</strong></td>
<td>Selected items</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td></td>
<td><strong>Activation Keys</strong></td>
<td>Activation keys</td>
<td>RHEL 6 w/OSE</td>
</tr>
<tr>
<td><strong>Nodes</strong></td>
<td><strong>Host Group</strong></td>
<td>Name</td>
<td>Nodes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifecycle Environment</td>
<td>devel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puppet Environment</td>
<td>RHEL_6_w_OSE</td>
</tr>
<tr>
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<td>Puppet CA</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puppet Master</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td><strong>Puppet Classes</strong></td>
<td>Included Classes</td>
<td>openshift_origin</td>
</tr>
<tr>
<td></td>
<td><strong>Network</strong></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Subnet</td>
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</tr>
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<td>Host Group</td>
<td>Tab</td>
<td>Option</td>
<td>Value</td>
</tr>
<tr>
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<td>--------------</td>
<td>-----------------</td>
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</tr>
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<td>Nodes</td>
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<td>Architecture</td>
<td>x86_64</td>
</tr>
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<td>Root password</td>
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</tr>
<tr>
<td></td>
<td>Parameters</td>
<td>All</td>
<td>Defaults</td>
</tr>
<tr>
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<td>Selected items</td>
<td>Boston</td>
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<tr>
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<td>Selected items</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td></td>
<td>Activation Keys</td>
<td>Activation keys</td>
<td>RHEL 6 w/OSE</td>
</tr>
<tr>
<td>RHEL OSP 6</td>
<td>Host Group</td>
<td>Name</td>
<td>RHEL OSP 6</td>
</tr>
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<td></td>
<td></td>
<td>Lifecycle Environment</td>
<td>RHEL_OSE_6</td>
</tr>
<tr>
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<td></td>
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<td>N/A</td>
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</tr>
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<td>Architecture</td>
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<td>Root password</td>
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<td>Parameters</td>
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<td>N/A</td>
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<tr>
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<td>Locations</td>
<td>Selected items</td>
<td>Boston</td>
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<td>Organizations</td>
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<td>Systems Engineering</td>
</tr>
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<td>Activation keys</td>
<td>RHEL OSP</td>
</tr>
<tr>
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<td>Host Group</td>
<td>Name</td>
<td>RHEV 3.5</td>
</tr>
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<td>RHEV_3_5</td>
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<td>Host Group</td>
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<td>Option</td>
<td>Value</td>
</tr>
<tr>
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<td>--------------</td>
<td>-------------------------</td>
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<td>Puppet CA</td>
<td></td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>Puppet Master</td>
<td></td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>Puppet Classes</td>
<td>Included Classes</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td>RHEV 3.5</td>
<td>Network</td>
<td>Domain</td>
<td>refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subnet</td>
<td>syseng(10.19.10.0/23)</td>
</tr>
<tr>
<td>RHEV 3.5</td>
<td>Operating System</td>
<td>Architecture</td>
<td>x86_64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating system</td>
<td>RedHat 7.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media</td>
<td>RHSE/Library/Red_Hat_7_Server _Kickstart_x86_64_7_1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partition table</td>
<td>Kickstart default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Root password</td>
<td>&lt;REDACTED&gt;</td>
</tr>
<tr>
<td></td>
<td>Parameters</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Locations</td>
<td>Selected items</td>
<td>Boston</td>
</tr>
<tr>
<td></td>
<td>Organizations</td>
<td>Selected items</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td></td>
<td>Activation Keys</td>
<td>Activation keys</td>
<td>RHEV Hypervisor</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>Name</td>
<td>RHEV 3.5 Manager</td>
</tr>
<tr>
<td></td>
<td>Lifecycle Environment</td>
<td>Name</td>
<td>RHEV_3_5</td>
</tr>
<tr>
<td></td>
<td>Puppet Environment</td>
<td>Name</td>
<td>RHEV_3_5</td>
</tr>
<tr>
<td></td>
<td>Content Source</td>
<td>Name</td>
<td>RHEV_3_5</td>
</tr>
<tr>
<td></td>
<td>Puppet CA</td>
<td>Name</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>Puppet Master</td>
<td>Name</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>Puppet Classes</td>
<td>Included Classes</td>
<td>rhci-sat6.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>Network</td>
<td>Domain</td>
<td>refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subnet</td>
<td>syseng(10.19.10.0/23)</td>
</tr>
<tr>
<td>RHEV 3.5</td>
<td>Operating System</td>
<td>Architecture</td>
<td>x86_64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating system</td>
<td>RHEL Server 6.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Media</td>
<td>RHSE/Library/Red_Hat_6_Server _Kickstart_x86_64_6_6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partition table</td>
<td>Kickstart default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Root password</td>
<td>&lt;REDACTED&gt;</td>
</tr>
<tr>
<td>Host Group</td>
<td>Tab</td>
<td>Option</td>
<td>Value</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
<td>-----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>RHEV 3.5 Manager</td>
<td>Parameters</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Locations</td>
<td>Selected items</td>
<td>Boston</td>
</tr>
<tr>
<td></td>
<td>Organizations</td>
<td>Selected items</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td></td>
<td>Activation Keys</td>
<td>Activation keys</td>
<td>RHEV Manager</td>
</tr>
</tbody>
</table>

*Table 4.7-1: Host Group Settings*

Click **Submit** to complete each host group creation.

### 4.8 Provisioning Templates

Provisioning templates provide a way to customize host deployment with Satellite 6. This includes kickstarts and snippets. For the reference environment the following custom provisioning templates are used for the defined host groups:

<table>
<thead>
<tr>
<th>Host Group</th>
<th>Provisioning Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEV 3.5 Manager</td>
<td>RHEVM Hosted</td>
</tr>
<tr>
<td>RHEV 3.5</td>
<td>RHEV Hosted</td>
</tr>
<tr>
<td>RHEL OSP 6</td>
<td>RHEL OSP</td>
</tr>
<tr>
<td>Broker</td>
<td>OSE</td>
</tr>
<tr>
<td>Nodes</td>
<td>OSE</td>
</tr>
</tbody>
</table>

*Table 4.8-1: Provisioning Templates*

Specifics regarding the contents of each custom provisioning template are found in **Appendix F: kickstarts and snippets**.

To create a custom provisioning template navigate to **Hosts > Provisioning templates**. Either click **New Template** or **Clone** an existing template. For the reference environment the **Satellite Kickstart Default** template is cloned and a custom provisioning template is modified.
Each custom provisioning template is associated to **Applicable Operating Systems**, **Host Group**, and **Environment**.

To create the associations, within the custom provisioning template, select the **Association** tab. For **Applicable Operating Systems** select the desired operating system to move under **Selected items**. Click **Add combination** to assign the needed **Host Group** and **Environment**. For the reference environment the following associations are made for each custom provisioning template:

<table>
<thead>
<tr>
<th>Provisioning Template</th>
<th>Associations</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEVM Hosted</td>
<td>Applicable Operating Systems</td>
<td>RHEL Server 6.6</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>RHEV 3.5 Manager</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>KT_RHSE_RHEV_3_5_RHEV_3_5_9</td>
</tr>
<tr>
<td>RHEV Hosted</td>
<td>Applicable Operating Systems</td>
<td>RedHat 7.1</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>KT_RHSE_RHEV_3_5_RHEV_3_5_9</td>
</tr>
<tr>
<td>RHEL OSP</td>
<td>Applicable Operating Systems</td>
<td>RedHat 7.1</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>RHEL OSP 6</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>N/A</td>
</tr>
<tr>
<td>OSE</td>
<td>Applicable Operating Systems</td>
<td>RHEL Server 6.6</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>Broker</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>KT_RHSE_devel_RHEL_6_w_OSE_4</td>
</tr>
<tr>
<td></td>
<td>Host Group</td>
<td>Nodes</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>KT_RHSE_devel_RHEL_6_w_OSE_4</td>
</tr>
</tbody>
</table>

**Table 4.8-2: Provisioning Template Associations**

Click **Submit** to complete for each custom provision template.

**Note:** Type is set to *provision* for all custom provisioning templates.
5 Deploying Red Hat Enterprise Virtualization 3.5

For the reference environment a Red Hat Enterprise Virtualization self-hosted engine configuration is deployed from Red Hat Satellite 6. Additionally, only the needed steps to deploy from Satellite 6 are outlined and references provided to existing product documentation for the remaining steps.

5.1 NFS Configuration

To support the self-hosted engine install, a dedicated NFS server is configured hosting an NFS share. This share provides storage space for the RHEV Manager virtual machine.

Specific NFS configuration options and iptables settings for cf-vms are located in Appendix D: iptables and firewalld and Appendix E: Scripts and Configuration Files.

5.2 Deploy RHEV Self-Hosted Engine

The self-hosted engine is deployed onto a bare metal machine. This is a requirement as this machine also serves as a hypervisor in the deployed RHEV environment.

As the admin user, select the previously created organization and location, and navigate to Hosts > New host. Provide a Name, select an Organization, select a Location, Host Group, and selection an option for Deploy on.

For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>rhci-rhev</td>
</tr>
<tr>
<td>Organization</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Location</td>
<td>Boston</td>
</tr>
<tr>
<td>Host Group</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td>Deploy on</td>
<td>Bare Metal</td>
</tr>
</tbody>
</table>

Table 5.2-1: Self-Hosted Engine Host Deployment Options

Upon selecting the Host Group, the previously defined host group values populate the various options.

---

Click the **Network** tab and provide the **MAC address** for the host machine under **Primary Interface**. This is the network interface used to PXE boot and deploy the operating system on the system.

**Figure 5.2.1: Self-Hosted Engine MAC address**

![Primary Interface](image)

On the **Operating System** tab verify the information listed and click **Resolve** to populate the **Provisioning templates**.

**Figure 5.2.2: Self-Hosted Engine Provisioning Templates**

![Provisioning templates](image)

With all remaining options verified, click **Submit** to begin the host deployment. Power on the bare metal machine to initiate the PXE boot process. Upon successful install, the host appears under **Hosts** > **All hosts** with a green status.

**Figure 5.2.3: Self-Hosted Engine Deployment Status**

![Deployment Status](image)

**Note:** If issues arise during the deployment of a host, review the `install.post.log` file located under `/root` on the host machine.
Login to the console of the deployed self-hosted engine host and perform the self-hosted engine install referring to the *Red Hat Enterprise Virtualization 3.5 Installation Guide*.

**Note:** Configure the primary Ethernet interface of the self-hosted engine host with a static IP address prior to running `hosted-engine --deploy`.

The following specific values are provided during the self-hosted engine install:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please specify the storage you would like to use</td>
<td>nfs3</td>
</tr>
<tr>
<td>Please specify the full shared storage connection path to use</td>
<td><code>&lt;path to nfs server/share&gt;</code></td>
</tr>
<tr>
<td>Please indicate a nic to set rhevm bridge on</td>
<td>eth1</td>
</tr>
<tr>
<td>Please specify the device to boot the VM from</td>
<td>pxe</td>
</tr>
<tr>
<td>You may specify a MAC address for the VM or accept a randomly generated default</td>
<td>Random (this MAC address is needed when deploying the RHEV VM from Satellite; please document)</td>
</tr>
</tbody>
</table>

**Table 5.2-2: Self-Hosted Engine Install Options**

**Note:** Before confirming the installation settings at the *Configuration Preview* screen to continue the self-hosted engine install, use the assigned MAC address to create a new host within Satellite 6.

As the *admin* user, select the previously created organization and location, and navigate to *Hosts > New host*. Provide a *Name*, select an *Organization*, select a *Location*, *Host Group*, and select an option for *Deploy on*.

For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>rhci-rhevm</td>
</tr>
<tr>
<td>Organization</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Location</td>
<td>Boston</td>
</tr>
<tr>
<td>Host Group</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td>Deploy on</td>
<td>Bare Metal</td>
</tr>
</tbody>
</table>

**Table 5.2-3: RHEV Manager Host Deployment Options**

Upon selecting the *Host Group*, the previously defined host group values populate the various options.

---

Click the **Network** tab and provide the **MAC address** for the host machine under **Primary Interface**. This is the previously captured MAC address which is used to PXE boot and deploy the operating system on the system.

![Primary Interface Table]

**Figure 5.2.4: RHEV Manager MAC address**

On the **Operating System** tab verify the information listed and click **Resolve** to populate the **Provisioning templates**.

![Provisioning templates]

**Figure 5.2.5: RHEV Manager Provisioning Templates**

With all remaining options verified, click **Submit** to begin the RHEV Manager host deployment.

Continue the self-hosted engine install by confirming the installation settings at the **Configuration Preview** screen.

Complete the self-hosted engine install following the steps detailed in the *Red Hat Enterprise Virtualization 3.5 Installation Guide*⁶. Upon successful install, the host appears under **Hosts > All hosts** with a green status.

![Deployment Status]

**Figure 5.2.6: RHEV Manager Deployment Status**
Upon successful self-hosted engine deployment, complete the configuration of the RHEV environment by adding the RHEV Hypervisor (self-hosted physical machine) and configuring a Data storage domain.

5.3 IdM Integration (optional)

Additionally RHEV supports integration with directory service providers. For the reference environment Red Hat Identity Management is used. Steps for configuring IdM as a directory service provider for RHEV are found in the Red Hat Enterprise Virtualization 3.5 Administration Guide.

For the reference environment IdM user `devel` (Clark Jones) is added as a RHEV user and assigned the `DataCenterAdmin` role.

<table>
<thead>
<tr>
<th>User</th>
<th>Authorization provider</th>
<th>Namespace</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin (admin@internal)</td>
<td>internal</td>
<td>*</td>
<td>SuperUser</td>
</tr>
<tr>
<td>admin (admin@internal)</td>
<td>internal</td>
<td>*</td>
<td>PowerUserRole</td>
</tr>
<tr>
<td>Clark Jones (devel@profile1-authz)</td>
<td>profile1-authz</td>
<td>dc=refarch,dc=gos,dc=redhat,....</td>
<td>DataCenterAdmin</td>
</tr>
</tbody>
</table>

**Figure 5.3.1: IdM RHEV User**

Reference configuration files are located in Appendix E Scripts and Configuration Files.

Note: An IdM user may be required to change their password. To do so the user can login to the IdM user portal to reset.

5.4 Satellite 6 Compute Resource

With RHEV deployed and configured, add it as a compute resource to Satellite. As the admin user select the appropriate Organization and Location, navigate to Infrastructure > Compute resources, and click New Compute Resource.

---


Provide a **Name**, select a **Provider**, **URL** to the provider, a **Username**, a **Password**, and click **Load Datacenters**. For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>RHEV3.5</td>
</tr>
<tr>
<td>Provider</td>
<td>RHEV</td>
</tr>
<tr>
<td>URL</td>
<td><a href="https://rhci-rhevm.refarch.bos.redhat.com/api">https://rhci-rhevm.refarch.bos.redhat.com/api</a></td>
</tr>
<tr>
<td>Username</td>
<td>admin@internal</td>
</tr>
<tr>
<td>Password</td>
<td>[REDACTED]</td>
</tr>
</tbody>
</table>

**Table 5.4-1: Compute Resource Values**

Under the **Locations** and **Organizations** tab and choose the desired location and organization.

<table>
<thead>
<tr>
<th>URL</th>
<th><a href="https://rhci-rhevm.refarch.bos.redhat.com/api">https://rhci-rhevm.refarch.bos.redhat.com/api</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g.</td>
<td><a href="https://ovirt.example.com/api">https://ovirt.example.com/api</a></td>
</tr>
<tr>
<td>Username</td>
<td>admin@internal</td>
</tr>
<tr>
<td>e.g.</td>
<td>admin@internal</td>
</tr>
<tr>
<td>Password</td>
<td>*******</td>
</tr>
<tr>
<td>Datacenter</td>
<td>Default</td>
</tr>
<tr>
<td>Test Connection</td>
<td></td>
</tr>
<tr>
<td>Quota ID</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.4.1: RHEV Compute Resource**

Click **Submit** to complete.
6 Deploying Red Hat Enterprise Linux OpenStack Platform 6

For the reference environment, the Red Hat Enterprise Linux OpenStack Platform Installer\(^9\) is deployed from Red Hat Satellite 6. Additionally, only the needed steps to deploy from Satellite 6 are outlined and references provided to existing product documentation and reference architectures for the remaining steps.

### 6.1 Deploy RHEL OSP Installer

The RHEL OSP Installer is deployed onto a bare metal machine and becomes a deployment host for the RHEL OSP environment. Due to this fact, configuration management (puppet and katello-agent) of this host from Satellite 6 is not permitted as it conflicts with the necessary configuration management required for the RHEL OSP Installer that is used to manage the deployed RHEL OSP hosts.

**Note:** As part of the provisioning template customization, puppet and katello-agent installation and configuration are disabled. Refer to Appendix F kickstarts and snippets for additional details.

As the *admin* user, select the previously created organization and location, and navigate to *Hosts > New host*. Provide a *Name*, select an *Organization*, select a *Location*, select a *Host Group*, and select a option for *Deploy on*.

For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>rhci-rhelosp-inst</td>
</tr>
<tr>
<td>Organization</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Location</td>
<td>Boston</td>
</tr>
<tr>
<td>Host Group</td>
<td>RHEL OSP 6</td>
</tr>
<tr>
<td>Deploy on</td>
<td>Bare Metal</td>
</tr>
</tbody>
</table>

**Table 6.1-1: RHEL OSP Installer Host Deployment Options**

Upon selecting the *Host Group*, the previously defined host group values populate the various options.

---

Click the **Network** tab and provide the **MAC address** for the host machine under **Primary Interface**. This is the network interface used to PXE boot and deploy the operating system on the system.

On the **Operating System** tab verify the information listed and click **Resolve** to populate the **Provisioning templates**.

---

**Figure 6.1.1: RHEL OSP Installer MAC address**

<table>
<thead>
<tr>
<th><strong>Primary Interface</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAC address</strong></td>
</tr>
<tr>
<td>5cf3:fc:78:ef:84</td>
</tr>
<tr>
<td><strong>Subnet</strong></td>
</tr>
<tr>
<td>syseng(10.19.10.0/23)</td>
</tr>
<tr>
<td><strong>IP address</strong></td>
</tr>
<tr>
<td>10.19.11.65</td>
</tr>
</tbody>
</table>

**Figure 6.1.2: RHEL OSP Installer Provisioning Templates**
With all remaining options verified, click **Submit** to begin the host deployment. Power on the bare metal machine to initiate the PXE boot process. Upon successful install, the host appears under **Hosts > All hosts**.

**Note:** The host appears with a status of *No reports*. This is due to the katello-agent and puppet config management being disabled as mentioned previously in this section.

If issues arise during the deployment of a host, review the `install.post.log` file located under `/root` on the host machine.

### 6.2 Pre-Deployment Preparation and `rhel-osp-installer` Execution

After deploying the RHEL OSP Installer host, several actions are required to prepare the host before running the `rhel-osp-installer` setup.

To prepare the RHEL OSP Installer host perform the following:

1. Set a static IP configuration for eno1
2. Configure eno2 for a static IP used for the provisioning network
3. Configure the RHEL OSP Installer host to perform as a gateway\(^{10}\)
4. Configure iptables to open necessary ports
5. Modify `/etc/resolv.conf` for necessary DNS servers

Refer to **Appendix D iptables and firewall** and **Appendix E Scripts and Configuration Files** for settings used for the reference environment.

With the RHEL OSP Installer host pre-configured, execute the `rhel-ops-installer` command to complete the installation of the host prior to deploying the RHEL OSP environment. Refer to *Deploying OpenStack: Enterprise Environments (Red Hat Enterprise Linux OpenStack Platform)*\(^{11}\) for the installation steps.

For the reference environment a basic deployment\(^{12}\) is selected and the following settings are used during the `rhel-osp-installer` setup:

**Network Configuration**

*Network interface: 'eno2'*

---


IP address: '192.168.0.1'
Network mask: '255.255.255.0'
Network address: '192.168.0.0'
Host Gateway: '10.19.11.254'
DHCP range start: '192.168.0.2'
DHCP range end: '192.168.0.254'
DHCP Gateway: '192.168.0.1'
DNS forwarder: '10.19.11.248'
Domain: 'refarch.bos.redhat.com'
NTP sync host: '10.5.26.10'
Timezone: 'America/New_York'

Client Authentication Configuration
Set root password.

Installation Medium Configuration
Enter RHEL repo path:
1. Set RHEL repo path (http or https URL):
   http://10.19.11.51/pulp/repos/RHSE/Library/content/dist/rhel/server/7/7.1/x86_64/kickstart/
   Note: The URL path points to the Satellite 6 server in the reference environment.

Subscription Management Configuration
Enter your subscription manager credentials:
1. Subscription manager username: [REDACTED]
2. Subscription manager password: [REDACTED]
3. Comma separated repositories: rhel-7-server-openstack-6.0-rpms
   rhel-7-server-openstack-6.0-installer-rpms rhel-7-server-rh-common-rpms
   rhel-ha-for-rhel-7-server-rpms
4. Subscription manager pool (recommended): 8a85f9814bfa3a50014c234c0eca3812
5. Subscription manager proxy hostname:
6. Subscription manager proxy port:
7. Subscription manager proxy username:
8. Subscription manager proxy password:
9. Proceed with configuration
10. Skip this step (provisioning won't subscribe your machines)
   Note: At the time of this publication the RHEL OSP Installer subscription manager options does not support activation keys which is required for Satellite 6. The following feature request has been filed: https://bugzilla.redhat.com/show_bug.cgi?id=1194839

Upon completion of the rhel-osp-installer execution, a URL and credentials are provided to access the RHEL OSP Installer user interface. It is recommended to change the admin password upon initial login.

Success!
   * Foreman is running at /
   https://www.rhci-rhelosp-inst.refarch.bos.redhat.com
   Initial credentials are admin / Gzw2AiipJH72TwNW
* Foreman Proxy is running at /
https://www.rhci-rhelosp-inst.refarch.bos.redhat.com:8443
* Puppetmaster is running at port 8140
The full log is at /var/log/rhel-osp-installer/rhel-osp-installer.log

**Note:** For high availability and more complex deployments using the RHEL OSP Installer, refer to the following reference architecture: *Deploying Highly Available Red Hat Enterprise Linux OpenStack Platform 6 with Ceph Storage - Using Red Hat Enterprise Linux OpenStack Platform Installer* ¹³

### 6.3 Deploy RHEL OSP

Once the RHEL OSP Installer node setup is complete, login to the RHEL OSP Installer UI as admin and create a new subnet for external traffic.

Navigate to **Infrastructure > Subnets** and click **New Subnet**. For the reference environment, the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>External</td>
</tr>
<tr>
<td>Network address</td>
<td>10.19.10.0</td>
</tr>
<tr>
<td>Network mask</td>
<td>255.255.254.0</td>
</tr>
<tr>
<td>Gateway address</td>
<td>10.19.11.254</td>
</tr>
<tr>
<td>Primary DNS server</td>
<td>10.19.11.51 (address of the Satellite 6 server)</td>
</tr>
<tr>
<td>Secondary DNS server</td>
<td>10.19.11.248</td>
</tr>
<tr>
<td>IPAM</td>
<td>None</td>
</tr>
<tr>
<td>VLAN ID</td>
<td>&lt;none&gt;</td>
</tr>
<tr>
<td>Boot mode</td>
<td>DHCP</td>
</tr>
</tbody>
</table>

*Table 6.3-1: RHEL OSP Installer External Subnet*

Click the **Domains** tab and place a check mark next to the domain.

*Figure 6.3.1: RHEL OSP Installer External Subnet Domains*

Click **Submit** to complete.

**Note:** Verify the settings for the *default* subnet. Ensure the **Start of IP range** is set to a number greater than the RHEL OSP nodes deployed or plan to be deployed to avoid potential conflicts.

Create a new RHEL OSP deployment by navigating to **OpenStack Installer > New deployment**. For the reference environment the following values are provided:

<table>
<thead>
<tr>
<th>Tab</th>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment Settings</td>
<td>Name</td>
<td>rhci-rhelosp-inst</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>First RHEL OSP deployment</td>
</tr>
<tr>
<td></td>
<td>Networking</td>
<td>Nova Network</td>
</tr>
<tr>
<td></td>
<td>Message Provider</td>
<td>Qpid</td>
</tr>
<tr>
<td></td>
<td>Platform</td>
<td>Red Hat Enterprise Linux OpenStack Platform 6 on RHEL 7</td>
</tr>
<tr>
<td></td>
<td>Service Password</td>
<td>[REDACTED]</td>
</tr>
<tr>
<td></td>
<td>Custom Repos</td>
<td>None</td>
</tr>
<tr>
<td>Network Configuration</td>
<td>External</td>
<td>Move to external subnet</td>
</tr>
<tr>
<td></td>
<td>Tenant</td>
<td>Move to default subnet</td>
</tr>
<tr>
<td>Services Overview</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Services Configuration</td>
<td>Tenant Network Type</td>
<td>Flat with DHCP</td>
</tr>
<tr>
<td>(Nova)</td>
<td>Floating IP range for</td>
<td>10.19.10.0/23</td>
</tr>
<tr>
<td></td>
<td>external network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed IP range for</td>
<td>192.168.0.0/24</td>
</tr>
<tr>
<td></td>
<td>tenant networks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tenant network device</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>MTU</td>
<td></td>
</tr>
<tr>
<td>Services Configuration</td>
<td>Choose Driver Backend</td>
<td>Local File</td>
</tr>
<tr>
<td>(Glance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services Configuration</td>
<td>Choose Driver Backend</td>
<td>LVM</td>
</tr>
<tr>
<td>(Cinder)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 6.3-2: RHEL OSP Installer External Subnet*

Click **Submit** to complete.
On the **Overview** tab under **Deployment Roles**, click the + next to **Controller**. Place a check mark next to the desired host and click **Assign Hosts**.

![Assign Hosts Table](image)

**Figure 6.3.2: RHEL OSP Installer Assign Hosts**

Perform the same for **Compute (Nova)**.

Click the **Hosts** tab and under **Assigned**, place a check mark next to one of the hosts and click **Configure Networks**. Move the *External* network to *eno1*. Click **Done** to complete. Perform the same for each remaining host.

Upon completion, click the **Deploy** button to begin deployment for the RHEL OSP environment.

A confirmation screen appears. Place a check mark next to **The networks have been configured for these hosts** and click **Deploy**.

![Deploy Confirmation](image)

**Figure 6.3.3: RHEL OSP Installer Deployment Confirmation**
The RHEL OSP deployment begins and deployment progress is displayed.

![Deployment Progress Progress](image)

**Figure 6.3.4: RHEL OSP Installer Deployment Progress**

**Note:** Each RHEL OSP host must be PXE booted from the Foreman discovery image to begin the RHEL operating system install. For the reference environment, host deployment takes roughly two hours for completion.

Upon the RHEL OSP deployment completion, a success status is displayed along with the URL and credentials to the RHEL OSP dashboard. Additionally, Access all details button displays all deployed services and configured IP address.

![Deployment Completion](image)

**Figure 6.3.5: RHEL OSP Installer Deployment Completion**
7 Deploying OpenShift Enterprise 2.2

With the underlying Red Hat Cloud Infrastructure deployed, the next step is deploying a cloud based Platform-as-a Service, such as Red Hat OpenShift Enterprise, to include development applications. For the reference environment OpenShift Enterprise is deployed onto the self-hosted RHEV compute resource.

7.1 Pre-deployment Preparation

Chapter 4 Red Hat Satellite 6 Configuration discusses preparing the Satellite environment to support the deployment of OpenShift Enterprise. In addition to configuring Satellite, the imported openshift_origin puppet module requires customization of the Smart Class Parameters.

To modify the openshift_origin smart class parameter settings, navigate to Configure > Puppet classes, select the openshift_origin puppet class, click the Smart Class Parameter tab, and modify each parameter with the desired values.

The following parameters are modified for the reference environment:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Override</th>
<th>Parameter type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>bind key</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>4q9vJH2UPhtwHfQJzl8zu8XXtCYzExBMevU5SLG7VuGsLRI4hk8AuPVozb2fx3Bj4y1ejFZvpPjk1rtaOGEmqg==</td>
</tr>
<tr>
<td>broker hostname</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>osebroker.refarch.bos.redhat.com</td>
</tr>
<tr>
<td>broker ip addr</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>10.19.11.70</td>
</tr>
<tr>
<td>conf nameserver allow recursion</td>
<td>&lt;checked&gt;</td>
<td>boolean</td>
<td>true</td>
</tr>
<tr>
<td>Conf nameserver upstream dns</td>
<td>&lt;checked&gt;</td>
<td>array</td>
<td>[&quot;10.19.11.51&quot;]</td>
</tr>
<tr>
<td>datastore_hostname</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>osebroker.refarch.bos.redhat.com</td>
</tr>
<tr>
<td>dns infrastructure key</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>4q9vJH2UPhtwHfQJzl8zu8XXtCYzExBMevU5SLG7VuGsLRI4hk8AuPVozb2fx3Bj4y1ejFZvpPjk1rtaOGEmqg==</td>
</tr>
<tr>
<td>dns infrastructure names</td>
<td>&lt;checked&gt;</td>
<td>array</td>
<td>[{&quot;hostname&quot;:&quot;osebroker.refarch.bos.redhat.com&quot;,&quot;ipaddr&quot;:&quot;10.19.11.70&quot;}, {&quot;hostname&quot;:&quot;rhci-sat6.refarch.bos.redhat.com&quot;,&quot;ipaddr&quot;:&quot;10.19.11.51&quot;}]</td>
</tr>
<tr>
<td>dns infrastructure zone</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>refarch.bos.redhat.com</td>
</tr>
</tbody>
</table>

14 http://www.theforeman.org/manuals/1.8/index.html#4.2.5ParameterizedClasses
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Override</th>
<th>Parameter type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>install cartridges</td>
<td>&lt;checked&gt;</td>
<td>array</td>
<td>[&quot;cron&quot;,&quot;diy&quot;,&quot;haproxy&quot;,&quot;mongodb&quot;,&quot;nodejs&quot;,&quot;perl&quot;,&quot;php&quot;,&quot;postgresql&quot;,&quot;python&quot;,&quot;ruby&quot;,&quot;jenkins&quot;,&quot;jenkins-client&quot;,&quot;mysql&quot;]</td>
</tr>
<tr>
<td>install cartridges optional deps</td>
<td>&lt;checked&gt;</td>
<td>array</td>
<td>[&quot;php&quot;]</td>
</tr>
<tr>
<td>install method</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>none</td>
</tr>
<tr>
<td>msgserver hostname</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>osebroker.refarch.bos.redhat.com</td>
</tr>
<tr>
<td>nameserver hostname</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>osebroker.refarch.bos.redhat.com</td>
</tr>
<tr>
<td>nameserver ip addr</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>10.19.11.70</td>
</tr>
<tr>
<td>node hostname</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>&lt;%= @host.name %&gt;</td>
</tr>
<tr>
<td>ose version</td>
<td>&lt;checked&gt;</td>
<td>string</td>
<td>2.2</td>
</tr>
<tr>
<td>register host with nameserver</td>
<td>&lt;checked&gt;</td>
<td>boolean</td>
<td>true</td>
</tr>
<tr>
<td>*roles</td>
<td>&lt;checked&gt;</td>
<td>array</td>
<td>[&quot;broker&quot;,&quot;msgserver&quot;,&quot;datastore&quot;,&quot;nameserver&quot;]</td>
</tr>
</tbody>
</table>

*Additional settings for the `role` parameter:

<table>
<thead>
<tr>
<th>Section</th>
<th>Option</th>
<th>Validator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional Input Validator</td>
<td>Required</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>&lt;checked&gt;</td>
<td></td>
</tr>
<tr>
<td>Override Value For Specific Hosts</td>
<td>Match</td>
<td>hostgroup=Broker</td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>[&quot;broker&quot;,&quot;msgserver&quot;,&quot;datastore&quot;,&quot;nameserver&quot;]</td>
</tr>
<tr>
<td></td>
<td>Match</td>
<td>hostgroup=Nodes</td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>[&quot;node&quot;]</td>
</tr>
</tbody>
</table>

*Table 7.1-2: OpenShift Origin roles Parameter Settings*

Click **Submit** to complete.
7.2 Deployment

The first step to deploy the OpenShift Enterprise environment is deployment of the Broker host. To deploy onto the self-hosted RHEV environment, navigate to Hosts > New host.

For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>osebroker</td>
</tr>
<tr>
<td>Organization</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Location</td>
<td>Boston</td>
</tr>
<tr>
<td>Host Group</td>
<td>Broker</td>
</tr>
<tr>
<td>Deploy on</td>
<td>RHEV3.5 (RHEV)</td>
</tr>
</tbody>
</table>

Table 7.2-1: OpenShift Broker Host Deployment Options

On the Network tab, assign the configured IP address used for the openshift_origin, broker ip addr parameter.

Select the Virtual Machine tab and provide the desired values. For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster</td>
<td>Default</td>
</tr>
<tr>
<td>Template</td>
<td>Select template</td>
</tr>
<tr>
<td>Cores</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>4 GB</td>
</tr>
<tr>
<td>Network Interfaces</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Network</td>
</tr>
<tr>
<td>Volumes</td>
<td>Size (GB)</td>
</tr>
<tr>
<td></td>
<td>Storage domain</td>
</tr>
</tbody>
</table>
Table 7.2-2: OpenShift Broker Virtual Machine Deployment Options

Click **Submit** to initiate the Broker host deployment.

Complete the OpenShift Enterprise deployment by deploying multiple OpenShift nodes by navigating to **Hosts > New host**.

For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>osenode{1,2,3}</td>
</tr>
<tr>
<td>Organization</td>
<td>Systems Engineering</td>
</tr>
<tr>
<td>Location</td>
<td>Boston</td>
</tr>
<tr>
<td>Host Group</td>
<td>Nodes</td>
</tr>
<tr>
<td>Deploy on</td>
<td>RHEV3.5 (RHEV)</td>
</tr>
</tbody>
</table>

**Table 7.2-3: OpenShift Nodes Host Deployment Options**

On the **Network** tab, assign an IP address for each node. For the reference environment the following IP addresses are used for each node deployed:

<table>
<thead>
<tr>
<th>Node</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>osenode1</td>
<td>10.19.11.71</td>
</tr>
<tr>
<td>osenode2</td>
<td>10.19.11.72</td>
</tr>
<tr>
<td>osenode3</td>
<td>10.19.11.73</td>
</tr>
</tbody>
</table>

**Table 7.2-4: OpenShift Nodes Host IP Address Assignment**

**Figure 7.2.2: OpenShift Enterprise Node – IP Address**
Select the **Virtual Machine tab** and provide the desired values. For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster</td>
<td>Default</td>
</tr>
<tr>
<td>Template</td>
<td>Select template</td>
</tr>
<tr>
<td>Cores</td>
<td>1</td>
</tr>
<tr>
<td>Memory</td>
<td>4 GB</td>
</tr>
<tr>
<td>Network Interfaces</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>nic1</td>
</tr>
<tr>
<td></td>
<td>Network</td>
</tr>
<tr>
<td></td>
<td>rhevm</td>
</tr>
<tr>
<td>Volumes</td>
<td>Size (GB)</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Storage domain</td>
</tr>
<tr>
<td></td>
<td>Data</td>
</tr>
<tr>
<td></td>
<td>Bootable</td>
</tr>
<tr>
<td></td>
<td>&lt;checked&gt;</td>
</tr>
<tr>
<td></td>
<td>Start</td>
</tr>
<tr>
<td></td>
<td>Power ON this machine</td>
</tr>
</tbody>
</table>

*Table 7.2-5: OpenShift Node Virtual Machine Deployment Options*

Click **Submit** to initiate the Node host deployment.

Navigate to **Hosts > All hosts** to review the deployment status.

**Figure 7.2.3: OpenShift Enterprise Host Status**

Note: “A” indicates the node(s) are actively running puppet configuration management. I.E. `openshift_origin` parameter customization for example.

### 7.3 Post Deployment Testing

Prior to deploying applications, cartridges, gears, etc. within OpenShift Enterprise, test the configuration by executing `oo-diagnostics` on the broker. Resolve any errors prior to proceeding.

Validate the OpenShift Enterprise deployment by performing the following actions:

1. On the broker create a district.

   ```
   # oo-admin-ctl-district -c create -n php -p small
   Successfully created district: 5536f1ab1bca37223b000001
   {
   "_id"="5536f1ab1bca37223b000001",
   ```
2. Add a node to the district.

```bash
# oo-admin-ctl-district -c add-node -n jenkins -i /osenode1.refarch.bos.redhat.com
Success for node 'osenode1.refarch.bos.redhat.com'!
```

```json
{"_id"=>"5536f1ab1bca37223b000001",
 "active_servers_size"=>1,
 "available_capacity"=>6000,
 "available_uids"=>"<6000 uids hidden>",
 "created_at"=>2015-04-22 00:56:11 UTC,
 "gear_size"=>"small",
 "max_capacity"=>6000,
 "max_uid"=>6999,
 "name"=>"php",
 "platform"=>"linux",
 "servers"=>
 [{"_id"=>"5536f1d21bca37c02d000001",
  "active"=>true,
  "name"=>"osenode1.refarch.bos.redhat.com",
  "unresponsive"=>false},
 "updated_at"=>2015-04-22 00:56:11 UTC,
 "uuid"=>"5536f1ab1bca37223b000001"}
```

Note: To add more nodes execute the same command for each node hostname.

3. Import cartridges from the node and view from the broker

```bash
# oo-admin-ctl-cartridge -c import-node --activate
Importing cartridges from node 'osenode2.refarch.bos.redhat.com'.
No change
```

```bash
# oo-admin-ctl-cartridge -c list
* cron-1.4       plugin     Cron 1.4       2015/04/22 00:51:28 UTC
* jenkins-client-1 plugin    Jenkins Client 2015/04/22 00:51:28 UTC
* mongodb-2.4    service    MongoDB 2.4    2015/04/22 00:51:28 UTC
* mysql-5.1      service    MySQL 5.1      2015/04/22 00:51:28 UTC
* mysql-5.5      service    MySQL 5.5      2015/04/22 00:51:28 UTC
* postgresql-8.4  service    PostgreSQL 8.4 2015/04/22 00:51:28 UTC
* postgresql-9.2  service    PostgreSQL 9.2  2015/04/22 00:51:28 UTC
* diy-0.1        web        Do-It-Yourself 0.1 2015/04/22 00:51:28 UTC
* jenkins-1      web        Jenkins Server   2015/04/22 00:51:28 UTC
* nodejs-0.10    web        Node.js 0.10    2015/04/22 00:51:28 UTC
```
4. Access the web console to complete application deployment

**Figure 7.3.1: OpenShift Enterprise Web Console**

* perl-5.10        web       Perl 5.10          2015/04/22 00:51:28 UTC
* php-5.3          web       PHP 5.3            2015/04/22 00:51:28 UTC
* php-5.4          web       PHP 5.4            2015/04/22 00:51:28 UTC
* python-2.6       web       Python 2.6         2015/04/22 00:51:28 UTC
* python-2.7       web       Python 2.7         2015/04/22 00:51:28 UTC
* python-3.3       web       Python 3.3         2015/04/22 00:51:28 UTC
* ruby-1.8         web       Ruby 1.8           2015/04/22 00:51:28 UTC
* ruby-1.9         web       Ruby 1.9           2015/04/22 00:51:28 UTC
* ruby-2.0         web       Ruby 2.0           2015/04/22 00:51:28 UTC
* haproxy-1.4      web_proxy Web Load Balancer  2015/04/22 00:51:28 UTC

Note: To access the OpenShift Enterprise web console, enter the hostname/IP address of the broker into a web browser and enter the default credentials: demo/changeme
5. Click **Create your first application now**. Choose the type of application. For the reference environment the *php* application is selected with the following values:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public URL</td>
<td><a href="http://php-newapp.example.com">http://php-newapp.example.com</a></td>
</tr>
<tr>
<td>Scaling</td>
<td>Scale with web traffic</td>
</tr>
<tr>
<td>Will you be changing the code of this application?</td>
<td>Not now, continue</td>
</tr>
</tbody>
</table>

*Table 7.3-1: OpenShift Application Deployment*

Access the *php* application by navigating to the application web console.

*Figure 7.3.2: OpenShift *php* Application*

Welcome to your PHP application on OpenShift

*Figure 7.3.3: OpenShift *php* Web Console*
7.4 Scaling an Application

In addition to deploying OpenShift Enterprise applications, the deployed applications can be scaled up by performing the following on the broker host:

```
rhc app scale-up php -k
Login to osebroker.refarch.bos.redhat.com: demo
Password: *******
RESULT:
php scaled up
```

To verify scaling, perform the following:

**Before:**

```
rhc app show php --gears -v -k
Login to osebroker.refarch.bos.redhat.com: demo
Password: *******
```

<table>
<thead>
<tr>
<th>ID</th>
<th>State</th>
<th>Cartridges</th>
<th>Size</th>
<th>SSH URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5537bd511bca3af59000001</td>
<td>started</td>
<td>php-5.4</td>
<td>small</td>
<td>haproxy-1.4</td>
</tr>
<tr>
<td>5537bd511bca3af59000001</td>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:5537bd511bca3af59000001@php-newapp.example.com">5537bd511bca3af59000001@php-newapp.example.com</a></td>
</tr>
<tr>
<td>5537bf111bca37680b000013</td>
<td>started</td>
<td>php-5.4</td>
<td>small</td>
<td></td>
</tr>
<tr>
<td>5537bf111bca37680b000013</td>
<td></td>
<td></td>
<td></td>
<td>5537bf111bca37680b000013-newapp.example.com</td>
</tr>
</tbody>
</table>

**After:**

```
rhc app show php --gears -v -k
Login to osebroker.refarch.bos.redhat.com: demo
Password: *******
```

<table>
<thead>
<tr>
<th>ID</th>
<th>State</th>
<th>Cartridges</th>
<th>Size</th>
<th>SSH URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5537bd511bca3af59000001</td>
<td>started</td>
<td>php-5.4</td>
<td>small</td>
<td>haproxy-1.4</td>
</tr>
<tr>
<td>5537bd511bca3af59000001</td>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:5537bd511bca3af59000001@php-newapp.example.com">5537bd511bca3af59000001@php-newapp.example.com</a></td>
</tr>
<tr>
<td>5537c0b31bca372171000004</td>
<td>started</td>
<td>php-5.4</td>
<td>small</td>
<td></td>
</tr>
<tr>
<td>5537c0b31bca372171000004</td>
<td></td>
<td></td>
<td></td>
<td>5537c0b31bca372171000004-newapp.example.com</td>
</tr>
<tr>
<td>55380ecd1bca372ca9000003</td>
<td>started</td>
<td>php-5.4</td>
<td>small</td>
<td></td>
</tr>
<tr>
<td>55380ecd1bca372ca9000003</td>
<td></td>
<td></td>
<td></td>
<td>55380ecd1bca372ca9000003-newapp.example.com</td>
</tr>
</tbody>
</table>
For the *php* application, the following URL can be accessed to view status:
http://php-newapp.example.com/haproxy-status/

### 7.5 Moving Gears Between Nodes

OpenShift applications consist of cartridges and gears. Gears are the underlying component for which cartridges are composed of depending on the service for the application.

For scheduled maintenance it may be necessary to move gears between the OpenShift nodes. To move gears between nodes, perform the following:

1. Setup shared SSH keys between the broker and nodes:

   **Broker**

   ```bash
   # ssh-keygen -t rsa -b 2048 -f ~/.ssh/rsync_id_rsa
   Generating public/private rsa key pair.
   Created directory '/root/.ssh'.
   Enter passphrase (empty for no passphrase):
   Enter same passphrase again:
   Your identification has been saved in /root/.ssh/rsync_id_rsa.
   Your public key has been saved in /root/.ssh/rsync_id_rsa.pub.
   The key fingerprint is:
   root@osebroker.refarch.bos.redhat.com
   The key's randomart image is:
   +---[ RSA 2048]----+
   | .o++o o+ .. |
   |                    |
   |                    |
   | .0++0 0+. |
   ```

   [15](https://www.openshift.com/products/architecture)

---

**Figure 7.4.1: OpenShift *php* Web Console**
2. Copy the public and private keys to /etc/openshift

```
Broker
# cp /root/.ssh/rsync_id_rsa* /etc/openshift/
```

3. scp the shared ssh keys to each node:

```
Broker
# scp .ssh/rsync_id_rsa* root@osenode1.refarch.bos.redhat.com:/etc/openshift/
```

```
The authenticity of host 'osenode1.refarch.bos.redhat.com (10.19.11.71)' can't be established.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'osenode1.refarch.bos.redhat.com,10.19.11.71' (RSA) to the list of known hosts.
root@osenode1.refarch.bos.redhat.com's password: rsync_id_rsa
rsync_id_rsa
100% 1675 1.6KB/s 00:00
rsync_id_rsa.pub
100%  419 0.4KB/s 00:00
```

4. On each node, follow the steps detailed in the *OpenShift Enterprise 2 Deployment Guide: Installing and Configuring OpenShift Enterprise*\(^\text{16}\).

5. Capture the UUID for the gears running under the php app:

```
Broker
# rhc app show php --gears -v -k
Login to osebroker.refarch.bos.redhat.com: demo
Password: ******
ID                      State   Cartridges          Size  SSH URL
------------------------ ------- ------------------- ----- -------------------------------------------
5537bd511bca37af59000001 started php-5.4 haproxy-1.4 small \
5537bd511bca37af59000001@php-newapp.example.com
5537c0b31bca372171000004 started php-5.4   small \
5537c0b31bca372171000004@5537c0b31bca372171000004-newapp.example.com
```

---

6. Move a gear from *osenode2* to *osenode1*:

**Broker**

```bash
# oo-admin-move --gear_uuid 5537bd511bca37af59000001 -i
osenode1.refarch.bos.redhat.com
URL: http://php-newapp.example.com
Login: demo
App UUID: 5537bd511bca37af59000001
Gear UUID: 5537bd511bca37af59000001
DEBUG: Source district uuid: 553721251bca3710ab000001
DEBUG: Destination district uuid: 553721251bca3710ab000001
DEBUG: Getting existing app 'php' status before moving
DEBUG: Gear component 'php-5.4' was running
DEBUG: Stopping existing app cartridge 'php-5.4' before moving
DEBUG: Stopping existing app cartridge 'haproxy-1.4' before moving
DEBUG: Force stopping existing app before moving
DEBUG: Gear platform is 'linux'
DEBUG: Creating new account for gear '5537bd511bca37af59000001' on
osenode1.refarch.bos.redhat.com
DEBUG: Moving content for app 'php', gear '5537bd511bca37af59000001' to
osenode1.refarch.bos.redhat.com
Identity added: /etc/openshift/rsync_id_rsa (/etc/openshift/rsync_id_rsa)
Agent pid 26935
unset SSH_AUTH_SOCK;
unset SSH_AGENT_PID;
echo Agent pid 26935 killed;
DEBUG: Moving system components for app 'php', gear
'5537bd511bca37af59000001' to osenode1.refarch.bos.redhat.com
Identity added: /etc/openshift/rsync_id_rsa (/etc/openshift/rsync_id_rsa)
Agent pid 26967
unset SSH_AUTH_SOCK;
unset SSH_AGENT_PID;
echo Agent pid 26967 killed;
DEBUG: Starting cartridge 'haproxy-1.4' in 'php' after move on
osenode1.refarch.bos.redhat.com
DEBUG: Starting cartridge 'php-5.4' in 'php' after move on
osenode1.refarch.bos.redhat.com
DEBUG: Fixing DNS and mongo for gear '5537bd511bca37af59000001' after move
DEBUG: Changing server identity of '5537bd511bca37af59000001' from
'osenode2.refarch.bos.redhat.com' to 'osenode1.refarch.bos.redhat.com'
DEBUG: Deconfiguring old app 'php' on osenode2.refarch.bos.redhat.com after
move
Successfully moved gear with uuid '5537bd511bca37af59000001' of app 'php'
from 'osenode2.refarch.bos.redhat.com' to 'osenode1.refarch.bos.redhat.com'
```

Additional information regarding deploying OpenShift Enterprise via puppet can be found in *OpenShift Enterprise 2 Puppet Deployment Guide: Installing and Configuring OpenShift Enterprise Using Puppet*[^17].

8 Deploying Red Hat CloudForms 3.1

Deploying CloudForms is the final step in completing the Red Hat Cloud Infrastructure deployment and provides cloud management platform capabilities\textsuperscript{18}.

\textbf{Note}: At the time of this writing, Satellite 6 does not support image based deployment. This feature is expected to be available in a future release of RHCI.

8.1 CloudForms Deployment

To deploy CloudForms, download the necessary image from the Red Hat Customer Portal. Navigate to \textbf{Downloads} and under \textbf{Cloud Products}, select \textbf{Red Hat CloudForms}. For the reference environment the \textit{CloudForms OpenStack Virtual Appliance} is used.

Required steps and configuration to support running CloudForms within RHEL OSP are found in \textit{Red Hat Cloud Infrastructure 5: Quick Start for Red Hat Enterprise Linux OpenStack Platform and Red Hat CloudForms with Smart Management}\textsuperscript{19}.

For the reference environment the following settings and configuration are used.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEL OSP Project</td>
<td>rhci</td>
</tr>
<tr>
<td>RHEL OSP User</td>
<td>rhci</td>
</tr>
<tr>
<td>Volume used for CFME database</td>
<td>20 GB</td>
</tr>
</tbody>
</table>

\textit{Table 8.1-1: RHEL OSP CloudForms Settings}

Additionally the \textit{default} security group is used with the following rules:

<table>
<thead>
<tr>
<th>Direction</th>
<th>Protocol</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>22</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>25</td>
</tr>
<tr>
<td>Ingress</td>
<td>UDP</td>
<td>53</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>80</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>389</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>443</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>636</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>5000</td>
</tr>
</tbody>
</table>

\textsuperscript{18} \url{http://www.redhat.com/en/technologies/cloud-computing/cloudforms}
\textsuperscript{19} \url{https://access.redhat.com/documentation/en-US/Red_Hat_Cloud_Infrastructure/5/html/Quick_Start_for_Red_Hat_Enterprise_Linux_OpenStack_Platform_and_Red_Hat_CloudForms_with_Smart_Management/index.htm}
### Table 8.1-2: CloudForms RHEL OSP Security Group Rules

<table>
<thead>
<tr>
<th>Direction</th>
<th>Protocol</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>5432</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>5672</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>8773</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>8774</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>8777</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>9292</td>
</tr>
<tr>
<td>Ingress</td>
<td>TCP</td>
<td>9696</td>
</tr>
<tr>
<td>Ingress</td>
<td>ICMP</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 8.2 CloudForms Discovery

Discover the deployed self-hosted RHEV environment by logging into the CloudForms user interface with the `admin` account and navigate to **Infrastructure > Providers**. Click **Configuration > Add a New Infrastructure Provider** and enter the details for the RHEV provider. For the reference environment the following values are provided:

<table>
<thead>
<tr>
<th>Section</th>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Information</td>
<td>Name</td>
<td>RHEV 3.5</td>
</tr>
<tr>
<td></td>
<td>Type</td>
<td>Red Hat Enterprise Virtualization Manager</td>
</tr>
<tr>
<td></td>
<td>Hostname</td>
<td>rhci-rhevm.refarch.bos.redhat.com</td>
</tr>
<tr>
<td></td>
<td>IP Address</td>
<td>10.19.11.61</td>
</tr>
<tr>
<td></td>
<td>API Port</td>
<td>443</td>
</tr>
<tr>
<td></td>
<td>Zone</td>
<td>default</td>
</tr>
<tr>
<td>Credentials</td>
<td>User ID</td>
<td>admin@internal</td>
</tr>
<tr>
<td></td>
<td>Password</td>
<td>[REDACTED]</td>
</tr>
<tr>
<td></td>
<td>Verify Password</td>
<td>[REDACTED]</td>
</tr>
</tbody>
</table>

*Table 8.2-1: RHEV Infrastructure Provider*
After the RHEV infrastructure provider is added, place a check mark next to it, click on Configuration, and select Refresh Relationships and Power States. This immediately performs a discovery of the RHEV environment.

![Configuration and Policy Configuration](image)

**Figure 8.2.1: CloudForms RHEV Provider Relationship Refresh**

Navigate to Infrastructure > Virtual Machines to begin managing machines in the self-deployed RHEV environment.

![Virtual Machines](image)

**Figure 8.2.2: CloudForms RHEV Provider Virtual Machines**

### 8.3 Satellite Registration

CloudForms 3.1 supports registering with on-premise Satellite 6 through the use of subscription-manager.

**Note:** At the time of this writing registering the CloudForms appliance through the CloudForms portal is not supported. However this planned for a future release.
To register the CloudForms appliance with the on-premise Satellite 6 server perform the following actions by accessing the appliance via ssh:

1. SSH to the CloudForms appliance.

   # ssh root@192.168.0.5
   root@192.168.0.5's password:
   [root@cloudforms ~]#

2. Use subscription-manager to register the CloudForms appliance to the on-premise Satellite 6 server.

   # subscription-manager register --org RHSE --activationkey CloudForms
   The system has been registered with ID: b68eb2cf-ad42-4faa-b1ec-b902edbf27be
   Installed Product Current Status:
   Product Name: Red Hat Software Collections (for RHEL Server)
   Status:       Subscribed
   Product Name: Red Hat Enterprise Linux Server
   Status:       Subscribed
   Product Name: Red Hat CloudForms
   Status:       Subscribed

---

Figure 8.3.1: CloudForms Satellite 6 Registration
8.4 IdM Integration (optional)

Optionally CloudForms can be configured to support LDAP authentication for users and groups. For the reference environment LDAP authentication is provided Red Hat Identity Management.

To configure CloudForms for LDAP authentication, navigate to **Configure > Configuration > Authentication**. Change **Mode** to **LDAP**. Fill in the appropriate details for the LDAP environment. For the reference environment the following values are used:

<table>
<thead>
<tr>
<th>Section</th>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDAP Settings</td>
<td>LDAP Host Names</td>
<td>10.19.11.22</td>
</tr>
<tr>
<td></td>
<td>LDAP Port</td>
<td>389</td>
</tr>
<tr>
<td></td>
<td>User Type</td>
<td>Distinguished Name (CN=User)</td>
</tr>
<tr>
<td></td>
<td>User Suffix: CN=&lt;user&gt;,</td>
<td>cn=users,cn=accounts,dc=refarch,dc=bos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dc=redhat,dc=com</td>
</tr>
<tr>
<td>Role Settings</td>
<td>Get User Groups from LDAP</td>
<td>&lt;checked&gt;</td>
</tr>
<tr>
<td></td>
<td>Get Roles from Home Forest</td>
<td>&lt;checked&gt;</td>
</tr>
<tr>
<td></td>
<td>Follow Referrals</td>
<td>&lt;unchecked&gt;</td>
</tr>
<tr>
<td></td>
<td>Base DN</td>
<td>cn=users,cn=accounts,dc=refarch,dc=bos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dc=redhat,dc=com</td>
</tr>
<tr>
<td></td>
<td>Bind DN</td>
<td>uid=admin,cn=users,cn=accounts,dc=refarch,dc=bos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dc=redhat,dc=com</td>
</tr>
<tr>
<td></td>
<td>Bind Password</td>
<td>[REDACTED]</td>
</tr>
</tbody>
</table>

**Table 8.4-1: CloudForms LDAP Settings**

To add LDAP users and groups for authentication and role based access control (RBAC) refer to *Red Hat CloudForms 3.1: Management Engine 5.3 Settings and Operations Guide*[^20].

For the reference environment, the IdM development group is added with the devel user (Clark Jones) assigned the EVMRole – Administrator with access only to the RHEV 3.5 infrastructure provider.

**Figure 8.4.1: CloudForms LDAP User Group**
9 Conclusion

Whether deploying highly customized virtual machines with complex lifecycle management or enabling agile development environments, Red Hat Cloud Infrastructure has it covered providing end-to-end, Infrastructure-as-a-Service (IaaS) on premise cloud capabilities.

The goal of this reference architecture is to demonstrate the configuration of Red Hat Satellite 6 to successfully deploy and manage Red Hat Enterprise Virtualization 3.5, Red Hat Enterprise Linux OpenStack Platform 6, Red Hat OpenShift Enteprprise 2.2, and Red Hat CloudForms 3.1 in a private cloud setting. The following use cases are successfully demonstrated:

- Configuration of Satellite 6 to support deploying RHCI components
- Deploying a self-hosted RHEV environment from Satellite 6
- Deploying a RHEL OSP environment from Satellite 6
- Deploying OpenShift Enterprise using OpenShift Origin puppet modules onto RHEV
- Deploying CloudForms and demonstrating discovery and management of RHCI on-premise cloud

In addition to, optional integration with Red Hat Identity Management for Red Hat Cloud Infrastructure components is demonstrated where applicable.
Appendix A: Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Contributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Thursday, April 30, 2015</td>
<td>Brett Thurber</td>
</tr>
<tr>
<td></td>
<td>Initial Release</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Monday, September 21, 2015</td>
<td>Brett Thurber</td>
</tr>
<tr>
<td></td>
<td>Section 7 updates</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B: Contributors

<table>
<thead>
<tr>
<th>Contributor</th>
<th>Title</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Dodson</td>
<td>Sr. Software Engineer</td>
<td>Content, Review</td>
</tr>
<tr>
<td>Balaji Jayavelu</td>
<td>Principal Software Engineer</td>
<td>Content, Review</td>
</tr>
</tbody>
</table>

Appendix C: Satellite 6 Install Settings

```
#katello-installer --foreman-admin-username admin --foreman-admin-password [REDACTED] --capsule-dhcp true --capsule-dhcp-gateway 10.19.11.254
--capsule-dhcp-nameservers 10.19.11.51 --capsule-dhcp-range "10.19.11.150
10.19.11.200" --capsule-dns true --capsule-dns-forwarders 10.19.143.248
--capsule-dns-reverse 11.19.10.in-addr.arpa --capsule-dns-zone
refarch.bos.redhat.com --capsule-tftp true --capsule-tftp-servername
$(hostname) --capsule-puppet true --capsule-puppetca true
--capsule-dhcp-interface eth0 --capsule-dns-interface eth0
```

Appendix D: iptables and firewalld

```
cf-vms

# Completed on Thu May 26 05:59:18 2011
# Generated by iptables-save v1.4.7 on Thu May 26 05:59:18 2011
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [43:20252]
:CF - [0:0]
-A INPUT -i virbr0 -p udp -m udp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 67 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 67 -j ACCEPT
-A INPUT -j CF
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 111 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 111 -j ACCEPT
```

refarch-feedback@redhat.com 85 www.redhat.com
-A INPUT -p udp -m state --state NEW -m udp --dport 662 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 662 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 875 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 875 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 892 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 892 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 32769 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 32769 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 32803 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -d 192.168.122.0/24 -o virbr0 -m state --state
RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -s 192.168.122.0/24 -i virbr0 -j ACCEPT
-A FORWARD -i virbr0 -o virbr0 -j ACCEPT
-A FORWARD -o virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -i virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
-A CF -p tcp -m state --state NEW -m tcp --dport 2049 -j ACCEPT
-A CF -p udp -m state --state NEW -m udp --dport 2049 -j ACCEPT
COMMIT

# Completed on Thu May 26 05:59:18 2011

rhci-rhelosp-inst

# Generated by iptables-save v1.4.21 on Sun Apr 19 03:54:47 2015
*nat
:PREROUTING ACCEPT [0:0]
:INPUT ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
:POSTROUTING ACCEPT [1:142]
-A POSTROUTING -s 192.168.0.0/24 -j MASQUERADE
COMMIT

# Completed on Sun Apr 19 03:54:47 2015

# Generated by iptables-save v1.4.21 on Sun Apr 19 03:54:47 2015
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -p tcp -m multiport --ports 22 -m comment --comment "22 accept -ssh" -j ACCEPT
-A INPUT -p tcp -m multiport --ports 443 -m comment --comment "443 accept -apache" -j ACCEPT
-A INPUT -p tcp -m multiport --ports 53 -m comment --comment "53 accept -dns tcp" -j ACCEPT
-A INPUT -p udp -m multiport --ports 53 -m comment --comment "53 accept -dns udp" -j ACCEPT
-A INPUT -p udp -m multiport --ports 67 -m comment --comment "67 accept -dhcp" -j ACCEPT
-A INPUT -p udp -m multiport --ports 68 -m comment --comment "68 accept -bootp" -j ACCEPT
-A INPUT -p udp -m multiport --ports 69 -m comment --comment "69 accept -tftp" -j ACCEPT
-A INPUT -p tcp -m multiport --ports 80 -m comment --comment "80 accept -
apache" -j ACCEPT
-A INPUT -p tcp -m multiport --ports 8140 -m comment --comment "8140 accept puppetmaster" -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 80 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 443 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 53 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 53 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 111 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 111 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 32803 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 32769 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 2020 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 2020 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 662 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 662 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 892 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 892 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 875 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 875 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 2049 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 2049 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 69 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 69 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 8140 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 8140 -j ACCEPT
-A FORWARD -o eno+ -j ACCEPT
-A FORWARD -s 192.168.0.0/24 -j ACCEPT
-A FORWARD -d 192.168.0.0/24 -j ACCEPT
-A FORWARD -i eno+ -j ACCEPT
COMMIT
# Completed on Sun Apr 19 03:54:47 2015

rhci-sat6

<?xml version="1.0" encoding="utf-8"?>
<zone>
  <short>Public</short>
  <description>For use in public areas. You do not trust the other computers on networks to not harm your computer. Only selected incoming connections are accepted.</description>
  <service name="dhcpv6-client"/>
  <service name="ssh"/>
  <port protocol="tcp" port="443"/>
  <port protocol="tcp" port="80"/>
  <port protocol="tcp" port="8140"/>
  <port protocol="tcp" port="9090"/>
  <port protocol="tcp" port="8080"/>
  <port protocol="udp" port="69"/>
  <port protocol="udp" port="636"/>
  <port protocol="tcp" port="69"/>
  <port protocol="tcp" port="53"/>
rhci-rhev

# oVirt default firewall configuration. Automatically generated by vdsm bootstrap script.
#filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
# vdsm
-A INPUT -p tcp --dport 54321 -j ACCEPT
# SSH
-A INPUT -p tcp --dport 22 -j ACCEPT
# snmp
-A INPUT -p udp --dport 161 -j ACCEPT

# libvirt tls
-A INPUT -p tcp --dport 16514 -j ACCEPT

# guest consoles
-A INPUT -p tcp -m multiport --dports 5900:6923 -j ACCEPT

# migration
-A INPUT -p tcp -m multiport --dports 49152:49216 -j ACCEPT

# Reject any other input traffic
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -m physdev ! --physdev-is-bridged -j REJECT --reject-with icmp-host-prohibited
COMMIT

rhci-rhevm

# Generated by ovirt-engine installer
#filtering rules
#filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -i lo -j ACCEPT
-A INPUT -p icmp -m icmp --icmp-type any -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 5432 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 443 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 7410 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 6100 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 80 -j ACCEPT

#drop all rule
-A INPUT -j REJECT --reject-with icmp-host-prohibited

COMMIT

rhci-idm

<?xml version="1.0" encoding="utf-8"?>
<zone>
  <short>Public</short>
  <description>For use in public areas. You do not trust the other computers on networks to not harm your computer. Only selected incoming connections are accepted.</description>
  <service name="dhcpv6-client"/>
  <service name="ssh"/>
  <port protocol="tcp" port="443"/>
  <port protocol="tcp" port="80"/>
  <port protocol="tcp" port="464"/>
  <port protocol="tcp" port="138"/>
  <port protocol="udp" port="88"/>
  <port protocol="udp" port="464"/>
  <port protocol="tcp" port="445"/>
  <port protocol="tcp" port="88"/>
  <port protocol="tcp" port="7389"/>
  <port protocol="udp" port="139"/>
  <port protocol="udp" port="123"/>
  <port protocol="tcp" port="139"/>
  <port protocol="tcp" port="389"/>
  <port protocol="tcp" port="22"/>
  <port protocol="tcp" port="53"/>
  <port protocol="udp" port="389"/>
  <port protocol="udp" port="138"/>
  <port protocol="udp" port="445"/>
  <port protocol="tcp" port="53"/>
  <port protocol="tcp" port="636"/>
</zone>

mac001a6476000b – RHEL OSP Controller

# Generated by iptables-save v1.4.21 on Mon Apr 20 23:26:42 2015
*filter
  :INPUT ACCEPT [1:52]
  :FORWARD ACCEPT [0:0]
  :OUTPUT ACCEPT [3:206]
  :nova-api-FORWARD - [0:0]
  :nova-api-INPUT - [0:0]
  :nova-api-OUTPUT - [0:0]
  :nova-api-local - [0:0]
  :nova-filter-top - [0:0]
-A INPUT -j nova-api-INPUT
-A INPUT -p tcp -m multiport --dports 15672,5672 -m comment --comment "001 amqp incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 80,443 -m comment --comment "001 apache incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 8776 -m comment --comment "001 cinder incoming" -j ACCEPT
-A INPUT -p udp -m multiport --dports 5404,5405 -m comment --comment "001 corosync mcast" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 3306,9200,4567,4568,4444 -m comment --comment "001 galera incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 9191,9292 -m comment --comment "001 glance incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 8004 -m comment --comment "001 heat incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 5000,35357 -m comment --comment "001 keystone incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 81 -m comment --comment "001 load balancer incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 27017 -m comment --comment "001 nosql incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 8774,8775,6080,6081 -m comment --comment "001 nova incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 2224 -m comment --comment "001 pcsd incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 3260 -m comment --comment "010 iscsi incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 11211 -m comment --comment "010 memcached incoming" -j ACCEPT
-A INPUT -p tcp -m multiport --dports 873 -m comment --comment "010 rsync incoming" -j ACCEPT
-A FORWARD -j nova-filter-top
-A FORWARD -j nova-api-FORWARD
-A OUTPUT -j nova-filter-top
-A OUTPUT -j nova-api-OUTPUT
-A nova-api-INPUT -d 192.168.0.2/32 -p tcp -m tcp --dport 8775 -j ACCEPT
-A nova-filter-top -j nova-api-local
COMMIT
# Completed on Mon Apr 20 23:26:42 2015
# Generated by iptables-save v1.4.21 on Mon Apr 20 23:26:42 2015
*nat
:PREROUTING ACCEPT [241:16844]
:INPUT ACCEPT [137:9916]
:OUTPUT ACCEPT [31832:1915535]
:POSTROUTING ACCEPT [31832:1915535]
nova-api-OUTPUT [0:0]
nova-api-POSTROUTING [0:0]
nova-api-PREROUTING [0:0]
nova-api-float-snat [0:0]
nova-api-snat [0:0]
nova-postrouting-bottom [0:0]
-A PREROUTING -j nova-api-PREROUTING
-A OUTPUT -j nova-api-OUTPUT
-A POSTROUTING -j nova-api-POSTROUTING
-A POSTROUTING -j nova-postrouting-bottom

www.redhat.com 90 refarch-feedback@redhat.com
-A nova-api-snat -j nova-api-float-snat
-A nova-postrouting-bottom -j nova-api-snat
COMMIT

# Completed on Mon Apr 20 23:26:42 2015
# Generated by iptables-save v1.4.21 on Mon Apr 20 23:26:42 2015

mac5cf3fc1b6746 – RHEL OSP Compute

# Generated by iptables-save v1.4.21 on Sun Apr 19 01:28:06 2015

osebroker

# Firewall configuration written by system-config-firewall
# Manual customization of this file is not recommended.

osenodes{1,2,3}

# Firewall configuration written by system-config-firewall
# Manual customization of this file is not recommended.
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 22 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 80 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 443 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 8000 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 8443 -j ACCEPT
:rhc-app-comm - [0:0]
-A INPUT -m tcp -p tcp --dport 35531:65535 -m state --state NEW -j ACCEPT
-A INPUT -j rhc-app-comm
-A OUTPUT -j rhc-app-comm
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
COMMIT

Appendix E: Scripts and Configuration Files

big_hammer.sh

#!/bin/bash

# This is the "big hammer" approach to installing the Openshift Origin puppet module for Red Hat Satellite 6.
# Courtesy of Scott Dodson; sdodson@redhat.com

puppet module install openshift-openshift_origin

for i in `ls`; do cd /etc/puppet/modules/$i && puppet module build; done

find /etc/puppet/modules/ -wholename '*pkg/*.tar.gz' -exec hammer -v repository upload-content --product=openshift --name=openshift --path={} --organization="Systems Engineering" \\;

cf-vms – /etc/sysconfig/nfs

# Define which protocol versions mountd
# will advertise. The values are "no" or "yes"
# with yes being the default
#MOUNTD_NFS_V2="no"
#MOUNTD_NFS_V3="no"
#
# Path to remote quota server. See rquotad(8)
#RQUOTAD="/usr/sbin/rpc.rquotad"
# Port rquotad should listen on.
#RQUOTAD_PORT=875
# Optional options passed to rquotad
#RPCRQUOTADOPTS=""
# Optional arguments passed to in-kernel lockd
#LOCKDARG=
# TCP port rpc.lockd should listen on.
LOCKD_TCPPORT=32803
# UDP port rpc.lockd should listen on.
LOCKD_UDPPORT=32769
#
#
# Optional arguments passed to rpc.nfbsd. See rpc.nfbsd(8)
# Turn off v2 and v3 protocol support
#RPCNFSDARGS="-N 2 -N 3"
# Turn off v4 protocol support
#RPCNFSDARGS="-N 4"
# Number of nfs server processes to be started.
# The default is 8.
#RPCNFSDCOUNT=8
# Stop the nfbsd module from being pre-loaded
#NFSD_MODULE="noload"
# Set V4 grace period in seconds
#NFSD_V4_GRACE=90
#
#
# Optional arguments passed to rpc.mountd. See rpc.mountd(8)
#RPCMOUNTDOPTS=""
# Port rpc.mountd should listen on.
MOUNTD_PORT=892
#
#
# Optional arguments passed to rpc.statd. See rpc.statd(8)
#STATDARG=""
# Port rpc.statd should listen on.
STATD_PORT=662
# Outgoing port statd should used. The default is port
# is random
#STATD_OUTGOING_PORT=2020
# Specify callout program
#STATD_HA_CALLOUT="/usr/local/bin/foo"
#
#
# Optional arguments passed to rpc.idmapd. See rpc.idmapd(8)
#RPCIDMAPDARGS=""
#
# Set to turn on Secure NFS mounts.
#SECURE_NFS="yes"
# Optional arguments passed to rpc.gssd. See rpc.gssd(8)
#RPCGSSDARGS=""
# Optional arguments passed to rpc.svcgssd. See rpc.svcgssd(8)
#RPCSVCGSSDARGS=""
#
# To enable RDMA support on the server by setting this to
# the port the server should listen on
#RDMA_PORT=20049
cf-vms – /etc/exports

/etc/exports

```
/nfsshare  10.19.11.*(rw,sync,no_root_squash,fsid=0)
```

rhci-rhelosp-inst - /etc/sysconfig/network-scripts/ifcfg-eno1

```
NAME="eno1"
DEVICE="eno1"
ONBOOT=yes
NETBOOT=yes
PEERDNS=no
UUID="a84075d1-d1b1-4d4d-b08a-88b7ecb8c160"
BOOTPROTO=static
IPADDR=10.19.11.65
NETMASK=255.255.254.0
GATEWAY=10.19.11.254
TYPE=Ethernet
```

rhci-rhelosp-inst - /etc/sysconfig/network-scripts/ifcfg-eno2

```
DEVICE=eno2
BOOTPROTO=none
HWADDR=5c:f3:fc:78:ef:86
ONBOOT=yes
HOTPLUG=yes
TYPE=Ethernet
IPADDR=192.168.0.1
NETMASK=255.255.255.0
PEERDNS=yes
DNS1=192.168.0.1
DNS2=10.19.11.248
NM_CONTROLLED=no
```

rhci-rhelosp-inst - /usr/lib/sysctl.d/00-system.conf

```
# Kernel sysctl configuration file
#
# For binary values, 0 is disabled, 1 is enabled. See sysctl(8) and
# sysctl.conf(5) for more details.

# Disable netfilter on bridges.
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0

# Controls the maximum shared segment size, in bytes
kernel.shmmax = 4294967295

# Controls the maximum number of shared memory segments, in pages
kernel.shmall = 268435456

#Gateway
net.ipv4.ip_forward = 1
```

rhci-rhelosp-inst - /etc/resolv.conf

```
#domain www.redhat.com
#search 94.refarch-feedback@redhat.com
```
# Generated by NetworkManager
search refarch.bos.redhat.com

# No nameservers found; try putting DNS servers into your
# ifcfg files in /etc/sysconfig/network-scripts like so:
#
# DNS1=xxx.xxx.xxx.xxx
# DNS2=xxx.xxx.xxx.xxx
# DOMAIN=lab.foo.com bar.foo.com
nameserver 192.168.0.1
nameserver 10.19.11.248

rhci-rhevm – profile1.properties

#
# Select one
#
#include = <openldap.properties>
#include = <389ds.properties>
#include = <rhds.properties>
include = <ipa.properties>
#include = <iplanet.properties>
#include = <rfc2307.properties>
#include = <rfc2307-openldap.properties>
#
# Server
#
vars.server = rhci-idm.refarch.bos.redhat.com
#
# Search user and its password.
#
vars.user =
uid=admin,cn=users,cn=accounts,dc=refarch,dc=bos,dc=redhat,dc=com
vars.password = [REDACTED]

pool.default.serverset.single.server = ${global:vars.server}
pool.default.auth.simple.bindDN = ${global:vars.user}
pool.default.auth.simple.password = ${global:vars.password}

# Create keystore, import certificate chain and uncomment
# if using ssl/tls.
#pool.default.ssl.startTLS = true
#pool.default.ssl.truststore.file = ${local:_basedir}/${global:vars.server}.jks
#pool.default.ssl.truststore.password = changeit
Appendix F: kickstarts and snippets

RHEVM Hosted

```plaintext
<%#
kind: provision
name: Satellite Kickstart Default
oses:
  - Red Hat Enterprise Linux 5
  - Red Hat Enterprise Linux 6
  - Red Hat Enterprise Linux 7
%
rhel_compatible = @host.operatingsystem.family == 'Redhat' && @host.operatingsystem.name != 'Fedora'
os_major = @host.operatingsystem.major.to_i
# safemode renderer does not support unary negation
pm_set = @host.puppetmaster.empty? ? false : true
puppet_enabled = pm_set || @host.params['force-puppet']
section_end = (rhel_compatible && os_major <= 5) ? '' : '%end'
%
install
<%= @mediapath %>
lang en_US.UTF-8
selinux --enforcing
keyboard us
skipx
network --bootproto <%= @static ? "static --ip=#{@host.ip} --gateway=#{@host.subnet.gateway} --nameserver=#{@host.subnet.dns_primary},#{@host.subnet.dns_secondary}.reject{|n| n.blank?}.join(',')" : 'dhcp' %>
--hostname <%= @host %>
rootpw --iscrypted <%= root_pass %>
firewall --<%= os_major >= 6 ? 'service=' : '' %>ssh
authconfig --useshadow --passalgo=sha256 --kickstart
timezone --utc <%= @host.params['time-zone'] || 'UTC' %>
bootloader --location=mbr --append="nofb quiet splash=quiet" <%= grub_pass %>
<% if os_major == 5 -%>
key --skip
<% end -%>

<% if @dynamic -%>
%include /tmp/diskpart.cfg
<% else -%>
<%= @host.diskLayout %>
<% end -%>

text
reboot

%packages --ignoremissing
yum
```

dhclient
ntp
wget
@Core
<%= section_end -%>
<% if @dynamic -%>
%pre
<%= @host.diskLayout %>
<%= section_end -%>
<% end -%>

%post --nochroot
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
  cp -va /etc/resolv.conf /mnt/sysimage/etc/resolv.conf
  /usr/bin/chvt 1
} 2>&1 | tee /mnt/sysimage/root/install.postnochroot.log
<%= section_end -%>

%post
logger "Starting anaconda <%= @host %> postinstall"
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
  # update local time
  echo "updating system time"
  /usr/sbin/ntpdate -s <%= @host.params['ntp-server'] %>
  /usr/sbin/hwclock --systohc
  chkconfig ntpd on
<%= snippet "subscription_manager_registration" %>

  <% if @host.respond_to?(:realm) && @host.respond_to?(:otp) && @host.realm && @host.otp && @host.realm.realm_type == "Red Hat Identity Management" -%>
  <%= snippet "idm_register" %>
  <% end -%>

  # update all the base packages from the updates repository
  yum -t -y -e 0 update
  yum install -y rhevm

  <% if puppet_enabled %>
  # and add the puppet package
  yum -t -y -e 0 install puppet

  echo "Configuring puppet"
cat > /etc/puppet/puppet.conf << EOF
<%= snippet 'puppet.conf' %>
EOF

  # Setup puppet to run on system reboot

refarch-feedback@redhat.com
www.redhat.com
/sbin/chkconfig --level 345 puppet on

/usr/bin/puppet agent --config /etc/puppet/puppet.conf -o --tags no_such_tag
<% if @host.puppetmaster.blank? ? '' : "--server #{@host.puppetmaster}" %>
--no-daemonize
<% end -%>

sync

<% if @provisioning_type == nil || @provisioning_type == 'host' -%>
# Inform the build system that we are done.
echo "Informing Satellite that we are built"
wget -q -O /dev/null --no-check-certificate <%= foreman_url %>
<% end -%>

2>&1 | tee /root/install.post.log
exit 0
<% if @provisioning_type == nil || @provisioning_type == 'host' -%>
# Inform the build system that we are done.
echo "Informing Satellite that we are built"
wget -q -O /dev/null --no-check-certificate <%= foreman_url %>
<% end -%>

exit 0
<%= section_end -%>

RHEV Hosted

<% kind: provision
name: Satellite Kickstart Default
oses:
- Red Hat Enterprise Linux 5
- Red Hat Enterprise Linux 6
- Red Hat Enterprise Linux 7
%>
<%
  rhel_compatible = @host.operatingsystem.family == 'Redhat' && @host.operatingsystem.name != 'Fedora'
os_major = @host.operatingsystem.major.to_i
  # safemode renderer does not support unary negation
  pm_set = @host.puppetmaster.empty? ? false : true
  puppet_enabled = pm_set || @host.params['force-puppet']
  section_end = (rhel_compatible && os_major <= 5) ? '' : '%end'
%>

install
<%= @mediapath %>
lang en_US.UTF-8
selinux --enforcing
keyboard us
skipx
network --bootproto <%= @static ? "static --ip=#{@host.ip} --netmask=#{@host.subnet.mask} --gateway=#{@host.subnet.gateway}" : "dhcp" %> --hostname <%= @host %>
rootpw --iscrypted <%= root_pass %>
firewall --service=ssh
authconfig --useshadow --passalgo=sha256 --kickstart
timezone --utc 'UTC' %>

bootloader --location=mbr --append="nolb quiet splash=quiet" <%= grub_pass %>
<% if os_major == 5 -%>
key --skip
<% end -%>

<% if @dynamic -%>
%include /tmp/diskpart.cfg
<% else -%>
<%= @host.diskLayout %>
<% end -%>

text
reboot

%packages --ignoremissing
yum
dhcclient
ntp
wget
@Core
<%= section_end -%>

<% if @dynamic -%>
%pre
<%= @host.diskLayout %>
<%= section_end -%>
<% end -%>

%post --nochroot
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
  cp -va /etc/resolv.conf /mnt/sysimage/etc/resolv.conf
  /usr/bin/chvt 1
}
2>&1 | tee /mnt/sysimage/root/install.postnochroot.log
<%= section_end -%>

%post
logger "Starting anaconda <%= @host %> postinstall"
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
  # update local time
  echo "updating system time"
  /usr/sbin/ntpdate -sub <%= @host.params['ntp-server'] || '10.16.255.2' %>
  /usr/sbin/hwclock --systohc
  systemctl enable ntpd

  <%= snippet "subscription_manager_registration" %>

  <% if @host.respond_to?(:realm) && @host.respond_to?(:otp) && @host.realm && @host.otp && @host.realm.realm_type == "Red Hat Identity Management" -%>
  <%= snippet "idm_register" %>
  <% end -%>
  refarch-feedback@redhat.com
  99
  www.redhat.com
# update all the base packages from the updates repository
yum -t -y -e 0 update
yum group install -y 'Server with GUI'
yum install -y ovirt-hosted-engine-setup

<% if puppet_enabled %>
# and add the puppet package
yum -t -y -e 0 install puppet

echo "Configuring puppet"
cat > /etc/puppet/puppet.conf << EOF
<%= snippet 'puppet.conf' %>
EOF

# Setup puppet to run on system reboot
/sbin/chkconfig --level 345 puppet on

/usr/bin/puppet agent --config /etc/puppet/puppet.conf -o --tags no_such_tag
<%= @host.puppetmaster.blank? ? '' : "--server #{@host.puppetmaster}" %>
--no-daemonize
<% end -%>

sync

<% if @provisioning_type == nil || @provisioning_type == 'host' -%>
# Inform the build system that we are done.
echo "Informing Satellite that we are built"
wget -q -O /dev/null --no-check-certificate <%= foreman_url %>
<% end -%>
) 2>&1 | tee /root/install.post.log
exit 0

<%= section_end -%>

RHEL OSP

<%#
kind: provision
name: RHEL OSP
oses:
  - Red Hat Enterprise Linux 5
  - Red Hat Enterprise Linux 6
  - Red Hat Enterprise Linux 7
%
<% rhel_compatible = @host.operatingsystem.family == 'Redhat' &&
    @host.operatingsystem.name != 'Fedora'
    os_major = @host.operatingsystem.major.to_i
    # safemode renderer does not support unary negation
    pm_set = @host.puppetmaster.empty? ? false : true
    puppet_enabled = pm_set || @host.params['force-puppet']
    section_end = (rhel_compatible && os_major <= 5) ? '' : '%end'
%>
install
<%= @mediapath %>
lang en_US.UTF-8
selinux --enforcing
keyboard us
skipx
network --bootproto <%= @static ? "static --ip=#{@host.ip}
--netmask=#{@host.subnet.mask} --gateway=#{@host.subnet.gateway}
--nameserver=#{[@host.subnet.dns_primary,@host.subnet.dns_secondary].reject{|n| n.blank?}.join(',')}" : 'dhcp' %> --hostname <%= @host %>
rootpw --iscrypted <%= root_pass %>
firewall --service='ssh'
authconfig --useshadow --passalgo=sha256 --kickstart
timezone --utc <%= @host.params['time-zone'] || 'UTC' %>
bootloader --location=mbr --append="nofb quiet splash=quiet" <%= grub_pass %>
<% if os_major == 5 %>
key --skip
<% end %>
<% if @dynamic %>
%include /tmp/diskpart.cfg
<% else %>
<%= @host.diskLayout %>
<% end %>
text
reboot
%packages --ignoremissing
yum
dhclient
ntp
wget
@Core
<%= section_end %>
<% if @dynamic %>
%pre
<%= @host.diskLayout %>
<%= section_end %>
<% end %>
%post --nochroot
exec < /dev/tty3 > /dev/tty3
#changing to VT 3 so that we can see whats going on....
/usr/bin/chvt 3
{
cp -va /etc/resolv.conf /mnt/sysimage/etc/resolv.conf
/usr/bin/chvt 1
} 2>&1 | tee /mnt/sysimage/root/install.postnochroot.log
<%= section_end %>
logger "Starting anaconda <%= @host %> postinstall"
exec < /dev/tty3 > /dev/tty3
#changing to VT 3 so that we can see whats going on....
/usr/bin/chvt 3
{
#update local time
echo "updating system time"
/usr/sbin/ntpdate -sub <%= @host.params['ntp-server'] || '10.16.255.2' %>%
/usr/sbin/hwclock --systohc
<%= snippet "rhel_osp_sub_man" %>

<% if @host.respond_to?(:realm) && @host.respond_to?(:otp) && @host.realm && @host.otp && @host.realm.realm_type == "Red Hat Identity Management" -%>
<%= snippet "idm_register" %>
<% end -%>

# update all the base packages from the updates repository
yum -t -y -e 0 update

<% if puppet_enabled %> # and add the puppet package
yum -t -y -e 0 install puppet

# echo "Configuring puppet"
cat > /etc/puppet/puppet.conf << EOF
<%= snippet 'puppet.conf' %>
EOF

# Setup puppet to run on system reboot
#/sbin/chkconfig --level 345 puppet on

#/usr/bin/puppet agent --config /etc/puppet/puppet.conf -o --tags
no_such_tag <%= @host.puppetmaster.blank? ? '' : "--server
#{@host.puppetmaster}" %> --no-daemonize
<% end -%>

sync

<% if @provisioning_type == nil || @provisioning_type == 'host' -%>
# Inform the build system that we are done.
echo "Informing Satellite that we are built"
wget -q -0 /dev/null --no-checkertificate <%= foreman_url %>
<% end -%>
) 2>&1 | tee /root/install.post.log
exit 0
<%= section_end -%>

OSE
<%#
kind: provision
name: Satellite Kickstart Default
oses:
- Red Hat Enterprise Linux 5
- Red Hat Enterprise Linux 6
- Red Hat Enterprise Linux 7

rhel_compatible = @host.operatingsystem.family == 'Redhat' &&
@host.operatingsystem.name != 'Fedora'
os_major = @host.operatingsystem.major.to_i
# safemode renderer does not support unary negation
pm_set = @host.puppetmaster.empty? ? false : true
puppet_enabled = pm_set || @host.params['force-puppet']
section_end = (rhel_compatible && os_major <= 5) ? '' : '%end'

install
<%= @mediapath %>
lang en_US.UTF-8
selinux --enforcing
keyboard us
skipx
network --bootproto <%= @static ? "static --ip=#{@host.ip} --netmask=#{@host.subnet.mask} --gateway=#{@host.subnet.gateway} --nameserver='#{@host.subnet.dns_primary},#{@host.subnet.dns_secondary}'} : 'dhcp' %> --hostname <%= @host %>
rootpw --iscrypted <%= root_pass %>
firewall --%{ os_major >= 6 ? 'service=' : '' }%ssh
authconfig --useshadow --passalgo=sha256 --kickstart
timezone --utc <%= @host.params['time-zone'] || 'UTC' %>

bootloader --location=mbr --append="nofb quiet splash=quiet" <%= grub_pass %>
<% if os_major == 5 -%>
key --skip
<% end -%>

<% if @dynamic -%>
%include /tmp/diskpart.cfg
<% else -%>
<%= @host.diskLayout %>
<% end -%>
text
reboot

%packages --ignoremissing
yum
dhclient
ntp
wget
@Core
<%= section_end -%>

<% if @dynamic -%>
%pre
%post --nochroot
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
    cp -va /etc/resolv.conf /mnt/sysimage/etc/resolv.conf
    /usr/bin/chvt 1
} 2>&1 | tee /mnt/sysimage/root/install.postnochroot.log
%

%post
logger "Starting anaconda <%= @host %> postinstall"
exec < /dev/tty3 > /dev/tty3
# changing to VT 3 so that we can see what's going on....
/usr/bin/chvt 3
{
    # update local time
    echo "upgrading system time"
    /usr/sbin/ntpdate -sub <%= @host.params['ntp-server'] || '10.16.255.2' %>
    /usr/sbin/hwclock --systohc
    chkconfig ntpd on
%
    <%= snippet "subscription_manager_registration" %>
%
    <% if @host.respond_to?(:realm) && @host.respond_to?(:otp) && @host.realm &&
        @host.otp && @host.realm.realm_type == "Red Hat Identity Management" -%>
        <%= snippet "idm_register" %>
        <% end -%>
%
    # update all the base packages from the updates repository
    yum -t -y -e 0 update
%
    <% if puppet_enabled %> # and add the puppet package
    yum -t -y -e 0 install puppet
%
    echo "Configuring puppet"
    cat > /etc/puppet/puppet.conf << EOF
    <%= snippet 'puppet.conf' %>
    EOF
%
    # Setup puppet to run on system reboot
    /sbin/chkconfig --level 345 puppet on
%
    /usr/bin/puppet agent --config /etc/puppet/puppet.conf -o --tags no_such_tag
    <%= @host.puppetmaster.blank? ? '' : "--server #{@host.puppetmaster}" %>
    --no-daemonize
%
    sync
Informing Satellite that we are built
wget -q -O /dev/null --no-check-certificate <%= foreman_url %>
exit 0

rhel_osp_sub_man (snippet)

# add subscription manager
yum -t -y -e 0 install subscription-manager
rpm -ivh <%= subscription_manager_configuration_url %>

echo "Registering the System"
subscription-manager register --org="<%= @host.params['kt_org']%>" --name="<%= @host.name %>" --activationkey="<%= @host.params['kt_activation_keys']%>"

% if @host.content_source %
  subscription-manager config --rhsm.baseurl=https://<%= @host.content_source.hostname %>/pulp/repos
% end %

% if @host.operatingsystem.name == "RedHat" %
  # add the rhel rpms to install katello agent
  subscription-manager repos --enable=rhel-*-rh-common-rpms
% end %

echo "Installing Katello Agent"
yum -t -y -e 0 install katello-agent
chkconfig goferd on

echo "Installing RHEL OSP Installer"
yum -t -y -e 0 install rhel-osp-installer

Appendix G: Troubleshooting
G.1 Time Synchronization

For the reference environment it is critical to synchronize all systems to a central time server. Example /etc/ntpd.conf:

# For more information about this file, see the man pages

driftfile /var/lib/ntp/drift
# Permit time synchronization with our time source, but do not
# permit the source to query or modify the service on this system.
restrict default nomodify notrap nopeer noquery

# Permit all access over the loopback interface. This could
# be tightened as well, but to do so would effect some of
# the administrative functions.
restrict 127.0.0.1
restrict ::1

# Hosts on local network are less restricted.
#restrict 192.168.1.0 mask 255.255.255.0 nomodify notrap

# Use public servers from the pool.ntp.org project.
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
#server 0.rhel.pool.ntp.org iburst
#server 1.rhel.pool.ntp.org iburst
#server 2.rhel.pool.ntp.org iburst
#server 3.rhel.pool.ntp.org iburst
server 10.16.255.2

#broadcast 192.168.1.255 autokey   # broadcast server
#broadcastclient    # broadcast client
#broadcast 224.0.1.1 autokey       # multicast server
#multicastclient 224.0.1.1          # multicast client
#manycastserver 239.255.254.254     # manycast server
#manycastclient 239.255.254.254 autokey # manycast client

# Enable public key cryptography.
#crypto

includefile /etc/ntp/crypto/pw

# Key file containing the keys and key identifiers used when operating
# with symmetric key cryptography.
keys /etc/ntp/keys

# Specify the key identifiers which are trusted.
#trustedkey 4 8 42

# Specify the key identifier to use with the ntpdc utility.
#requestkey 8

# Specify the key identifier to use with the ntpq utility.
#controlkey 8

# Enable writing of statistics records.
#statistics clockstats cryptostats loopstats peerstats

# Disable the monitoring facility to prevent amplification attacks using
# ntpdc
# monlist command when default restrict does not include the noquery flag.
# See
#CVE-2013-5211 for more details.
# Note: Monitoring will not be disabled with the limited restriction flag.
disable monitor
**Note:** All RHEL 7 based systems are converted to utilize the Network Time Protocol daemon.

### G.2 Log files

*CloudForms*

<table>
<thead>
<tr>
<th>File</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>evm.log</td>
<td>Main CFME log file. Very verbose and all events are written to this file.</td>
</tr>
<tr>
<td>automate.log</td>
<td>Automate events are logged to this file.</td>
</tr>
<tr>
<td>audit.log</td>
<td>Security related events are logged to this file.</td>
</tr>
<tr>
<td>miqconsole.log</td>
<td>CFME appliance events are logged to this file. Ex. power off or on.</td>
</tr>
<tr>
<td>miq_ntpdate.log</td>
<td>Time synchronization events are logged to this file.</td>
</tr>
<tr>
<td>policy.log</td>
<td>Policy related events are logged to this file.</td>
</tr>
<tr>
<td>prince.log</td>
<td>Events related to report conversions are logged to this file.</td>
</tr>
<tr>
<td>production.log</td>
<td>Rails and application events are logged to this file.</td>
</tr>
<tr>
<td>rhevm.log</td>
<td>RHEV related events are logged in this file.</td>
</tr>
<tr>
<td>top_output.log</td>
<td>Periodic top output is logged to this file.</td>
</tr>
<tr>
<td>vim.log</td>
<td>VMware related events are logged in this file.</td>
</tr>
<tr>
<td>vmdb_restart.log</td>
<td>Events related to restarting the VMDB database are logged in this file.</td>
</tr>
<tr>
<td>vmstat_output.log</td>
<td>Periodic virtual memory statistics are logged to this file.</td>
</tr>
</tbody>
</table>

*Table G.2-1: CloudForms Log Files*

**Satellite 6**

https://access.redhat.com/solutions/1155573

**RHEL OSP**

/\var\log/<service_name> (nova, glance, heat, cinder, etc.)

**OpenShift Enterprise**


**RHEV**

https://access.redhat.com/solutions/17587

**IdM**
