

Dell Proof of Concept Deployment Guide

1. Configure Foreman Server

If the provisioning interface on the provisioned host is not the first interface returned in the puppet data, Foreman will overwrite the configuration in the database. This can cause issues later.

To prevent Foreman from changing the IP and MAC information to reflect the puppet data, change the **ignore_puppet_facts_for_provisioning** setting.

- Log into the Foreman user interface.
- Move the mouse over the **Administer** drop down menu on the right side of the interface.
- Select **Settings** from the menu.
- Select the **Provisioning** tab.
- Select Value for the **ignore_puppet_facts_for_provisioning** setting.
 - Change this setting to **true**.

1.1. Hammer Command Preparation

During the steps in this document, the **hammer** command is used to more easily perform the configurations. Usage of the **hammer** command requires identifiers for the various pieces of information stored within the Foreman server. This includes identifiers for the defined installation media, partitions, templates, hosts, as well as other items.

A checklist file, *dell-poc-checklist.pdf*, is available to easily keep track of this information.

Download and print the Dell POC Checklist from

<https://wiki.opencrowbar.org/pages/viewpage.action?pageId=6326050>.

Write the various information gathered and needed on the checklist for reference as needed.

Several steps in this document use files to configure the environment. These files are available in a TAR file called *dell-poc-deploy.tgz*. This TAR file is available from

<https://wiki.opencrowbar.org/pages/viewpage.action?pageId=6326050>.

Download the tar file and unzip it into the */root/poc* directory..

```
# cd /root  
  
# tar xzvf /PATH/TO/FILE/dell-poc-deploy.tgz
```

1.2. Version Locking

All RPMs on the Foreman VM, OpenStack Controller node, and OpenStack Compute nodes are locked to specific versions. This is to ensure that the software on these nodes is the

same software that has been tested and validated by Dell. To allow updating RPMs on these nodes, see Appendix A.

Execute the following command to make the version locking files available during node provisioning:

```
# cp -r /root/dell-poc-deploy/vlock_files /usr/share/foreman/public
```

1.3. The Hammer Command

- Install the packages that contain the **hammer** command.

```
# yum -y install "*hammer*"
```

This should install the following packages:

- **rubygem-hammer_cli-doc-0.1.1-12.el6sat.noarch**
- **rubygem-hammer_cli-0.1.1-12.el6sat.noarch**
- **rubygem-hammer_cli_foreman-0.1.1-16.el6sat.noarch**
- **rubygem-hammer_cli_foreman-doc-0.1.1-16.el6sat.noarch**
- Configure the **hammer** command to display *200* items per page. This just makes it easier to read everything.
 - Replace the value for the **:per_page:** option in the */etc/hammer/cli_config.yml* file.
- Configure the **hammer** command to not prompt for a username/password when connecting.
 - Add the following to the beginning of the */etc/hammer/cli_config.yml* file. Replace the name and password appropriately.

```
:foreman:  
:username: 'admin'  
:password: 'changeme'
```

1.4. Hammer help

The hammer command takes the **--help** option. This option can be used with most of its sub-commands as well. It is useful to see the various options that can be used.

1.5. Configure the Installation Medium

Configure the installation medium that will be used to provision the hosts.

Use the **hammer medium create** command to add the entry.

The command requires the **--name**, **--os-family** and **--path** options.

The **name** option should specify a name that is appropriate for the installation.

The **os-family** should remain Redhat in most cases.

The **path** option specifies the path or URL to the installation tree.

1.5.1. Satellite Server

The path included in the example below should work with most satellite installation, just replace **SATELLITE_SERVER** with the appropriate FQDN.

```
# hammer medium create --name "Dell OSP Pilot" --os-family Redhat \  
  --path 'http://SATELLITE_SERVER/ks/dist/ks-rhel-$arch-server-$major-  
$version'
```

1.5.2. Local ISO on Foreman Node

- **mkdir /usr/share/foreman/public/iso**
- Copy the RHEL7 iso to the */root* directory of the foreman node
- Edit */etc/fstab*
- Add the following line to the end:

```
/root/RHEL-7.0-Server-x86_64-dvd.iso /usr/share/foreman/public/iso  
iso9660 loop,ro 0 0
```

- **mount -a**

```
hammer medium create --name "Dell OSP Pilot" --os-family Redhat \  
  --path 'http://FOREMAN_SERVER/iso'
```

1.5.3. Local ISO on Solution Admin Host

- On the Solution Admin Host:
 - **yum install httpd**
 - Configure **httpd** with any options you want. Defaults will work, but are not secure.
 - copy the ISO to the SAH in */store/data/iso*
 - **"mount -o loop ISO NAME /mnt"**
 - **"mkdir /store/data/iso/RHEL6.5"** (Name of the OS)
 - **"rsync -av /mnt/ /store/data/iso/RHEL6.5"**
 - **"umount /mnt"**
 - **"ln -s /store/data/iso/RHEL6.5 RHEL6.5"**
- Validate the web interface works

<http://ipaddress of foreman/RHEL6.5/README>

1.6. Note the Medium ID

After the medium is created, execute the **hammer medium list** command.

Take note of the ID (first column) for the newly created medium. This will be needed later.

1.7. Configure the Partition Tables

Configure the partition tables that the provisioned hosts will use. These partition tables are provided in two files.

dell-poc-controller.partition	Partition table for the POC controller nodes.
dell-poc-compute.partition	Partition table for the POC compute nodes.

Use the **hammer partition-table create** command to install the partition tables. Specify an appropriate **NAME** for each partition table and specify the file that contains the data. Install only the needed partition tables.

```
# hammer partition-table create --name dell-poc-controller --os-family  
Redhat \  
  --file /root/poc/dell-poc-controller.partition  
  
# hammer partition-table create --name dell-poc-compute --os-family Redhat \  
  --file /root/poc/dell-poc-compute.partition
```

After the partition tables are created, execute the **hammer partition-table list** command.

Take note of the ID's of the newly created partition tables.

1.8. Configure the Operating Systems

A operating system definition for **Red Hat Enterprise Linux 6.5** was created when the Foreman server registered with itself. But a definition for **Red Hat Enterprise Linux 7.0** was not.

Create a new operating system definition for **Red Hat Enterprise Linux 7.0**.

Use the **hammer os create** command to create the definition.

```
# hammer os create --name "RedHat" --major 7 --minor 0 --family Redhat
```

After creating the operating system, execute the **hammer os list** command.

Take note of the ID's for the new **RedHat 6.5** and **RedHat 7.0** operating systems.

Associate the **x86_64** architecture with the **RedHat 6.5** and **RedHat 7.0** operating systems.

Execute the **hammer os add-architecture** command for each operating systems ID.

```
# hammer os add-architecture --architecture x86_64 --id RHEL6.5_OS_ID
# hammer os add-architecture --architecture x86_64 --id RHEL7.0_OS_ID
```

The appropriate partition tables need associated with the operating systems.

Use the **hammer os add-ptable** command to associate the appropriate partition tables to the operating system Id.

This command must be executed four times, once for each combination of partition table and the **RedHat 6.5** and **RedHat 7.0** operating system IDs.

```
# hammer os add-ptable --ptable-id P_ID --id OS_ID
```

1.9. Configure Subnets

A subnet called OpenStack was created automatically during installation. Execute **hammer subnet list** and note the ID of this subnet.

```
# hammer subnet list
```

IP addresses can be automatically assigned to newly provisioned hosts from this subnet. To do this, a range of IPs to assign must be defined.

Use the **hammer subnet update** command to assign the range of IP addresses and to also set the default gateway for the provisioned hosts.

If the foreman server is acting as the gateway, the gateway address is the IP address of the Foreman servers provisioning interface.

```
# hammer subnet update --id SN_ID --from START_IP_RANGE --to END_IP_RANGE \
--gateway GATEWAY_IP
```

1.10. [Configure Templates](#)

Four template files are provided and used to provision hosts.

dell-osp-ks.template	Provisioning template that provides the kickstart file.
dell-osp-pxe.template	PXE template that contains the PXE configuration..
interface_config.template	Snippet that provides a means to configure extra interfaces during installation. This template is called from the kickstart template.
bonding_snippet.template	Snippet that provides a means to bond interfaces during installation. This template is called from the kickstart template.

Create the templates using the **hammer template create** command.

```
# hammer template create --name "Dell OpenStack Kickstart Template" --type provision \
  --operatingsystem-ids "OS_ID_RH6.5, OS_ID_RH7.0" --file /root/poc/dell-osp-ks.template

# hammer template create --name "Dell OpenStack PXE Template" --type PXELinux \
  --operatingsystem-ids "OS_ID_RH6.5, OS_ID_RH7.0" --file /root/poc/dell-osp-pxe.template

# hammer template create --name "bond_interfaces" --type snippet \
  --file /root/poc/bonding_snippet.template

# hammer template create --name "interface_config" --type snippet \
  --file /root/poc/interface_config.template
```

After the templates are created, use the **hammer template list** command to determine the IDs of the templates.

The provisioning and PXE templates must be associated with the operating systems. Use the **hammer os update** command to update the template associations.

Execute the following command for each of the **RedHat 6.5** and **RedHat 7.0** IDs. This command also associates the installation medium to the operating system.

```
# hammer os update --config-template-ids "KS_ID, PXE_ID" \
  --medium-ids MEDIUM_ID --id OS_ID
```

The templates are now associated with the operating systems, they must now be set as the default templates for the operating systems.

Execute the **hammer os set-default** template command for each template and operating system combination. The command should be executed four times in total.

```
# hammer os set-default-template --config-template-id TMPLT_ID --id OS_ID
```

The **hammer os info** command can be used to check the configuration of the operating systems.

```
# hammer os info --id 1

Id: 1
Full name: RedHat 6.5
Release name:
Family: Redhat
Name: RedHat
Major version: 6
Minor version: 5
Partition tables:

Default templates:
  Dell OpenStack Kickstart Template (provision)
  Dell OpenStack PXE Template (PXELinux)
Architectures:

Installation media:
  Red Hat Satellite
Templates:
  Dell OpenStack Kickstart Template (provision)
  Dell OpenStack PXE Template (PXELinux)
Parameters:
```


1.11. [Gather More Information](#)

A few more IDs are required in order to install a host. Execute the following commands and take note of the appropriate IDs.

- Environments

```
# hammer environment list
```

- Domains

```
# hammer domain list
```

- Puppet Proxy

```
# hammer proxy list
```

- Architectures

```
# hammer architecture list
```

1.12. [Configure facts updates](#)

Foreman updates the host information using the Puppet facts. Foreman updates the provisioning information with the first interface returned from the Puppet facts. To prevent this, perform the following steps.

- Log into the Foreman UI.
- Select the **Administer** drop down on the top right of the window.
- Select **Settings**. Select the **Provisioning** tab.
- Edit the `ignore_puppet_facts_for_provisioning` setting and set it to *true*.

2. Provisioning the Nodes

Provision the nodes using the following command. Variables are being used to make it easier to use the `hammer` command.

Simply set the **NAME**, **PTABLE**, and **MAC** variables appropriately for a host, then execute the `hammer host create` command. Once the host is created, reset the variables for the next host and execute the same `hammer` command again.

Repeat this until all hosts are created. Make sure to change the root password on the command line as needed.

NAME	The host name of the provisioned host.
PTABLE	The ID of the partition table that should be used when deploying this host. This ID is the same for all the compute nodes, but the controller uses a different partition table ID.
MAC	The hardware address of the provisioning interface for the node.

Change the remaining IDs in the command as appropriate.

```
# NAME=CHANGEME

# PTABLE=CHANGEME

# MAC=CHANGEME

# hammer host create --name "${NAME}" --root-password 'CHANGEME' \
  --build true --enabled true --managed true --environment-id 2 \
  --domain-id 1 --puppet-proxy-id 1 --operatingsystem-id 2 \
  --subnet-id 1 --architecture-id 1 --medium-id 9 \
  --partition-table-id ${PTABLE} \
  --mac ${MAC}
```

2.1. Get host information

The IDs of the newly defined hosts are needed to finish their configuration.

Execute the `hammer host list` command to get the host IDs. Take note of these IDs.

```
# hammer host list
```

2.2. Configure Operating System Updates.

Configure the Operating system definition with the parameters for registering the provisioned host for updates.

The **hammer os set-parameter** command is used to set the parameters.

The following parameters are set.

subscription_manager	Specifies that the hosts will register with Subscription Manager. (true or false)
subscription_manager_username	The user name of the Subscription Manager account to register to.
subscription_manager_password	The password for the Subscription Manager account.
subscription_manager_pool	The ID of the pool to attach the host to.
subscription_manager_repos	The repositories that should be enabled after the host is registered.

2.2.1. Determine Pool ID

To determine the pool id, you must have an existing server that is registered to the RedHat Hosted Services. This server must also be registered using the same credentials as the ones being used in this environment.

Once the server is correctly registered, execute the **subscription-manager list --all --available** command to see the available subscription pools.

The command will output a list of available pools. Each section of information lists what the subscription provides, its pool ID, how many are available, the type of system it is for, as well as other information.

Determine the correct pool ID needed for this environment and take note of it. Place close attention to the **System Type**. The **System Type** can be *Virtual* or *Physical*. You cannot use a pool marked as *Virtual* for a physical server.

```
# subscription-manager list --all --available
```

[OUTPUT ABBREVIATED]

```
Subscription Name: Red Hat Cloud Infrastructure, Standard (8-sockets)
Provides:          Red Hat Beta
                  Red Hat OpenStack Beta
                  JBoss Enterprise Application Platform
                  Red Hat Software Collections (for RHEL Server)
                  Red Hat Enterprise Virtualization
                  Oracle Java (for RHEL Server)
                  Red Hat OpenStack
                  Red Hat Enterprise MRG Messaging
                  Red Hat Enterprise Linux Server
                  Red Hat Enterprise Linux High Availability (for RHEL
Server)
                  Red Hat Software Collections Beta (for RHEL Server)
                  Red Hat Enterprise Linux Load Balancer (for RHEL Server)
                  Red Hat CloudForms
SKU:               MCT2861
Pool ID:           aaaa111bbb222ccc333ddd444eee5556
Available:         7
Suggested:         1
Service Level:     Standard
Service Type:      L1-L3
Multi-Entitlement: No
Ends:              09/23/2015
System Type:       Physical
```

[OUTPUT ABBREVIATED]

These steps should be performed for both the **RedHat 6.5** and **RedHat 7.0** operating systems. Define the **os_ID** variable to the ID of the operating system then execute the remaining commands.

Change the **os_ID** to the other ID and repeat the commands again.

Make sure to specify the appropriate **username**, **password**, and **pool ID** by replacing the **CHANGEME**'s and **POOL_ID**.

```
# OS_ID=2

# hammer os set-parameter --operatingsystem-id ${OS_ID} --name
subscription_manager --value true

# hammer os set-parameter --operatingsystem-id ${OS_ID} --name
subscription_manager_username --value CHANGEME

# hammer os set-parameter --operatingsystem-id ${OS_ID} --name
subscription_manager_password --value 'CHANGEME'

# hammer os set-parameter --operatingsystem-id ${OS_ID} --name
subscription_manager_pool --value POOL_ID

# hammer os set-parameter --operatingsystem-id ${OS_ID} --name
subscription_manager_repos \
    --value "rhel-server-rhsc1-7-rpms, rhel-7-server-rpms, rhel-7-server-
openstack-5.0-rpms"
```

2.2.2. Optional Proxy Settings

Proxy settings for the **subscription-manager** and **yum** commands can be set by defining the needed parameters. These parameters are completely optional if not needed.

Although defining and using the following parameters will work for most environments, they may not work for all. Setting the parameters gives the provisioning template the information to set the proxy information using the **subscription-manager config** command.

If these setting do not work in your environment, the kickstart file may need to be manually modified. This can be done using the Foreman user interface..

The following parameters can be set using the **hammer os set-parameter** command as above.

subscription_manager_proxy	The proxy server to use, if needed.
subscription_manager_proxy_port	The proxy port to use, if needed.
subscription_manager_proxy_user	The proxy username, if needed.
subscription_manager_proxy_password	The proxy password, if needed.

2.3. Controller Node

Set **nics** parameter on the controller host. This provides the kickstart file the needed information to configure the two non-provisioned (Public API, Private API) interfaces.

The value for the parameter consists of a space separated list of nic configuration bash associative array. The entire value is enclosed within single tick-marks and parentheses. (...)

Each key/value is in the following format: [IFACE]="parameters"

An example of defining two interfaces: `hammer host set-parameter --host-id 3 --name nics \ --value ([em1]="onboot static aa:bb:cc:dd:ee:ff 192.168.0.110/255.255.255.0" [em2]="onboot static 11:22:33:44:55:66 192.169.10.110/255.255.255.0")`

The parameters consist of the following:

onboot	The interface is enabled when the system boots. Default is disabled.
dhcp static none	The interface gets its network configuration using DHCP, the network configuration is statically configured, or the interface has no network configuration. If no option is specified, dhcp is assumed.
xx:xx:xx:xx:xx:xx	The hardware address of the interface.
x.x.x.x/y.y.y	The IP address and Network mask of the interface. Used only when static is specified. Must be in the format presented.

Execute the following command to set the nic parameters for the two other interfaces used by the controller node. Replace the **HOST_ID**, **IFACE**, **MAC**, and **IP/MASK** parameters as appropriate.

```
# hammer host set-parameter --host-id HOST_ID --name nics \
  --value '([IFACE]="onboot static MAC IP/MASK" [IFACE]="onboot static MAC
  IP/MASK") '
```

Execute the following command to make the RPM version locking file available during provisioning. Replace **HOST_ID** with the host ID and **FOREMAN_SERVER** with the IP address of the Foreman server on the provisioning network.

```
# hammer host set-parameter --host-id HOST_ID --name yum_versionlock_file \
  --value 'http://FOREMAN_SERVER/vlock_files/controller.vlock'
```

2.4. Compute Nodes

The **nics** parameter must be set to configure the three remaining (Nova Public, Nova Private, Private API) interfaces used on the compute nodes.

Execute the following hammer command on each compute node. Note that the third interface specified is the IFACE_NOVA_PRIVATE interface. This interface has no network configuration, but should be enabled upon boot.

```
# hammer host set-parameter --host-id HOST_ID --name nics \  
  --value '([IFACE]="onboot static MAC IP/MASK" [IFACE]="onboot static MAC  
IP/MASK"  
[IFACE_NOVA_PRIVATE]="onboot none MAC") '
```

Execute the following command to make the RPM version locking file available during provisioning. Replace *HOST_ID* with the host ID and *FOREMAN_SERVER* with the IP address of the Foreman server on the provisioning network.

```
# hammer host set-parameter --host-id HOST_ID --name yum_versionlock_file \  
  --value 'http://FOREMAN_SERVER/vlock_files/compute.vlock'
```

2.5. [Start Provisioning](#)

PXE boot each of the nodes. After they are booted, make sure the networks are configured appropriately.

3. Assigning Hostgroups

3.1. Configure Hostgroup Parameters

The default values for the host group parameters are specified in the *dell-poc.yaml.erb* file. This file consists of a couple of sections. The top section contains parameters that are most commonly changed. Under normal situations, the parameters in the remaining sections should not be changed.

Below are listed the parameters that should be changed for each environment. The remaining parameters are noted within the file.

passwd_auto	The password to use in most places.
controller_admin_host	The IP address of the controller nodes interface that has administrative network traffic.
controller_priv_host	The IP address of the controller nodes interface connected to the Private API network.
controller_pub_host	The IP address of the controller nodes interface connected to the Public API network.
nova_public_net	Network address and mask for the Nova Public Network
nova_public_iface	Compute nodes interface that is connected to the Nova Public Network
nova_private_net	Network address and mask for the Nova Private Network
nova_private_iface	Compute nodes interface that is connected to the Nova Private Network
private_api_net	Network address and mask for the Private API Network
private_api_iface	Compute nodes interface that is connected to the Private API Network

Table 3.1.1:

Caution should be taken when changing parameters since the parameter type is determined when it is defined in the *dell-poc.yaml.erb* file.

When changing values, ensure the new value is in the same syntax as the previous one. Whether a parameter is enclosed in quotes, square brackets, or spans multiple lines determines the type of parameter.

Edit the *dell-poc.yaml.erb* file and make the appropriate changes.

3.2. Apply hostgroup parameters

The `rubygem-foreman_api` package must be installed to apply the changes in the `dell-poc.yaml.erb` file.

```
# yum install -y rubygem-foreman_api
```

Change to the `/usr/share/openstack-foreman-installer` directory and execute the `bin/quickstack_defaults.rb` command as shown below.

```
# cd /usr/share/openstack-foreman-installer

# bin/quickstack_defaults.rb -g config/hostgroups.yaml -d ~/dell-
poc.yaml.erb -v parameters
```

The `network_overrides` parameter cannot easily be set using the `dell-poc.yaml.erb` file. It is set using the `hammer sc-param update` command.

First, the parameter ID must be determined, then the settings applied. Replace `VLAN` with the starting VLAN number to be used in the environment. Make sure the syntax of the line does not change.

```
# ParamId=$( hammer sc-param list --per-page 1000 --search
network_overrides \
  | awk '/network_overrides/ {print $1}')

# hammer sc-param update --id ${ParamId} \
  --default-value '{"vlan_start": VLAN, "force_dhcp_release": "false"}'
--override yes
```

4. Configure Nodes

After the nodes are installed, they must have a host group assigned to them.

The IDs of the host groups must be determined. Execute the **hammer hostgroup list** command. Take note of the IDs for the Controller (Nova Network) and Compute (Nova Network) host groups.

```
# hammer hostgroup list
```

4.1. Add Controller hostgroup

Apply the Controller (Nova Network) host group to the controller node using the **hammer host update** command.

```
# hammer host update --hostgroup-id HOSTGROUP_ID --id HOST_ID
```

Once the host group is applied, log into the controller node and execute the following command to pull the host group configuration.

```
# puppet agent -t -dv |& tee /root/puppet.out
```

This command pipes a copy of the output to the */root/puppet.out* file for later review. Watch the output or review the */root/puppet.out* file for errors.

4.2. Add Compute hostgroup

Add the host groups to the hosts one at a time. Make sure to run **puppet agent -t -dv | & tee /root/puppet.out** between each.

Do not add the next host in the list until the previous one is finished. Failure to do so can lead to a race condition that prevents proper installation and configuration of the compute nodes.

```
# hammer host update --hostgroup-id HOSTGROUP_ID --id HOST_ID
```

Wait for each compute node to finish its configuration before starting the next one.

5. Appendix A - Updating RPMs on Version Locked Nodes

At a high level, updating RPMs on a version locked node (Foreman VM, Ceph ICE VM, OpenStack Controller nodes, OpenStack Compute nodes, or Ceph Storage nodes) is to identify the RPMs that need to be updated, remove them from the version lock list on that node, update the RPMs, and then add the updated RPMs back into the version lock list. Detailed instructions for accomplishing this follow.

Note: All of the following commands should be run as the root user.

To produce a list of RPMs that are version locked on a node, login to the node and execute the following command:

```
# yum versionlock list
```

Next, identify the RPMs to be updated from the output of the above command.

Remove the selected RPMs from the version lock list by executing the following command for each RPM, substituting VLockListEntry with an entry from the output of the versionlock list command above containing the RPM name:

```
# yum versionlock delete "VLockListEntry"
```

Note: The VLockListEntry must match an entry in the output of the “yum versionlock list” command exactly.

Update each of the selected RPMs by executing the following command for each RPM, substituting RPMName with the name of the RPM without the version number:

```
yum update RPMName
```

Finally, add each of the selected RPMs back into the version lock list by executing the following command again substituting RPMName with the name of the RPM without the version number:

```
yum versionlock add RPMName
```