# openstack-xenserver Documentation Release latest

Sep 27, 2017

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Contents:

1. Overview

The OpenStack foundation has an excellent setup guide for their October 2015 release, "Liberty", which can be found at http://docs.openstack.org/liberty/install-guide-rdo/. However, this guide only deals with the use of the "KVM" hypervisor, and does not cover the use of "XenServer" hypervisor.

There are many circumstances in which it may be desirable to build an OpenStack Liberty XenServer environment. However, in my efforts to do so, I have found the available online documentation regarding using XenServer with OpenStack to be inadequate, outdated or just plain incorrect. Specifically, during this project I experienced issues with:

- XenServer networking configuration
- Nova and Neutron configurations for XenServer networking
- · iSCSI authentication issues with Cinder volumes
- · Cinder volume mapping errors with XenServer instances
- · Cinder quota errors
- ISO image support for XenServer
- Horizon bug affecting XenServer images
- Image metadata for dual hypervisor-type environments
- · Neutron requirements for dual-hypervisor-type environments
- Neutron bug affecting the use of OpenvSwitch (Required for XenServer)
- VNC console connectivity

This guide is heavily based on the OpenStack foundation's guide. It does not go into the same level of detail, but does highlight the differences when using XenServer instead of KVM. Their guide should be considered the superior one, and the "master" guide, and I recommend reading their guide if you have no familiarity with OpenStack at all.

Some elements of this guide are also based on the following blog post: https://www.citrix.com/blogs/2015/11/30/ integrating-xenserver-rdo-and-neutron/

On each page, I have highlighted in **bold** any steps which differ from the original guide. These are typically XenServer-specific changes.

This guide is for a simple setup with "flat" networking. There are no provisions for private "virtual" networks, or any firewall functionality. The guide also does not yet cover "swift" object storage, although this shouldn't differ from the OpenStack foundation's guide. A future version of the guide may add these functions.

Later pages in this guide deal with adding a KVM hypervisor to the environment. These pages include changes which I found to be necessary in order to support a dual hypervisor-type environment (i.e the use of XenServer and KVM in the same OpenStack).

Finally, there are pages regarding the creation of CentOS 7 images for both hypervisors. These pages highlight some differences in the image-creation process for both hypervisors, including the package and partitioning requirements to support automatic disk resizing and injection of SSH keys for the root user.

Two networks are required, a "public" network (which instances will be connected to for their day-to-day traffic), and a "management" network, which our OpenStack servers will use for their connectivity. Any servers with connections to both will have eth0 connected to the "public" network, and eth1 connected to the "management" network.

Any IP addresses in the guide should, of course, be replaced with your own. You will also need to pre-generate the following variables which will be referred to throughout the guide:

Variable	Meaning
	Root reserverd for MuSOI
*MISQL_ROOI*	Root password for MySQL.
*KEYSTONE_DBPASS*	Password for the keystone MySQL database.
*ADMIN_TOKEN*	A temporary token for initial connection to keystone.
*RABBIT_PASS*	Password for the openstack rabbitmq user.
*GLANCE_DBPASS*	Password for the glance MySQL database.
*GLANCE_PASS*	Password for the glance identity user.
*NOVA_DBPASS*	Password for the nova MySQL database.
*NOVA_PASS*	Password for the nova identity user.
*NEUTRON_DBPASS*	Password for the neutron MySQL database.
*NEUTRON_PASS*	Password for the neutron identity user.
*NEUTRON_METADATA_SECRET*	Random secret string for the metadata service.
*CINDER_DBPASS*	Password for the cinder MySQL database.
*CINDER_PASS*	Password for the cinder identity user.
*XENSERVER_ROOT*	Root password for XenServer.
*XENSERVER_IP*	IP address of XenServer.
*CONTROLLER_ADDRESS*	A DNS address for the controller server.
*ADMIN_PASS*	Password for the admin identity user.
*DEMO_PASS*	Password for the demo identity user.
*XAPI_BRIDGE*	The name of the ovs bridge to be used by instances.
*SERVER_IP*	The IP of the server you are currently working on.
*VM_IP*	The IP of the "compute" VM for that hypervisor.
*HOST_NAME*	The hostname of the physical hypervisor (e.g. XenServer).

• The \*ADMIN\_TOKEN\* can be created by running:

# openssl rand -hex 10

- For \*XENSERVER\_ROOT\*, do not use a password you're not comfortable placing in plaintext in the nova configuration.
- For \*CONTROLLER\_ADDRESS\*, ensure that this is an address which you can reach from your workstation.
- For \*XAPI\_BRIDGE\*, this won't be determined until later in the build process. You should write it down for later use once it is defined.
- Any instance of "\*HOST\_NAME\*" refers to the hostname of the **physical hypervisor host**. For example, this would be "compute1.openstack.lab.mycompany.com", and not "compute1-vm.openstack.lab.mycompany.com".

One final note: I do disable SELINUX in this guide, for simplicity. This is a personal choice, but I know that some people do choose to run SELINUX on their systems. The guide does include the installation of SELINUX support for openstack, so you should be able to set this back to "ENFORCING", even after performing the installation with this set to "PERMISSIVE". I have not tested this.

## Changelog

#### Mar 17 2016:

• Add patch for neutron bug to the "install neutron on compute VM" page.

#### Mar 16 2016:

- Add nova and neutron configuration fixes for whole-host migration.
- Replace unnecesary XenServer reboot with Toolstack restart.

#### Mar 15 2016:

- Add cinder configuration fix to allow volume migration.
- Correct screenshot ordering on XenServer host installation page.
- Add screenshot for primary disk selection to XenServer host installation page.

#### Mar 9 2016:

• Add note regarding case-sensitive udev rules file.

#### Mar 4 2016:

• Add fix to prevent installation of kernels from Xen repository on Storage node.

#### Feb 19 2016:

- Add fix to Horizon config for Identity v3.
- Fix changelog order.

#### Feb 17 2016:

- Add steps to enable auto power-on of the "compute" VM on the XenServer host.
- Add required steps to enable migration and live migration of instances between XenServer hosts.

#### Feb 12 2016:

- Create changelog.
- Various clarifications.
- Extended identity's token expiration time.
- Correct syntax for neutron ovs configuration on controller.
- Correct syntax when populating neutron database.
- · Add note regarding large storage requirements for cinder image-to-volume conversion.

## **About the Author**

My name is Alex Oughton, and I work with OpenStack clouds, as well as dedicated hosting solutions. My work doesn't involve the actual deployment of OpenStack, and so this guide was developed during a self-learning exercise. If you have any feedback regarding this guide, including any suggestions or fixes, please do contact me on Twitter: http://twitter.com/alexoughton.

You can also directly contribute to this guide through its github: https://github.com/alexoughton/rtd-openstack-xenserver.

### 2. Build Controller Host

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/environment-networking-controller.html http://docs.openstack.org/liberty/install-guide-rdo/environment-ntp-controller.html http://docs.openstack.org/liberty/install-guide-rdo/environment-packages.html

- 1. In this guide, I am using a Virtual Machine running on a VMWare hypervisor as my control node. If you are doing the same, you must ensure that the vSwitches on the hypervisor have "promiscuous mode" enabled.
- 2. Boot the control node with the CentOS 7.2.1511 DVD.
- 3. Set your time zone and language.
- 4. For "Software Selection", set this to "Infrastructure Server".
- 5. Keep automatic partitioning. Allow to install only on first disk.
- 6. Set the controller's IPv4 address and hostname. Disable IPv6. Give the connection the name "eth1".

Editing eth1						
Connection name:	eth1					
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6	Settings
Method: Manua	al					•
Addresses						
Address		Netmask		Gateway		Add
172.16.0.192		255.255.255.0		172.16.0.1		Delete
		<b>k</b>				Delete
DNS servers:	8.8.8					
Search domains						
DHCP client ID:						
Require IPv4 addressing for this connection to complete			e			
						Routes
Cance			Cancel	Save		

		Editing	geth1		
Connection name:	ethl				
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings
Method: Ignor	e				•
Addresses					
Address		Prefix	Ga	teway	Add
					Delete
DNS servers:					
Search domain	s:				
IPv6 privacy ext	ensions: Disal	oled			•
🗌 Require IPv6	6 addressing for t	his connection to complet	e		5a
2					Routes
					Cancel Save

NETWORK & HOST NAME		CENTOS 7 INSTALLATION
Ethernet (em 1) Broadcom Corporation NetXtreme II BCM5709 Gigabit Ethernet Ethernet (em 2) Broadcom Corporation NetXtreme II BCM5709 Gigabit Ethernet	Ethernet (em2) Connected Hardware Address 14:FE:B5:CA:C5:A2 Speed 1000 Mb/s IP Address 172.16.0.192 Subnet Mask 255.255.255.0 Default Route 172.16.0.1 DNS 8.8.8.8	ON
+ - Host name: controller.openstack.lab.eco.rackspace.com	•	Configure

- 7. Click on "Begin Installation".
- 8. Set a good root password.
- 9. Once installation is complete, reboot the server, and remove the DVD/ISO from the server.
- 10. SSH in to server as root.
- 11. Stop and disable the firewalld service:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

#### 12. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
SELINUX=permissive
```

#### 13. Update all packages on the server:

# yum update

14. If running the control node on VMWare, install the VM tools:

```
# yum install open-vm-tools
```

15. We need persistent network interface names, so we'll configure udev to give us these. Replace 00:00:00:00:00:00:00 with the MAC addresses of your control node:

- Note: This file is case-sensitive, and the MAC addresses should be lower-case.
- 16. Rename the network interface configuration files to eth0 and eth1. Replace eno00000001 and eno00000002 with the names of your control node's interfaces:

```
# cd /etc/sysconfig/network-scripts
# mv ifcfg-eno00000001 ifcfg-eth0
# mv ifcfg-eno00000002 ifcfg-eth1
```

17. Modify the interface configuration files, replacing any instances of eno00000001 and eno00000002 (or whatever your interface names are) with eth0 and eth1 respectively:

```
# vim ifcfg-eth0
NAME=eth0
DEVICE=eth0
# vim ifcfg-eth1
NAME=eth1
DEVICE=eth1
```

18. Reboot the control node:

```
# systemctl reboot
```

- 19. SSH back in as root after the reboot.
- 20. Check that if config now shows eth0 and eth1:

```
# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
ether 00:0c:29:d9:36:46 txqueuelen 1000 (Ethernet)
RX packets 172313 bytes 34438137 (32.8 MiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 7298 bytes 1552292 (1.4 MiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 172.16.0.192 netmask 255.255.255.0 broadcast 172.16.0.255
inet6 fe80::20c:29ff:fed9:3650 prefixlen 64 scopeid 0x20<link>
ether 00:0c:29:d9:36:50 txqueuelen 1000 (Ethernet)
RX packets 1487929 bytes 210511596 (200.7 MiB)
RX errors 0 dropped 11 overruns 0 frame 0
TX packets 781276 bytes 4320203416 (4.0 GiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 0 (Local Loopback)
    RX packets 2462286 bytes 3417529317 (3.1 GiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2462286 bytes 3417529317 (3.1 GiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

21. Update the system hosts file with entries for all nodes:

```
# vim /etc/hosts
```

```
172.16.0.192 controller controller.openstack.lab.eco.rackspace.com
172.16.0.203 computel computel.openstack.lab.eco.rackspace.com
172.16.0.204 computel-vm computel-vm.openstack.lab.eco.rackspace.com
172.16.0.195 compute2 compute2.openstack.lab.eco.rackspace.com
172.16.0.196 block1 block1.openstack.lab.eco.rackspace.com
172.16.0.197 object1 object1.openstack.lab.eco.rackspace.com
172.16.0.198 object2 object2.openstack.lab.eco.rackspace.com
```

22. Update the "Chrony" (NTP Server) configuration to allow connections from our other nodes:

```
# vim /etc/chrony.conf
```

Allow 172.16.0.0/24

23. Restart the Chrony service:

```
# systemctl restart chronyd.service
```

24. Enable the OpenStack-Liberty yum repository:

# yum install centos-release-openstack-liberty

#### 25. Install the OpenStack client and SELINUX support:

```
# yum install python-openstackclient openstack-selinux
```

### 3. Install core services on controller

This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/environment-sql-database.html http://docs.openstack.org/liberty/install-guide-rdo/environment-nosql-database.html http://docs.openstack.org/liberty/install-guide-rdo/environment-messaging.html

1. Install MariaDB:

# yum install mariadb mariadb-server MySQL-python

2. Set some needed MariaDB configuration parameters:

```
# vim /etc/my.cnf
bind-address = 172.16.0.192
default-storage-engine = innodb
innodb_file_per_table
collation-server = utf8_general_ci
init-connect = 'SET NAMES utf8'
character-set-server = utf8
```

3. Enable and start the MariaDB service:

```
# systemctl enable mariadb.service
# systemctl start mariadb.service
```

4. Initialize MariaDB security. Say 'yes' to all prompts, and set a good root password:

# mysql\_secure\_installation

5. Set up the MySQL client configuration. Replace \*MYSQL\_ROOT\* with your own:

```
# vim /root/.my.cnf
```

[client] user=root password=\*MYSQL\_ROOT\*

6. Confirm that you are able to connect to MySQL:

# mysql
> quit

#### 7. Install RabbitMQ:

# yum install rabbitmq-server

#### 8. Enable and start the RabbitMQ service:

```
# systemctl enable rabbitmq-server.service
# systemctl start rabbitmq-server.service
```

#### 9. Create the "openstack" RabbitMQ user:

```
# rabbitmqctl add_user openstack *RABBIT_PASS*
# rabbitmqctl set_permissions openstack ".*" ".*"
```

## 4. Install Identity (keystone) on controller

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/keystone-install.html http://docs.openstack.org/liberty/install-guide-rdo/keystone-services.html http://docs.openstack.org/liberty/install-guide-rdo/keystone-verify.html http://docs.openstack.org/liberty/install-guide-rdo/keystone-openrc.html

1. Open the MySQL client and create the "keystone" database. Replace \*KEYSTONE\_DBPASS\* with your own:

```
# mysql
> create database keystone;
> grant all privileges on keystone.* to 'keystone'@'localhost' identified by
+ '*KEYSTONE_DBPASS*';
> grant all privileges on keystone.* to 'keystone'@'%' identified by '*KEYSTONE_
+ DBPASS*';
> quit
```

#### 2. Install the keystone packages:

```
# yum install openstack-keystone httpd mod_wsgi memcached python-memcached
```

#### 3. Enable and start the memcached service:

```
# systemctl enable memcached.service
# systemctl start memcached.service
```

4. Configure keystone. Replace \*ADMIN\_TOKEN\* and \*KEYSTONE\_DBPASS\* with your own:

```
# vim /etc/keystone/keystone.conf
[DEFAULT]
admin_token = *ADMIN_TOKEN*
```

```
[database]
connection = mysql://keystone:*KEYSTONE_DBPASS*@controller/keystone
[memcache]
servers = localhost:11211
[token]
provider = uuid
driver = memcache
expiration = 86400
[revoke]
driver = sql
```

- Note: I have extended token expiration to 24-hours, due to issues I experienced with large images timing-out during the saving process. You may wish to use a shorter expiration, depending on your security requirements.
- 5. Populate the keystone database:

# su -s /bin/sh -c "keystone-manage db\_sync" keystone

6. Set the Apache server name:

```
# vim /etc/httpd/conf/httpd.conf
ServerName controller
```

7. Configure wsgi:

```
# vim /etc/httpd/conf.d/wsgi-keystone.conf
 Listen 5000
 Listen 35357
 <VirtualHost *:5000>
     WSGIDaemonProcess keystone-public processes=5 threads=1 user=keystone_
WSGIProcessGroup keystone-public
     WSGIScriptAlias / /usr/bin/keystone-wsgi-public
     WSGIApplicationGroup %{GLOBAL}
     WSGIPassAuthorization On
     <IfVersion >= 2.4>
       ErrorLogFormat "%{cu}t %M"
     </IfVersion>
     ErrorLog /var/log/httpd/keystone-error.log
     CustomLog /var/log/httpd/keystone-access.log combined
     <Directory /usr/bin>
         <IfVersion >= 2.4>
             Require all granted
         </IfVersion>
         <IfVersion < 2.4>
             Order allow, deny
             Allow from all
         </IfVersion>
     </Directory>
 </VirtualHost>
```

```
<VirtualHost *:35357>
     WSGIDaemonProcess keystone-admin processes=5 threads=1 user=keystone.
→group=keystone display-name=%{GROUP}
     WSGIProcessGroup keystone-admin
     WSGIScriptAlias / /usr/bin/keystone-wsgi-admin
     WSGIApplicationGroup %{GLOBAL}
     WSGIPassAuthorization On
     <IfVersion >= 2.4>
       ErrorLogFormat "%{cu}t %M"
     </IfVersion>
     ErrorLog /var/log/httpd/keystone-error.log
     CustomLog /var/log/httpd/keystone-access.log combined
     <Directory /usr/bin>
         <IfVersion >= 2.4>
             Require all granted
         </IfVersion>
         <IfVersion < 2.4>
             Order allow, deny
             Allow from all
         </IfVersion>
     </Directory>
 </VirtualHost>
```

8. Enable and start the Apache service:

# systemctl enable httpd.service
# systemctl start httpd.service

9. Set up temportary connection parameters. Replace \*ADMIN\_TOKEN\* with your own:

```
# export OS_TOKEN=*ADMIN_TOKEN*
# export OS_URL=http://controller:35357/v3
# export OS_IDENTITY_API_VERSION=3
```

10. Create keystone service and endpoints:

#### 11. Create the "admin" project, user and role. Provide your \*ADMIN\_PASS\* twice when prompted:

```
# openstack project create --domain default --description "Admin Project" admin
# openstack user create --domain default --password-prompt admin
# openstack role create admin
# openstack role add --project admin --user admin admin
```

#### 12. Create the "service" project:

```
# openstack project create --domain default --description "Service Project"_
→service
```

13. Create the "demo" project, user and role. Provide your \*DEMO\_PASS\* twice when prompted:

```
# openstack project create --domain default --description "Demo Project" demo
# openstack user create --domain default --password-prompt demo
# openstack role create user
# openstack role add --project demo --user demo user
```

14. Disable authentication with the admin token:

# vim /usr/share/keystone/keystone-dist-paste.ini

- Remove admin\_token\_auth from [pipeline:public\_api], [pipeline:admin\_api] and [pipeline:api\_v3]
- 15. Disable the temporary connection parameters:

# unset OS\_TOKEN OS\_URL

16. Test authentication for the "admin" user. Provide \*ADMIN\_PASS\* when prompted:

• If this is working, various values will be returned (yours will be different):

```
+----+
| Field | Value |
+----+
| expires | 2016-02-05T22:55:18.580385Z |
| id | 9bd8b09e4fdd43cealf32ca6d62c946b |
| project_id | 76f8c8fd7b1e407d97c4604eb2a408b3 |
| user_id | 31766cbe74d541088c6ba2fd24654034 |
+----+
```

17. Test authentication for the "demo" user. Provide \*DEMO\_PASSwhen prompted:

- Again, if this is working, various values will be returned.
- 18. Create permanent client authentication file for the "admin" user. Replace \*ADMIN\_PASS\* with your own:

```
# vim /root/admin-openrc.sh
export OS_PROJECT_DOMAIN_ID=default
export OS_USER_DOMAIN_ID=default
export OS_PROJECT_NAME=admin
export OS_TENANT_NAME=admin
export OS_USERNAME=admin
export OS_PASSWORD=*ADMIN_PASS*
export OS_AUTH_URL=http://controller:35357/v3
export OS_IDENTITY_API_VERSION=3
```

19. Create permanent client authentication file for the "demo" user. Replace \*DEMO\_PASS\* with your own:

```
# vim /root/demo-openrc.sh
export OS_PROJECT_DOMAIN_ID=default
export OS_USER_DOMAIN_ID=default
export OS_PROJECT_NAME=demo
export OS_TENANT_NAME=demo
export OS_USERNAME=demo
export OS_PASSWORD=*DEMO_PASS*
export OS_AUTH_URL=http://controller:5000/v3
export OS_IDENTITY_API_VERSION=3
```

#### 20. Test authentication with the permanent settings:

```
# source admin-openrc.sh
# openstack token issue
```

• Once more, if this works, various values will be returned.

## 5. Install Images (glance) on controller

This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/glance-install.html

http://docs.openstack.org/liberty/install-guide-rdo/glance-verify.html

#### Step 9 has specific changes for the use of XenServer.

1. Open the MySQL client and create the "glance" database. Replace \*GLANCE\_DBPASS\* with your own:

```
# mysql
> create database glance;
> grant all privileges on glance.* to 'glance'@'localhost' identified by
$\dots''*GLANCE_DBPASS*';
> grant all privileges on glance.* to 'glance'@'%' identified by '*GLANCE_
$\dotsDBPASS*';
> guit
```

2. Create the "glance" user, role, service and endpoints. Provide \*GLANCE\_PASS\* when prompted:

#### 3. Install glance packages:

# yum install openstack-glance python-glance python-glanceclient

4. Configure glance-api. Replace \*GLANCE\_DBPASS\* and \*GLANCE\_PASS\* with your own:

```
# vim /etc/glance/glance-api.conf
 [database]
 connection = mysql://glance:*GLANCE_DBPASS*@controller/glance
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = glance
 password = *GLANCE_PASS*
 [paste_deploy]
 flavor = keystone
 [glance_store]
 default_store = file
 filesystem_store_datadir = /var/lib/glance/images/
 [DEFAULT]
 notification_driver = noop
```

5. Configure glance-registry. Replace \*GLANCE\_DBPASS\* and \*GLANCE\_PASS\* with your own:

```
# vim /etc/glance/glance-registry.conf
 [database]
 connection = mysql://glance:*GLANCE_DBPASS*@controller/glance
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = glance
 password = *GLANCE_PASS*
 [paste_deploy]
 flavor=keystone
 [DEFAULT]
 notification_driver = noop
```

6. Populate the glance database:

# su -s /bin/sh -c "glance-manage db\_sync" glance

• Note: "No handlers could be found for logger" warnings are normal, and can be ignored.

7. Enable and start the glance service:

```
# systemctl enable openstack-glance-api.service openstack-glance-registry.service
# systemctl start openstack-glance-api.service openstack-glance-registry.service
```

8. Add glance API version settings to the client authentication files:

# echo "export OS\_IMAGE\_API\_VERSION=2" | tee -a admin-openrc.sh demo-openrc.sh

9. Upload a sample image to the glance service:

10. Confirm that the image has been uploaded:

```
# glance image-list
+-----+
| ID | Name |
+-----+
| 1e710e0c-0fb6-4425-b196-4b66bfac495e | cirros-xen |
+-----++
```

### 6. Install Compute (nova) on controller

This page is based on the following OpenStack Installation Guide page:

http://docs.openstack.org/liberty/install-guide-rdo/nova-controller-install.html

1. Open the MySQL client and create the "nova" database. Replace \*NOVA\_DBPASS\* with your own:

```
# mysql
> create database nova;
> grant all privileges on nova.* to 'nova'@'localhost' identified by '*NOVA_
DBPASS*';
> grant all privileges on nova.* to 'nova'@'%' identified by '*NOVA_DBPASS*';
> quit
```

2. Create the "nova" user, role, service and endpoints. Provide \*NOVA\_PASS\* when prompted:

3. Install nova packages:

4. Configure nova. Replace \*NOVA\_DBPASS\*, \*NOVA\_PASS\*, \*SERVER\_IP\* and \*RABIT\_PASS\* with your own:

```
# vim /etc/nova/nova.conf
 [database]
 connection = mysql://nova:*NOVA_DBPASS*@controller/nova
 [DEFAULT]
 rpc_backend = rabbit
 auth_strategy = keystone
 my_ip = *SERVER_IP*
 network_api_class = nova.network.neutronv2.api.API
 security_group_api = neutron
 linuxnet_interface_driver = nova.network.linux_net.
→NeutronLinuxBridgeInterfaceDriver
 firewall_driver = nova.virt.firewall.NoopFirewallDriver
 enabled_apis = osapi_compute,metadata
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = nova
 password = *NOVA_PASS*
 [vnc]
 vncserver_listen = $my_ip
 vncserver_proxyclient_address = $my_ip
 [glance]
 host = controller
 [oslo_concurrency]
 lock_path = /var/lib/nova/tmp
```

5. Populate the nova database:

```
# su -s /bin/sh -c "nova-manage db sync" nova
```

6. Enable and start the nova service:

## 7. Build XenServer Host

This page is not based on the OpenStack Installation Guide.

- 1. In this guide I am using a server with a small RAID-1 for the OS, and a large RAID-10 for the VMs.
- 2. Boot with XenServer 6.5 DVD.
- 3. Set keyboard, agree to terms, etc.
- 4. Set the installation destination to sda.

Welcome t Copyright	to XenServer - Version 6.5.0 (#90233c) t (c) 2014 Citrix Systems, Inc.
	Select Primary Disk
	Please select the disk you would like to install XenServer on (disks with insufficient space are not shown).
	You may need to change your system settings to boot from this disk.
	sda - 136 GB [DELL PERC H700] sdb - 1862 GB [DELL PERC H700]
	Ok Back
<tab>/</tab>	<pre><alt-tab> between elements   <f5> more info   <f1> Help screen</f1></f5></alt-tab></pre>

5. Set VM storage to only sdb, and enable thin provisioning:



- 6. Select local media as the installation source.
- 7. Do not install any supplemental packs.
- 8. Skip verification of the installation media.
- 9. Set a good \*XENSERVER\_ROOT\* password. Use a password which you don't mind being plain-text readable to anyone who has root access to this system.
- 10. Set the management network interface to use eth1 and configure the IPv4 addresses:

Welcome to XenServer - Version 6.5.0 (#90233c) Copyright (c) 2014 Citrix Systems, Inc.						
Networking Please specify how networking should be configured for the management interface on this host. () Automatic configuration (DHCP) (*) Static configuration: IP Address: 172.16.0.203 Subnet mask: 255.255.0 Gateway: 172.16.0.1 Dk Back						
<tab>/<alt-tab> between elements                                      </alt-tab></tab>	lelp screen					

Welcome to XenServer - Version 6.5.0 (#90233c) Copyright (c) 2014 Citrix Systems, Inc.							
	Hostna	ame and DNS Configuration					
	Hostname:	ostname Configuration <mark>enstack.lab.eco.racksp</mark> a	ace.com_				
	DNS Server 1 DNS Server 2 DNS Server 3	DNS Configuration : 8.8.8.8 : :					
	Ok	Back					
<tab>/<alt-ta< th=""><td>b&gt; between eler</td><td>ments I</td><td>¦ ⟨F1⟩ Help screen</td></alt-ta<></tab>	b> between eler	ments I	¦ ⟨F1⟩ Help screen				

- 11. Set an appropriate timezone.
- 12. Configure the server to use NTP, and set the server address as the controller's IP:

Welcome to XenServer - Version 6.5.0 (#90233c) Copyright (c) 2014 Citrix Systems, Inc.
NTP Configuration
Please specify details of the NTP servers you wish to use (e.g. pool.ntp.org)?
NTP Server 1:         172.16.0.192           NTP Server 2:
Ok
<tab>/<alt-tab> between elements     <f1> Help screen</f1></alt-tab></tab>

- 13. Start the installation.
- 14. Reboot the server to start XenServer. The first boot will take a very long time. It will appear to hang a couple of times, but wait for it to reach the user interface.
- 15. On a Windows workstation, go to http://xenserver.org/open-source-virtualization-download.html
- 16. Download XenCenter Windows Management Console, and install it.

- 17. Download XenServer 6.5 SP1 (under Service Packs), and keep it safe in a directory.
- 18. Download all of the public hotfixes for XenServer 6.5 SP1, and also keep them safe in a directory.
- 19. Launch XenCenter, and click add new server:

8						
File	View	Pool	Server	VM	Storage	Tem
G B	ack - (	Forw	vard 👻 🛛	- <mark></mark>	dd New Se	rver
Search.					Q 😣	XenC

20. Enter the address and credentials of the XenServer:

8	Add New Server	?	x						
Enter the hos and your use	Enter the host name or IP address of the server you want to add and your user login credentials for that server.								
Server:	compute1.openstack.lab.eco.rackspace.com		~						
-User login ci	redentials		_						
User name:	root								
Password:	Password:								
	Add	Can	cel						

21. Enable the option to remember the connection, and click OK.

22. Open up the SP1 zip file you downloaded, and double-click the XenServer Update File inside:



23. This will open the Install Update wizard. Click Next:

8	Install Update	<b>–</b> 🗆 X	
Choose an existing update to install or upload a new one			
Before You Start Select Update	Select the update that you want to apply from the list of updates that have already been upload more managed servers, or click Add to upload a new update.	ed to one or	
Select Servers	Update   Description	Status	
Upload	XS65ESP1.xsupdate C:\Users\alexoughton\AppData\Local\Temp\3\Temp1_XS65ESP1.zip\XS	Not	
Prechecks			
Update Mode			
Install Update			
CITRIX.	Add		
	< Previous Next >	Cancel	

24. Select our one server, and click next:

8	Install Update	_ 🗆 X
Select the servers you wish to update		
Before You Start Select Update	Select one or more servers from the list of available servers. Servers where the selected update cannot be applied appear disabled in this list.	
Select Servers	Name	Version
Upload	Compute1.openstack.lab.eco.rackspace.com	6.5
Prechecks		
Update Mode		
Install Update		
<b>citrịx</b> .	Select All Clear All	
	< Previous Next >	Cancel

25. XenCenter will upload the update to the server. Click next when done:
| 8  | Install Update  |
|--|---|
| 🙀 Uploading selected fi                              | ile to your servers   |
| Before You Start<br>Select Update<br>Select Servers  | XenCenter is now uploading your update to the servers specified in the previous step.<br>Please wait for this operation to complete, then click Next to continue with the installation. |
| Upload<br>Prechecks<br>Update Mode<br>Install Update |   |
| <b>CİTRIX</b> .                                      | Uploading to server 'compute1.openstack.lab.eco.rackspace.com' Previous   < Previous Next >   |

26. XenCenter will run some checks. Click next when done:

8	Install Update	<b>– – ×</b>
Perform update prech	ecks on selected servers	0
Before You Start Select Update Select Servers	Update prechecks are performed to verify that the update "XS65ESP1" can be applied to the serve	rs.
Upload	Checking host liveness status OK	
Prechecks	Checking HA and WLB status OK	
Update Mode Install Update	Checking VM migration status OK Checking storage connections status OK Checking server side status	
<b>CITRIX</b>	✓ Hide successful prechecks     Check Again     R	esolve All
	< Previous Next >	Cancel

26. Select "Allow XenCenter to carry out the post-update tasks", and then click on "Install Update":

8	Install Update – 🗖 🗙
Select the update mode	
Before You Start Select Update Select Servers Upload Prechecks <b>Update Mode</b> Install Update	After the update has been installed, a number of post-update tasks such as rebooting the servers will be required before the updated servers are fully functional again. These tasks can be carried out automatically, or you can choose to perform them yourself. What would you like to do? <ul> <li>Allow XenCenter to carry out the post-update tasks as soon as the update has been applied.</li> <li>I will carry out the post-update tasks myself. If you are intending to apply further updates immediately after this one, choose this option and carry out the post-update tasks once at the end.</li> </ul> <li>Tasks to be performed:</li>
<b>CİTRĮX</b> .	Restart these servers in this order (master always first): compute1.openstack.lab.eco.rackspace.com (Master)
	< Previous Install update Cancel

27. XenCenter will perform the installation, and reboot the server. This will take a while to complete. Click Finish when done:

8	Install Update	- 🗆 X
🙀 Install the update		0
Before You Start Select Update Select Servers	Installing updates:	
Upload Prechecks	Installing update XS65ESP1 to compute1.openstack.lab.eco.rackspace.com	^
Update Mode		
Install Update		×
<b>CİTRİX</b> .		
	< Previous Finish	Cancel

28. Repeat steps 22-27 for all of the hotfixes you downloaded. Except in step 26, select "I will carry out the postupdate checks myself" for ALL of the hotfixes:

8	Install Update – 🗆 🗙
Select the update mod	de 🕜
Before You Start Select Update Select Servers Upload Prechecks Update Mode Install Update	After the update has been installed, a number of post-update tasks such as rebooting the servers will be required before the updated servers are fully functional again. These tasks can be carried out automatically, or you can choose to perform them yourself. What would you like to do? Allow XenCenter to carry out the post-update tasks as soon as the update has been applied. I will carry out the post-update tasks myself. If you are intending to apply further updates immediately after this one, choose this option and carry out the post-update tasks once at the end. Tasks to be performed: Restart these servers in this order (master always first): compute1.openstack.lab.eco.rackspace.com (Master)
<b>CITRIX</b>	Save tasks to file
	< Previous Install update Cancel

29. Reboot the XenServer by right-clicking it in XenCenter, and clicking on "Reboot":

8		
File View Pool Server	٧N	M Storage Templates Tools H
🕒 Back 🔹 💮 Forward 🔹 🛛	ę	🖡 Add New Server 🕕 🏪 New Pool
Search		🔍 🗟 compute1.openstack.
🖃 🎧 XenCenter		General Memory Storage
compute1.openstack.	lah er #51	New VM
DVD drives	<u> </u>	ert
Local storage		New SR
Kemovable storag		Import
		Add to Pool 🔸
		Enter Maintenance Mode
		Reboot
	۷	Shut Down
		Restart Toolstack
		Disconnect
		Reconnect As
	-0	Properties
		Log destination:

- 30. Once the server is back online, right-click it and select "New SR..."
- 31. Create an ISO library somewhere where you will have read/write access. In my case I am using a Windows share, but you can use NFS:

Ne	w Storage Repository - compute1.o	penstack.lab.eco.rackspace.com	_ 🗆 X
Choose the type of ne	w storage		0
Type Name Location	Virtual disk storage NFS VHD Software iSCSI Hardware HBA ISO library Windows File Sharing (CIFS) NFS ISO	Windows File Sharing (CIFS) Select this option if you have a library of VM inst images available as a Windows (CIFS) share that attach to your host or pool.	allation ISO you wish to
		< Previous Next >	Cancel
S Ne	w Storage Repository - compute1.op	penstack.lab.eco.rackspace.com	x
Type	CIFS storage Provide the name of the share where your setting the server options.	SR is located. You can optionally specify alternative	credentials by
Location	Share Name: \\windows.lab.eco.racks Example: \\server\share	pace.com\ISOs v Iame	
	✓       Use different user name         User name:       alexoughton         Password:       ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●		
CITRIX'			
		< Previous Finish	Cancel

- 32. SSH to the XenServer as root.
- 33. Create the OpenStack Integration Bridge network:

# xe network-create name-label=openstack-int-network

34. Obtain the bridge name of the new network. Write this down as \*XAPI\_BRIDGE\*, as this will be needed later:

```
# xe network-list name-label=openstack-int-network params=bridge
```

bridge (RO) : xapi0

35. Find the UUID of the ISO library created earlier:

```
# xe sr-list
 uuid (RO)
                           : ef0adc0a-3b56-5e9d-4824-0821f4be7ed4
           name-label ( RW): Removable storage
     name-description ( RW):
                 host ( RO): compute1.openstack.lab.eco.rackspace.com
                  type ( RO): udev
         content-type ( RO): disk
 uuid (RO)
                           : 6658e157-a534-a450-c4db-2ca6dd6296cf
           name-label ( RW): Local storage
     name-description ( RW):
                 host ( R0): compute1.openstack.lab.eco.rackspace.com
                 type ( RO): ext
         content-type ( RO): user
 uuid (RO)
                           : f04950c1-ee7b-2ccb-e3e2-127a5bffc5a6
           name-label ( RW): CIFS ISO library
     name-description ( RW): CIFS ISO Library [/\windows.lab.eco.rackspace.
→com\ISOs]
                 host (RO): compute1.openstack.lab.eco.rackspace.com
                 type (RO): iso
         content-type ( RO): iso
 uuid (RO)
                            : 7a549ca7-d1af-cf72-fd7e-2f48448354e8
           name-label ( RW): DVD drives
     name-description ( RW): Physical DVD drives
                 host (RO): compute1.openstack.lab.eco.rackspace.com
                 type ( RO): udev
         content-type ( RO): iso
 uuid (RO)
                           : 9a4f8404-7745-b582-484f-108917bf1488
           name-label ( RW): XenServer Tools
     name-description ( RW): XenServer Tools ISOs
                 host ( R0): compute1.openstack.lab.eco.rackspace.com
                  type ( RO): iso
         content-type ( RO): iso
```

• In my example, the UUID is f04950c1-ee7b-2ccb-e3e2-127a5bffc5a6.

36. Set a parameter on the ISO library. Replace \*UUID\* with the UUID found above:

# xe sr-param-set uuid=\*UUID\* other-config:i18n-key=local-storage-iso

37. Update the system hosts file with entries for all nodes:

```
# vi /etc/hosts
172.16.0.192 controller controller.openstack.lab.eco.rackspace.com
172.16.0.203 compute1 compute1.openstack.lab.eco.rackspace.com
172.16.0.204 compute1-vm compute1-vm.openstack.lab.eco.rackspace.com
172.16.0.195 compute2 compute2.openstack.lab.eco.rackspace.com
172.16.0.196 block1 block1.openstack.lab.eco.rackspace.com
172.16.0.197 object1 object1.openstack.lab.eco.rackspace.com
172.16.0.198 object2 object2.openstack.lab.eco.rackspace.com
```

38. Relax XSM SR checks. Needed for migration of instances with Cinder volumes:

```
# vi /etc/xapi.conf
```

```
relax-xsm-sr-check = true
```

39. Symlink a directory of the SR to /images. Needed for instance migration:

```
# LOCAL_SR=$(xe sr-list name-label="Local storage" --minimal)
# IMG_DIR="/var/run/sr-mount/$LOCAL_SR/images"
# mkdir -p "$IMG_DIR"
# ln -s "$IMG_DIR" /images
```

40. Set up SSH key authentication for the root user. Needed for instance migration. Press ENTER to give default response to all prompts:

# ssh-keygen

```
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
```

- Note: If you are building an additional XenServer host, you will instead copy the contents of /root/.ssh from your first XenServer host to your additional hosts.
- 41. Restart the XenServer Toolstack:

```
# xe-toolstack-restart
```

# CHAPTER 8

# 8. Build XenServer Compute VM

## This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/environment-networking-compute.html http://docs.openstack.org/liberty/install-guide-rdo/environment-ntp-other.html http://docs.openstack.org/liberty/install-guide-rdo/environment-packages.html

There are many additional steps here specific to XenServer.

1. In XenCenter, create a new VM:

	8									XenCe	entei	r	
	File	View	Pool	Server	VM St	orage	Templates	Tools	Help				
	С в	ack 🕶 (	Forw	vard 👻 🛛	🔁 Add	New Ser	ver   🚏 I	New Pool	🛅 New S	Storage	1	New VM	
	Search.				Q		compute1.	openstad	k.lab.eco.	rackspa	ce.co	om	
	د ش ¤	(enCente	er outel on	enstack la	h eco racki	Gene	eral Memor	y Storag	e Network	ing NIC	s	GPU	C
CIFS ISO library		Se	rver Gener	al Prope	erties								
DVD drives													

2. Select the CentOS 7 template:

8	New VM			_ 🗆 X
5 Select a VM template				0
Template	Search		Q	
Name	Name	Category	<u>^</u>	
Installation Media	🐼 CentOS 6 (32-bit)	CentOS		
Home Server	🕸 CentOS 6 (64-bit)	CentOS		
CPU & Memory	😵 CentOS 7	CentOS		
Storage	CoreOS	CoreOS	=	
Networking	🙋 Debian Squeeze 6.0 (32-bit)	Debian	=	
Finish	🙋 Debian Squeeze 6.0 (64-bit)	Debian		
	Oebian Wheezy 7.0 (32-bit)	Debian		
	🙋 Debian Wheezy 7.0 (64-bit)	Debian		
	🚱 Oracle Enterprise Linux 5 (32-bit)	Oracle		
	🚱 Oracle Enterprise Linux 5 (64-bit)	Oracle		
	🚱 Oracle Enterprise Linux 6 (32-bit)	Oracle		
	🚱 Oracle Enterprise Linux 6 (64-bit)	Oracle		
	Martin 7		×	
<b>CITRIX</b>	Copy host BIOS strings to VM			
			< Previous	Next > Cancel

3. Name the VM "compute":

8	New VM	X
Dame the new vir	al machine	?
Template Name Installation Media Home Server CPU & Memory GPU Storage Networking Finish	Enter a name that will help you to identify the virtual machine later. This could be a name that describes its software and hardware such as RHEL DHCP Server, Win2K3 XenApp Server or Exchange 2007 Client Access Server. This name will also be displayed in XenCenter's Resources pane and can be changed later. You can also add a more detailed description of the VM, if you wish. Name: compute Description:	
<b>CITRIX</b>		
	< Previous Next > Cance	:

4. Choose the CentOS 7 ISO (which you should have previously uploaded to the ISO library):

8	New VM
<b>D</b> Locate the operating	system installation media
Template Name	Select the installation method for the operating system software you want to install on the new VM.
Installation Media	Install from ISO library or DVD drive:
Home Server	CentOS-7-x86_64-NetInstall-1511.iso Vew ISO library
CPU & Memory GPU	O Boot from network
Storage	
Networking	
Finish	
CITRIX.	
	< Previous Next > Cancel

5. Place the VM on the only server available:

0	New VM
Select a home server	3
Template Name Installation Media Home Server CPU & Memory GPU Storage Networking Finish	When you nominate a home server for a virtual machine, the virtual machine will always be started up on that server if it is available. If this is not possible, then an alternate server within the same pool will be selected automatically.  O Don't assign this VM a home server. The VM will be started on any server with the necessary resources. (Shared storage required).  Place the VM on this server:  compute1.openstack.lab.eco.rackspace.com 125328 MB available (131059 MB total)
	< Previous Next > Cancel

6. Give it one CPU and 2GB:

8	New VM	_ 🗆 🗙
Dillocate processor and	d memory resources	3
Template Name Installation Media Home Server CPU & Memory GPU Storage Networking Finish	Specify the number of virtual CPUs, their topology and the amount of memory that wit to the new virtual machine.          Number of vCPUs:       1         Topology:       1 socket with 1 core per socket         Memory:       2048	ill be initially allocated
	< Previous N	lext > Cancel

7. Change the disk to 20GB by clicking on properties:

8	New VM	_ 🗆 X
🚺 Configure	storage for the new VM	?
Template Name Installation Media Home Server CPU & Memory GPU Storage	The virtual machine template you selected earlier provides the virtual disks listed below. You conserve the properties of these virtual disks, and add more disks if required. Alternatively, you can select the second option below to create a diskless VM that can be booten network and does not use any virtual disks. When you have finished configuring disks for the new virtual machine, click Next to continue to step.	an change the ed from the to the next
Networking	Location Size Shared	Add
Finish	Local storage on compute1.openstack.lab.eco.rackspace.com 10 GB False	Delete Properties
	Use storage-level fast disk clone	
	O Create a diskless VM that boots from the network	
<b>CITRIX</b>		
	< Previous Next >	Cancel
8	Edit Disk ?	×
Enter a name of any VM th	, description and size for your virtual disk. The size of your disk and the home server se e disk belongs to will affect which storage locations are available.	etting
Name:	compute 0	
Description:	Created by template provisioner	
Size:	20.000 🗘 GB 🗸	
Size:	20.000 GB V	f 1832 -
Size: Location:	20.000 GB V Solution GB V Local storage on compute1.openstack.lab.eco.rackspace.com 1832.58 GB free of	f 1832.7
Size: Location:	20.000	f 1832.7

8. Give the VM connections to your management and public networks:

8	New VM
Difigure network	ing on the new VM 🕜
Template Name Installation Media Home Server CPU & Memory GPU Storage <b>Networking</b> Finish	The virtual machine template you have selected provides the virtual network interfaces listed below. You can configure or delete the default virtual network interfaces here, and add more if required.         Virtual network interfaces on compute         MAC       Network         Add         Add         Oelete         You can configure and MAC>         Network         Add         Oelete         Properties
<b>CITRIX</b>	
	< Previous Next > Cancel

9. Complete the wizard, which will start the VM.

10. Go to the "compute" VM's console, which should be displaying the CentOS installer's boot screen:

8	XenCenter	_ 🗆 X
File View Pool Server VM Sto	rage Templates Tools Help	
🕒 Back 👻 💮 Forward 👻 🛛 📑 Add N	ew Server   🏪 New Pool 🛅 New Storage 🛅 New VM   🍈 Shut Down 🛞 Reboot 🕕 Suspend 🔞 For	ce Shut Down 💂
Search Q	Compute on 'compute1.openstack.lab.eco.rackspace.com'	Local root account
ArnCenter      Compute1 openstack lab eco rackri	General Memory Storage Networking Console Performance Snapshots Search	
	DVD Drive 1: CentOS-7-x86_64-NetInstall-1511.iso	✓ Eject
CIFS ISO library		
Local storage		
Kemovable storage		
	CentOS 7	
	Install CentOS 7 Test this media & install CentOS 7	
	Troubleshooting >	
	Press Tab for full configuration options on menu items.	
Objects		
Organization Views		
Saved Searches		
A Notifications		
	Send Ctrl+Alt+Del (Ctrl+Alt+Insert)	screen (Ctrl+Enter)

11. Highlight "Install CentOS 7", and press Enter:

			Stopping dracut initqueue hook
			Stopping Open-iSCSI
[	DK	]	Stopped udev Coldplug all Devices.
			Stopping udev Coldplug all Devices
0	DK	]	Stopped dracut pre-trigger hook.
			Stowing dracut pre-trigger book
r	nк	1	Stomed udeu Kernel Deuice Manager.
r	אח	í	Stopped door in its bories indiagon.
		-	Stoppin Generation Multinath Device Controller
r	עח	п	Stopping Device-mapper narripath Device Controller
L		1	Stopping descut are used hours.
r		п	Stopping draut pre-unco note
L	лv	1	Stupped aradul challes hours
		-	Stopping aracut cmaine nook
L	JK	1	Stopped Create Static Device Nodes in Zdev.
-			Stopping Create Static Device Nodes in /dev
L	JK	1	Stopped Create list of required static device nodes for the current kernel.
			Stopping Create list of required static device nodes for the current kernel
L	JK	1	Closed udev Kernel Socket.
L	JK	]	Closed udev Control Socket.
			Starting Cleanup udevd DB
[	DK	]	Stopped Device-Mapper Multipath Device Controller.
[	DK	]	Started Plymouth switch root service.
[	DK	]	Started Cleanup udevd DB.
I	DK	]	Reached target Switch Root.
			Starting Switch Root
₩el	come	e 1	co CentOS Linux 7 (Core)!
E	DK	]	Stopped Switch Root.
[	DK	]	Listening on LVM2 poll daemon socket.
E	DK	]	Listening on LVM2 metadata daemon socket.
			Mounting Temporary Directory
			Starting Create list of required static device nodes for the current kernel
E	DK	]	Listening on udev Kernel Socket.
			Mounting Debug File System
I	DK	]	Stopped target Switch Root.
[	DK	]	Stopped target Initrd File Sustems.
			Starting Device-Mapper Multipath Device Controller
E	DK	1	Reached target Paths.
r	пĸ	1	Created slice llser and Session Slice.
Г	пк	1	Sinhued Taruer Tul Craft LeSoStems
-			Starting Deuice-Manner Multinath Deuice Controller
Г	אח	1	Reached farget Paths
Г	אח	1	Treated slice liken and Session Slice
r	אח	1	Cieta in the back and bassion Sinte.
r r	ער	1	Enseted slice sustem-approval/2debell slice
r	ער	1	Gradua stree system anaconal Azasiett.stile.
L	JK	1	nearrea target Swap.
			NUMERING FUELA DESSAUE ADEDE FILE SUSTEM

12. If the console appears to "hang", with only a cursor showing (and no other activity), then quit XenCenter, relaunch it, and go back to the console. This should show the graphical installer is now running:



- 13. Set language and timezone.
- 14. Click on "Network & Hostname". Click on the "eth1" interface, and click on "configure".
- 15. Set the IPv4 address as appropriate:

Editing eth1								
Connection name:	eth1							
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings			
Method: Manua	al				•			
Addresses								
Address		Netmask		Gateway	Add			
172.16.0.192	172.16.0.192			172.16.0.1	Delete			
					Delete			
DNS servers:	8.8.8							
Search domains	s:							
DHCP client ID:								
Require IPv4	addressing for t	his connection to complet	e					
					Routes			
*					Cancel Save			

### 16. Disable IPv6, and click on "save":

		Editing	eth1		
Connection name:	eth1				
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings
Method: Ignore					•
Addresses					
Address		Prefix	Gat	teway	Add
					Delete
DNS servers:					
Search domains					
IPv6 privacy exte	ensions: Disabl	ed			•
🗌 Require IPv6	addressing for th	is connection to complet	e		
					Routes
					Cancel Save

17. Set an appropriate hostname, and then enable the "eth1" interface by setting the switch to "on":

NETWORK & HOST NAME		CENTOS 7 INSTALLATION I us Help!
Ethernet (eth0)	Ethernet (eth1) Connected Hardware Address AA:0A:B5:B7:75:64	ON
	Speed IP Address 172.16.0.192 Subnet Mask 255.255.255.0 Default Route 172.16.0.1 DNS 8.8.8.8	
+ - Host name: :ompute1-vm.openstack.lab.eco.rackspace.com		Configure

- 18. If using the NetInstall image, click on "Installation source". Set the source to network, and then define a knowngood mirror. You can use http://mirror.rackspace.com/CentOS/7.2.1511/os/x86\_64/.
- 19. Click on "Installation Destination". Select "I will configure partitioning" and click on "Done":

INSTALLATION DESTINATION	CENTOS 7 INSTALLATION
Device Selection	
Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Beg	in Installation" button.
Local Standard Disks	
20 GiB	
xvda / 20 GiB free	
Disks left u	nselected here will not be touched.
Specialized & Network Disks	
Add a disk	
Disks left u	nselected here will not be touched.
Other Storage Options	
Partitioning	
Autorratically configure partitioning. I will configure partitioning.	
I would like to make additional space available.	
Encryption Encrypt my data. You'll set a passphrase next.	
Full disk summary and boot loader 1 disk set	ected; 20 GiB capacity; 20 GiB free

20. Under "New mount points will use the following partition scheme", select "Standard Partition".

21. Click on the + button. Set the mount point to / and click "Add mount point":

MANUAL PARTITIONING		CENTOS 7 INSTALLATION
		🖽 us Help!
<ul> <li>New CentOS 7 Installation         You haven't created any mount points for your CentOS 7 installation yet. You can:         <ul> <li><u>Click here to create them automatically.</u></li> <li>Create new mount points by clicking the '+' button.</li> </ul> </li> <li>New mount points will use the following partitioning scheme:</li> </ul>		
Standard Partition 🔻	ADD A NEW MOUNT POINT More customization options are available after creating the mount point below. Mount Point: Desired Capacity: Cancel Add mount point	installation, you'll be able to view their details here.
+ - C AVAILABLE SPACE 20 GIB TOTAL SPACE 20 GIB		
1 storage device selected		Reset All

22. Set "File System" to "ext4", and then click "Done".

MANUAL PARTITIONING	- Bullin		CENTOS 7 INSTALLATION E us Help!
New CentOS 7 Installation		xvdal	
SYSTEM		Mount Point:	Device (c)
/ xvdal	20 GiB >		Device(s).
		Desired Capacity: 20 GiB	(xvda)
			Modify
		Device Type:       Standard Partition         The second s	
		File System: ext4   Reformat	
		Label:	Name:
			xvdal
			Update Settings Note: The settings you make on this screen will
+ - C			not be applied until you click on the main menus 'Begin Installation' button.
AVAILABLE SPACE 992.5 KiB 20 GiB			
1 storage device selected			Reset All

23. A yellow warning bar will appear. Click "Done" again, and then click on "Accept Changes".

Done		G								ENTOS 7 INS	TALLATION Help!
✓ New CentC	S 7 Ins	tallation		xvdal							
SYSTEM / xvdal		20	GiB >	Mount Poi	int:			Device (s):			
	SUMMA Your cus	RY OF CHANGE	<b>S</b> result in the	following ch	anges taki	ing effe	ct after you returr	1 to the main menu	u and begin inst	tallation:	
	Order	Action	Туре		Device	Name	Mount point				
	2 3 4	Create Format Create Device Create Format	partition ta partition ext4	ıble (MSDOS)	xvda xvdal xvdal		1				
						Cancel	& Return to Custo	m Partitioning	Accept Cha	anges Jpdate	Settings
+ – ( AVAILABLE SPACE 992.5 KIB	TOTAL	SPACE GIB						Note: not be	The settings y applied until y	rou make on this rou click on the n 'Begin Installat	screen will nain menu's ion' button.
<u>1 storage device</u>	selected										Res All

24. Click on "Software Selection". Select "Infrastructure Server", and click "Done".

Base Environment	Add-Ons for Selected Environment
<ul> <li>Minimal Install Basic functionality.</li> <li>Compute Node Installation for performing computation and processing.</li> <li>Infrastructure Server Server for operating network infrastructure services.</li> <li>File and Print Server File, print, and storage server for enterprises.</li> <li>Basic Web Server Server for serving static and dynamic internet content.</li> <li>Virtualization Host Minimal virtualization host.</li> <li>Server with GUI Server for operating network infrastructure services, with a GUI.</li> <li>GNOME Desktop GNOME is a highly intuitive and user friendly desktop environment.</li> <li>KDE Plasma Workspaces The KDE Plasma Workspaces, a highly-configurable graphical user interface which includes a panel, desktop, system icons and desktop widgets, and many powerful KDE applications.</li> <li>Development and Creative Workstation Workstation for software, hardware, graphics, or content development.</li> </ul>	<ul> <li>Backup Server Software to centralize your infrastructure's backups.</li> <li>DNS Name Server This package group allows you to run a DNS name server (BIND) on the system.</li> <li>Debugging Tools Tools for debugging misbehaving applications and diagnosing performance problems.</li> <li>Directory Client Clients for integration into a network managed by a directory service.</li> <li>E-mail Server Allows the system to act as a SMTP and/or IMAP e-mail server.</li> <li>FTP Server Allows the system to act as an FTP server.</li> <li>File and Storage Server CIFS, SMB, NFS, iSCSI, iSER, and iSNS network storage server.</li> <li>Guest Agents Agents used when running under a hypervisor.</li> <li>Hardware Monitoring Utilities A set of tools to monitor server hardware.</li> <li>High Availability Infrastructure for highly available services and/or shared storage.</li> <li>Identity Management Server Centralized management of users, servers and authentication policies.</li> <li>Infiniband Support Software designed for supporting clustering and grid connectivity using RDMA-based InfiniBand and iWARP fabrics.</li> <li>Java Platform</li> </ul>

- 25. Click "Begin Installation". Click on "Root Password" and set a good password.
- 26. Once installation is complete, click "Reboot".
- 27. SSH as root to the new VM.
- 28. In XenCenter, change the DVD drive to xs-tools.iso:



29. Mount the tools ISO and install the tools:



30. In XenCenter, eject the DVD drive:



31. Stop and disable the firewalld service:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

#### 32. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
```

SELINUX=permissive

#### 33. Update all packages on the VM:

# yum update

#### 34. Reboot the VM:

# systemctl reboot

35. Wait for the VM to complete the reboot, and SSH back in as root.

#### 36. Update the system hosts file with entries for all nodes:

```
# vim /etc/hosts
172.16.0.192 controller controller.openstack.lab.eco.rackspace.com
172.16.0.203 computel computel.openstack.lab.eco.rackspace.com
172.16.0.204 computel-vm computel-vm.openstack.lab.eco.rackspace.com
172.16.0.195 compute2 compute2.openstack.lab.eco.rackspace.com
172.16.0.196 block1 block1.openstack.lab.eco.rackspace.com
172.16.0.197 object1 object1.openstack.lab.eco.rackspace.com
172.16.0.198 object2 object2.openstack.lab.eco.rackspace.com
```

37. Update the chrony configuration to use the controller as a time source:

```
# vim /etc/chrony.conf
server controller iburst
```

- Remove any other servers listed, leaving only "controller".
- 38. Restart the chrony service, and confirm that "controller" is listed as a source:

39. Enable the OpenStack-Liberty yum repository:

```
# yum install centos-release-openstack-liberty
```

40. Install the OpenStack client and SELINUX support:

# yum install python-openstackclient openstack-selinux

- 41. SSH to the XenServer as root.
- 42. Obtain the UUID of the XenServer pool:

- Note: In my case, the UUID is f824b628-1696-9ebe-5a5a-d1f9cf117158.
- 43. Enable auto power-on for the XenServer pool. Replace \*POOL\_UUID\* with your own:

# xe pool-param-set uuid=\*POOL\_UUID\* other-config:auto\_poweron=true

44. Obtain the UUID of the "compute VM":

```
# xe vm-list name-label='compute'
uuid ( RO) : 706ba8eb-fe5f-8da2-9090-3a5b009ce1c4
name-label ( RW): compute
power-state ( RO): running
```

- Note: In my case, the UUID is 706ba8eb-fe5f-8da2-9090-3a5b009ce1c4.
- 45. Enable auto power-on for the "compute" VM. Replace \*VM\_UUID\* with your own:

```
# xe vm-param-set uuid=*VM_UUID* other-config:auto_poweron=true
```

# CHAPTER 9

## 9. Install Compute (nova) on XenServer compute VM

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/nova-compute-install.html

http://docs.openstack.org/liberty/install-guide-rdo/nova-verify.html

http://docs.openstack.org/liberty/install-guide-rdo/cinder-storage-install.html

It is also based on some steps from the following guide:

https://www.citrix.com/blogs/2015/11/30/integrating-xenserver-rdo-and-neutron/

### All steps have modifications for XenServer.

1. Download and install pip, and xenapi:

```
# wget https://bootstrap.pypa.io/get-pip.py
# python get-pip.py
# pip install xenapi
```

2. Install nova packages:

```
# yum install openstack-nova-compute sysfsutils
```

3. Configure nova. Replace \*HOST\_NAME\*, \*XENSERVER\_ROOT\*, \*CONTROLLER\_ADDRESS\*, \*XAPI\_BRIDGE\*, \*VM\_IP\*, \*NOVA\_PASS\*, \*XENSERVER\_IP\* and \*RABIT\_PASS\* with your own:

```
# vim /etc/nova/nova.conf
[DEFAULT]
rpc_backend = rabbit
auth_strategy = keystone
my_ip = *VM_IP*
network_api_class = nova.network.neutronv2.api.API
security_group_api = neutron
linuxnet_interface_driver = nova.network.linux_net.
→NeutronLinuxBridgeInterfaceDriver
```

```
firewall_driver = nova.virt.firewall.NoopFirewallDriver
compute_driver = xenapi.XenAPIDriver
host = *HOST_NAME*
live_migration_retry_count=600
[oslo_messaging_rabbit]
rabbit_host = controller
rabbit_userid = openstack
rabbit_password = *RABBIT_PASS*
[keystone_authtoken]
auth_uri = http://controller:5000
auth_url = http://controller:35357
auth_plugin = password
project_domain_id = default
user_domain_id = default
project_name = service
username = nova
password = *NOVA_PASS*
[vnc]
enabled = True
vncserver_listen = 0.0.0.0
vncserver_proxyclient_address = *XENSERVER_IP*
novncproxy_base_url = http://*CONTROLLER_ADDRESS*:6080/vnc_auto.html
[glance]
host = controller
[oslo_concurrency]
lock_path = /var/lib/nova/tmp
[xenserver]
connection_url=http://compute1
connection_username=root
connection_password=*XENSERVER_ROOT*
vif_driver=nova.virt.xenapi.vif.XenAPIOpenVswitchDriver
ovs_int_bridge=*XAPI_BRIDGE*
ovs_integration_bridge=*XAPI_BRIDGE*
```

#### 4. Download and modify a helper script for installing the dom0 plugins:

#### 5. Use the script to install the dom0 nova plugins:

```
# source rdo_xenserver_helper.sh
# install_dom0_plugins
```

- Answer yes to the RSA key prompt
- Enter the XenServer root password when prompted (twice)
- Ignore the errors related to the neutron plugins
- 6. Update the LVM configuration to prevent scanning of instances' contents:

```
# vim /etc/lvm/lvm.conf
devices {
    ...
    filter = ["r/.*/"]
```

- Note: Do not replace the entire "devices" section, only the "filter" line.
- 7. Enable and start the nova services:

```
# systemctl enable openstack-nova-compute.service
# systemctl start openstack-nova-compute.service
```

- 8. Log on to the controller node as root.
- 9. Load the "admin" credential file:
  - # source admin-openrc.sh
- 10. Check the nova service list:

# nova service-list			
++		-+	
→ -++++	Disabled Reason	Zone	<b>_</b>
<pre>     +</pre>	<pre>k.lab.eco.rackspace.com :19.000000   - k.lab.eco.rackspace.com :19.000000   - k.lab.eco.rackspace.com :22.000000   - k.lab.eco.rackspace.com :27.000000   - ck.lab.eco.rackspace.com 00   -  </pre>	'  _  _  _         nova	
	++		

- The list should include compute1-vm running nova-compute.
- 11. Check the nova endpoints list:

```
# nova endpoints
WARNING: nova has no endpoint in ! Available endpoints for this service:
+-----+
      | Value
 | nova
+-----
           _____
| id
    | 1c07bba299254336abd0cbe27c64be83
| interface | internal
| region | RegionOne
| region_id | RegionOne
 | url
      | http://controller:8774/v2/76f8c8fd7b1e407d97c4604eb2a408b3
```

nova	Value
id interface	++   221f3238f2da46fb8fc6897e6c2c4de1     public
region	RegionOne
region_id	RegionOne
url 	http://controller:8774/v2/76f8c8fd7b1e407d97c4604eb2a408b3
	· · · · · · · · · · · · · · · · · · ·
nova 	Value   ++
id	fdbd2fe1dda5460aaa486b5d142f99aa
interface	admin
region	RegionOne
region_id	RegionOne
url 	http://controller:8774/v2/76f8c8fd7b1e407d97c4604eb2a408b3
ARNING: keys	stone has no endpoint in ! Available endpoints for this service:
keystone	Value
id	+   33c74602793e454ea1d9ae9ab6ca5dcc
interface	
region	l RegionOne
region id	RegionOne
url	http://controller.5000/w2.0
ut t 	++
keystone	++   Value
id	+   688939b258ea4f1d956cb85dfc75e0c0
interface	internal
region	l RegionOne
region id	RegionOne
url	http://controller:5000/v2.0
	++ ++
keystone	Value
id	7c7652f07b2f4a2c8bf805ff49b6a4eb
interface	admin
region	RegionOne
region_id	RegionOne
url	http://controller:35357/v2.0
ARNING: gla	++ nce has no endpoint in ! Available endpoints for this service:
glance	++   Value
	++
interface	internal
ragion	
region id	
regron_rd	http://controllor.0202
uti 	++
alanco	++

```
| 54f519365b8e4f7f81b750fdbf55be2f |
| id
| interface | public
| region | RegionOne
| region_id | RegionOne
| url
    | http://controller:9292
   _____
+---
+-----
      | Value
| glance
+-----
             _____
| id | d5e7d60a0eba46b9ac7b992214809fe0 |
| interface | admin
| region | RegionOne
| region_id | RegionOne
| url
     | http://controller:9292
       ______
```

- The list should include endpoints for nova, keystone, and glance. Ignore any warnings.
- 12. Check the nova image list:



• The list should include the cirros-xen image previously uploaded.
### 10. Install Networking (neutron) on controller

This page is based on the following OpenStack Installation Guide page:

http://docs.openstack.org/liberty/install-guide-rdo/neutron-controller-install.html

#### Steps 3, 5, 6, 7, 9, 12, 13 and 15 have specific changes for the use of XenServer.

1. Open the MySQL client and create the "glance" database. Replace \*NEUTRON\_DBPASS\* with your own:

2. Create the "neutron" user, role, service and endpoints. Provide \*NEUTRON\_PASS\* when prompted:

#### 3. Install the neutron and ovs packages:

4. Configure neutron. Note that the default file already has lines for keystone\_authtoken. These must be deleted. Replace \*NEUTRON\_DBPASS\*, \*NEUTRON\_PASS\*, \*RABBIT\_PASS\* and \*NOVA\_PASS\* with your own:

```
# vim /etc/neutron/neutron.conf
 [database]
 connection = mysql://neutron:*NEUTRON_DBPASS*@controller/neutron
 rpc_backend = rabbit
 [DEFAULT]
 core_plugin = ml2
 service_plugins =
 auth_strategy = keystone
 notify_nova_on_port_status_changes = True
 notify_nova_on_port_data_changes = True
 nova_url = http://controller:8774/v2
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = neutron
 password = *NEUTRON_PASS*
 [nova]
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 region_name = RegionOne
 project_name = service
 username = nova
 password = *NOVA_PASS*
 [oslo_concurrency]
 lock_path = /var/lib/neutron/tmp
```

• Note: The service\_plugins value is intentionally left blank, and is used to disable these plugins.

#### 5. Configure the ml2 plugin:

```
# vim /etc/neutron/plugins/ml2/ml2_conf.ini
[ml2]
type_drivers = flat,vlan
tenant_network_types =
mechanism_drivers = openvswitch
extension_drivers = port_security
[ml2_type_flat]
```

```
flat_networks = public
[securitygroup]
enable_ipset = True
```

- Note: The tenant\_network\_types value is also intentionally left blank.
- 6. Configure ml2's ovs plugin. Replace **\*XAPI\_BRIDGE\*** with your own:

```
# vim /etc/neutron/plugins/ml2/openvswitch_agent.ini
[ovs]
integration_bridge = *XAPI_BRIDGE*
bridge_mappings = public:br-eth0
[securitygroup]
firewall_driver = neutron.agent.firewall.NoopFirewallDriver
```

7. Configure the DHCP Agent. Replace **\*XAPI\_BRIDGE\*** with your own:

```
# vim /etc/neutron/dhcp_agent.ini
[DEFAULT]
interface_driver = neutron.agent.linux.interface.OVSInterfaceDriver
ovs_integration_bridge = *XAPI_BRIDGE*
dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
enable_isolated_metadata= True
```

8. Configure the metadata agent. Note that the default file already has some lines in [DEFAULT]. These need to be commented-out or deleted. Replace \*NEUTRON\_PASS\* and \*NEUTRON\_METADATA\_SECRET\* with your own:

```
# vim /etc/neutron/metadata_agent.ini
[DEFAULT]
auth_uri = http://controller:5000
auth_url = http://controller:35357
auth_region = RegionOne
auth_plugin = password
project_domain_id = default
user_domain_id = default
project_name = service
username = neutron
password = *NEUTRON_PASS*
nova_metadata_ip = controller
metadata_proxy_shared_secret = *NEUTRON_METADATA_SECRET*
```

9. Reconfigure nova to use neutron. Replace \*NEUTRON\_PASS\*, \*NEUTRON\_METADATA\_SECRET\* and \*XAPI\_BRIDGE\* with your own:

```
# vim /etc/nova/nova.conf
[neutron]
url = http://controller:9696
auth_url = http://controller:35357
auth_plugin = password
project_domain_id = default
user_domain_id = default
```

```
region_name = RegionOne
project_name = service
username = neutron
password = *NEUTRON_PASS*
service_metadata_proxy = True
metadata_proxy_shared_secret = *NEUTRON_METADATA_SECRET*
ovs_bridge = *XAPI_BRIDGE*
```

#### 10. Symlink the ml2 configuration file to neutron's plugin.ini file:

```
# ln -s /etc/neutron/plugins/ml2/ml2_conf.ini /etc/neutron/plugin.ini
```

#### 11. Populate the neutron database:

#### 12. Enable and start the ovs service:

```
# systemctl enable openvswitch.service
# systemctl start openvswitch.service
```

#### 13. Set up the ovs bridge to the public network:

```
# ovs-vsctl add-br br-eth0
# ovs-vsctl add-port br-eth0 eth0
```

#### 14. Restart the nova service:

```
# systemctl restart openstack-nova-api.service
```

#### 15. Enable and start the neutron services:

### 11. Install Networking (neutron) on compute VM

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/neutron-compute-install.html

http://docs.openstack.org/liberty/install-guide-rdo/launch-instance.html

http://docs.openstack.org/liberty/install-guide-rdo/launch-instance-networks-public.html

It is also based on some steps from the following guide:

https://www.citrix.com/blogs/2015/11/30/integrating-xenserver-rdo-and-neutron/

#### Steps 1, 3, 4, 6, 8, 11, 14 and 15 have specific changes for the use of XenServer.

1. Install the neutron and ovs packages:

2. Configure neutron. Replace \*HOST\_NAME\*, \*RABBIT\_PASS\* and \*NEUTRON\_PASS\* with your own:

```
# vim /etc/neutron/neutron.conf
[DEFAULT]
rpc_backend = rabbit
auth_strategy = keystone
host = *HOST_NAME*
[oslo_messaging_rabbit]
rabbit_host = controller
rabbit_userid = openstack
rabbit_password = *RABBIT_PASS*
[keystone_authtoken]
auth_uri = http://controller:5000
auth_url = http://controller:35357
auth_plugin = password
```

```
project_domain_id = default
user_domain_id = default
project_name = service
username = neutron
password = *NEUTRON_PASS*
[oslo_concurrency]
lock_path = /var/lib/neutron/tmp
```

- Make sure that any connection options under [database] are deleted or commented-out.
- Delete or comment-out any pre-existing lines in the [keystone\_authtoken] section.
- 3. Configure the neutron ovs agent. Replace \*XAPI\_BRIDGE\* and \*XENSERVER\_ROOT\* with your own:

```
# vim /etc/neutron/plugins/ml2/openvswitch_agent.ini
[ovs]
integration_bridge = *XAPI_BRIDGE*
bridge_mappings = public:xenbr0
[agent]
root_helper = neutron-rootwrap-xen-dom0 /etc/neutron/rootwrap.conf
root_helper_daemon =
minimize_polling = False
[securitygroup]
firewall_driver = neutron.agent.firewall.NoopFirewallDriver
```

4. Configure neutron rootwrap to connect to XenServer. Replace \*XENSERVER\_ROOT\* with your own:

```
# vim /etc/neutron/rootwrap.conf
[xenapi]
xenapi_connection_url=http://compute1
xenapi_connection_username=root
xenapi_connection_password=*XENSERVER_ROOT*
```

- There are other lines already present in this file. These should be left as-is.
- 5. Reconfigure nova to use neutron. Replace \*NEUTRON\_PASS\* with your own:

```
[neutron]
url = http://controller:9696
auth_url = http://controller:35357
auth_plugin = password
project_domain_id = default
user_domain_id = default
region_name = RegionOne
project_name = service
username = neutron
password = *NEUTRON_PASS*
```

# vim /etc/nova/nova.conf

6. Use the helper script to install the dom0 neutron plugins:

```
# source rdo_xenserver_helper.sh
# install_dom0_plugins
```

- Enter the XenServer root password when prompted (twice).
- If you are prompted whether or not to overwrite a file under /tmp, answer y.
- 7. Restart the nova service:

# systemctl restart openstack-nova-compute.service

#### 8. Enable and start the neutron service:

```
# systemctl enable neutron-openvswitch-agent.service
# systemctl start neutron-openvswitch-agent.service
```

#### 9. Log on to the controller node as root.

- 10. Load the "admin" credential file:
  - # source admin-openrc.sh

#### 11. Check the neutron agent list:

```
# neutron agent-list
 +_____
    | id
                         | agent_type
                                      | host
                | alive | admin_state_up | binary
                                                  _____
       | 57c49643-3e48-4252-9665-2f22e3b93b0e | Open vSwitch agent | compute1-vm.
→openstack.lab.eco.rackspace.com | :-) | True
                                | neutron-openvswitch-
⊶agent |
| 977ff9ae-96e5-4ef9-93d5-65a8541d7d25 | Metadata agent
                                     | controller.
| neutron-metadata-
⇔agent
      | ca0fb18a-b3aa-4cd1-bc5f-ba4700b4d9ce | Open vSwitch agent | controller.
→openstack.lab.eco.rackspace.com | :-) | True | neutron-openvswitch-
agent |
| d42db23f-3738-48b3-8f83-279ee29e84ef | DHCP agent | controller.
| neutron-dhcp-agent _
⊶agent |
⇔openstack.lab.eco.rackspace.com | :-) | True
    _____
  _____+
```

- The list should include the ovs agent running on controller and compute1-vm.
- 12. Create the default security group:

```
# nova secgroup-add-rule default icmp -1 -1 0.0.0.0/0
# nova secgroup-add-rule default tcp 1 65535 0.0.0.0/0
```

13. Create the public network. Replace \*PUBLIC\_NETWORK\_CIDR\*, \*START\_IP\_ADDRESS\*, \*END\_IP\_ADDRESS\* \*DNS\_RESOLVER\* and \*PUBLIC\_NETWORK\_GATEWAY\* with your own:

- 14. There is a bug regarding the network's segmentation ID which needs to be fixed. This should be resolved in openstack-neutron-7.0.1, but if you are running an older version:
  - (a) Update the *segmentation\_id* field in the *neutron* database:

```
# mysql neutron
> update ml2_network_segments set segmentation_id=0;
> quit
```

(b) Update the segmentation\_id for the DHCP agent's ovs port:

```
\# ovs-vsctl set Port ovs-vsctl show | grep Port | grep tap | awk -F \" ' {_ <math display="inline">\rightarrow print $2 } ') other_config:segmentation_id=0
```

15. There is a bug in Neutron which is causing available XenAPI sessions to be exhausted. I have reported this and submitted a patch in https://bugs.launchpad.net/neutron/+bug/1558721. Until the bug is fixed upstream, here is the manual patch to fix the problem:

1. Open the neutron-rootwrap-xen-dom0 file:

```
# vim /usr/bin/neutron-rootwrap-xen-dom0
```

2. Locate the following lines (should start at line 117):

```
result = session.xenapi.host.call_plugin(
    host, 'netwrap', 'run_command',
    {'cmd': json.dumps(user_args), 'cmd_input': json.dumps(cmd_input)})
return json.loads(result)
```

3. Add the following before the 'return' line. It should have the same indentation as the 'return' line:

```
session.xenapi.session.logout()
```

4. The whole section should now read:

```
result = session.xenapi.host.call_plugin(
    host, 'netwrap', 'run_command',
    {'cmd': json.dumps(user_args), 'cmd_input': json.dumps(cmd_input)})
session.xenapi.session.logout()
return json.loads(result)
```

### 12. Install Dashboard (horizon) on controller

This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/horizon-install.html

http://docs.openstack.org/liberty/install-guide-rdo/horizon-verify.html

#### Step 3 has specific changes for the use of XenServer.

1. Install horizon packages:

# yum install openstack-dashboard

2. Configure horizon. Replace \*TIME\_ZONE\* with your own (for example "America/Chicago"):

```
# vim /etc/openstack-dashboard/local_settings
 OPENSTACK_CONTROLLER = "controller"
 ALLOWED_HOSTS = [' \star ', ]
 CACHES = \{
      'default': {
           'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',
           'LOCATION': '127.0.0.1:11211',
      }
 }
 OPENSTACK_KEYSTONE_DEFAULT_ROLE = "user"
 OPENSTACK_NEUTRON_NETWORK = {
      'enable_router': False,
      'enable_quotas': False,
      'enable_distributed_router': False,
      'enable_ha_router': False,
      'enable_lb': False,
      'enable_firewall': False,
      'enable_vpn': False,
      'enable_fip_topology_check': False,
  }
 TIME_ZONE = "*TIME_ZONE*"
```

```
OPENSTACK_API_VERSIONS = {
    "data-processing": 1.1,
    "identity": 3,
    "volume": 2,
}
```

- Note 1: There are many options already present in the file. These should be left as-is.
- Note 2: For the openstack\_neutron\_network block, modify the settings listed above, rather than replacing the entire block.
- 3. There is a bug in Horizon which is breaking image metadata when editing XenServer images. This has been reported in https://bugs.launchpad.net/horizon/+bug/1539722. Until the bug is fixed, here is a quick and dirty patch to avoid the problem:
  - (a) Open the forms.py file:

(b) Locate the following lines (should be lines 60 and 61):

```
else:
    container_format = 'bare'
```

(c) Add the following two lines above those lines:

(d) The whole section should now read:

```
elif disk_format == 'vhd':
    container_format = 'ovf'
else:
    container_format = 'bare'
```

4. Enable and restart the Apahce and memcached services:

```
# systemctl enable httpd.service memcached.service
# systemctl restart httpd.service memcached.service
```

5. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard:

	Openstack DASHBOARD	
Log In		
User Name		
Password		۲
		Connect

- 6. Log in using the admin credentials.
- 7. In the left-hand menu, under "Admin" and then "System", click on "System Information". This will display a list of compute services and network agents:

🧧 openstack	🔲 admin 👻						🛔 admin 👻
Project ~	System	Inform	ation				
Admin ^	Services Com	pute Services	Network Agents				
System ^				F	ilter		Q
Overview							•
Hypervisors	Name	Host		Zone	Status	State	Last Updated
Host Aggregates	nova-consoleauth	controller.ope	controller.openstack.lab.eco.rackspace.com		Enabled	Up	0 minutes
Instances	nova-scheduler	controller.openstack.lab.eco.rackspace.com		internal	Enabled	Up	0 minutes
Flavors	nova-conductor	controller.openstack.lab.eco.rackspace.com		internal	Enabled	Up	0 minutes
Imanes	nova-cert	controller.ope	controller.openstack.lab.eco.rackspace.com compute1- vm.openstack.lab.eco.rackspace.com		Enabled	Up	0 minutes
Networks	nova-compute	compute1- vm.openstac			Enabled	Up	0 minutes
Defaults	Displaying 5 items						
Metadata Definitions							Version: 8.0.0
System Information							
Identity ~							

🧧 openstack	🔳 admin 🖣	•					🛔 admin 🔻
Project ~	Syste	m Inform	ation				
Admin ^	Services	Compute Services	Network Agents				
System ^					Filter		Q
Overview Hypervisors	Туре	Name	Host		Status	State	Last Updated
Host Aggregates	Open vSwitch agent	neutron- openvswitch-agent	compute1- vm.openstack.lab.	eco.rackspace.com	Enabled	Up	0 minutes
Flavors	Metadata agent	neutron- metadata-agent	controller.openstac	k.lab.eco.rackspace.c	com Enabled	Up	0 minutes
Images Networks	Open vSwitch agent	neutron- openvswitch-agent	controller.openstac	k.lab.eco.rackspace.c	com Enabled	Up	0 minutes
Defaults	DHCP agent	neutron-dhcp-agent	controller.openstac	k.lab.eco.rackspace.c	com Enabled	Up	0 minutes
Metadata Definitions	Displaying 4	items					
System Information Identity	-						Version: 8.0.

### 13. Build block1 storage node OS

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/environment-networking-storage-cinder.html http://docs.openstack.org/liberty/install-guide-rdo/environment-ntp-other.html http://docs.openstack.org/liberty/install-guide-rdo/environment-packages.html

- 1. The block1 node will need to have a large second disk on which to store the cinder volumes. You may also wish to give it a large amount of storage at /var/lib/cinder/conversion (or /) if you will be writing large images to cinder volumes. It will only need a connection to the Management Network.
- 2. Boot the control node with the CentOS 7.2.1511 DVD.
- 3. Set your time zone and language.
- 4. For "Software Selection", set this to "Infrastructure Server".
- 5. Keep automatic partitioning. Allow to install only on first disk.
- 6. Set the controller's IPv4 address and hostname. Disable IPv6. Give the connection the name "eth0".

NETWORK & HO	DST NAME			CENT E us	TOS 7 INSTALLATION
		Editing	ethO		
Connection name:	eth0				
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings
Method: Manua	al				•
Addresses					
Address		Netmask		Gateway	Add
172.16.0.196		255.255.255.0		172.16.0.1	Delete
DNS servers:	8.8.8.8				
Search domains	::				
DHCP client ID:					
Require IPv4	addressing for t	his connection to complet	е		
					Routes
					Cancel Save

NETWORK & H	OST NAME				OS 7 INSTALLATION
		Editing	eth1		
onnection name:	eth0				
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings
Method: Ignor	9				•
Addresses	New Manager	101.00			
Address		Prefix	Gat	teway	Add
					Delete
DNS servers:					
Search domain	s:				
IPv6 privacy ext	ensions: Disal	oled			~
🗌 Require IPv6	3 addressing for t	his connection to complete	e		
					Routes
					Cancel Save

NETWORK & HOST NAME	CENTOS 7 INSTALLATION
Done	
Ethernet (eno16777984) VMware VMXNET3 Ethernet Controller	Connected
	Hardware Address 00:0C:29:FA:BB:DC
	Speed 10000 Mb/s
	IP Address 172.16.0.196
	Subnet Mask 255.255.255.0
	Default Route 172.16.0.1
	DNS 8.8.8.8
+ -	Configure
Host name: block1.openstack.lab.eco.rackspace.c	
	<u> </u>

- 7. Click on "Begin Installation".
- 8. Set a good root password.
- 9. Once installation is complete, reboot the server, and remove the DVD/ISO from the server.
- 10. SSH in to server as root.
- 11. Stop and disable the firewalld service:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

12. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
SELINUX=permissive
```

#### 13. Update all packages on the server:

# yum update

#### 14. If running the control node on VMWare, install the VM tools:

```
# yum install open-vm-tools
```

15. We need persistent network interface names, so we'll configure udev to give us these. Replace 00:00:00:00:00:00:00 with the MAC address of your block1 node:

```
# vim /etc/udev/rules.d/90-persistent-net.rules
```

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?\*",ATTR{address}=="00:00:00:00:00:00 →",ATTR{dev\_id}=="0x0", ATTR{type}=="1",KERNEL=="eno\*", NAME="eth0"

- Note: This file is case-sensitive, and the MAC addresses should be lower-case.
- 16. Rename the network interface configuration file to eth0. Replace eno00000001 with the name of your control node's interfaces:

```
# cd /etc/sysconfig/network-scripts
# mv ifcfg-eno00000001 ifcfg-eth0
```

17. Modify the interface configuration files, replacing any instances of eno00000001 (or whatever your interface name is) with eth0:

```
# vim ifcfg-eth0
NAME=eth0
DEVICE=eth0
```

18. Reboot the control node:

# systemctl reboot

- 19. SSH back in as root after the reboot.
- 20. Check that if config now shows eth0:

```
# ifconfig
 eth0: flags=4163<UP, BROADCAST, RUNNING, MULTICAST> mtu 1500
        inet 172.16.0.196 netmask 255.255.255.0 broadcast 172.16.0.255
        inet6 fe80::20c:29ff:fefa:bbdc prefixlen 64 scopeid 0x20<link>
        ether 00:0c:29:fa:bb:dc txqueuelen 1000 (Ethernet)
        RX packets 322224 bytes 137862468 (131.4 MiB)
        RX errors 0 dropped 35 overruns 0 frame 0
        TX packets 408936 bytes 108141349 (103.1 MiB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
 lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
        loop txqueuelen 0 (Local Loopback)
        RX packets 6 bytes 564 (564.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 6 bytes 564 (564.0 B)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

21. Update the system hosts file with entries for all nodes:

# vim /etc/hosts
172.16.0.192 controller controller.openstack.lab.eco.rackspace.com

172.16.0.203 computel computel.openstack.lab.eco.rackspace.com 172.16.0.204 computel-vm computel-vm.openstack.lab.eco.rackspace.com 172.16.0.195 compute2 compute2.openstack.lab.eco.rackspace.com 172.16.0.196 block1 block1.openstack.lab.eco.rackspace.com 172.16.0.197 object1 object1.openstack.lab.eco.rackspace.com 172.16.0.198 object2 object2.openstack.lab.eco.rackspace.com

22. Update the chrony configuration to use the controller as a time source:

```
# vim /etc/chrony.conf
```

server controller iburst

- Remove any other servers listed, leaving only "controller".
- 23. Restart the chrony service, and confirm that "controller" is listed as a source:

#### 24. Enable the OpenStack-Liberty yum repository:

# yum install centos-release-openstack-liberty

25. Install the OpenStack client and SELINUX support:

# yum install python-openstackclient openstack-selinux

### 14. Install Block Storage (cinder) on controller

This page is based on the following OpenStack Installation Guide page:

http://docs.openstack.org/liberty/install-guide-rdo/cinder-controller-install.html

1. Open the MySQL client and create the "cinder" database. Replace \*CINDER\_DBPASS\* with your own:

2. Create the "cinder" user, role, services and endpoints. Provide \*CINDER\_PASS\* when prompted:

```
# source admin-openrc.sh
# openstack user create --domain default --password-prompt cinder
# openstack role add --project service --user cinder admin
# openstack service create --name cinder --description "OpenStack Block Storage"_
→volume
# openstack service create --name cinderv2 --description "OpenStack Block Storage
\hookrightarrow" volumev2
# openstack endpoint create --region RegionOne volume public http://
# openstack endpoint create --region RegionOne volume internal http://
# openstack endpoint create --region RegionOne volume admin http://
# openstack endpoint create --region RegionOne volumev2 public http://
→controller:8776/v2/%\(tenant_id\)s
# openstack endpoint create --region RegionOne volumev2 internal http://
# openstack endpoint create --region RegionOne volumev2 admin http://
→controller:8776/v2/%\(tenant_id\)s
```

3. Install the cinder packages:

```
# yum install openstack-cinder python-cinderclient
```

4. Configure cinder. Replace \*SERVER\_IP\*, \*CINDER\_DBPASS\*, \*CINDER\_PASS\* and \*RABBIT\_PASS\* with your own:

```
# vim /etc/cinder/cinder.conf
 [database]
 connection = mysql://cinder:*CINDER_DBPASS*@controller/cinder
 [DEFAULT]
 rpc_backend = rabbit
 auth_strategy = keystone
 my_ip = *SERVER_IP*
 nova_catalog_info = compute:nova:publicURL
 nova_catalog_admin_info = compute:nova:adminURL
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = cinder
 password = *CINDER_PASS*
 [oslo_concurrency]
 lock_path = /var/lib/cinder/tmp
```

5. Populate the cinder database:

# su -s /bin/sh -c "cinder-manage db sync" cinder

#### 6. Reconfigure nova for cinder:

```
# vim /etc/nova/nova.conf
[cinder]
os_region_name = RegionOne
```

#### 7. Restart the nova service:

# systemctl restart openstack-nova-api.service

#### 8. Enable and start the cinder services:

# systemctl enable openstack-cinder-api.service openstack-cinder-scheduler.service
# systemctl start openstack-cinder-api.service openstack-cinder-scheduler.service

### 15. Install Block Storage (cinder) on storage node

This page is based on the following OpenStack Installation Guide page:

http://docs.openstack.org/liberty/install-guide-rdo/cinder-storage-install.html

#### Steps 3, 4, 5, 6, 8, 9 and 10 have specific changes for the use of XenServer.

1. Create the LVM volume group on the second disk:

```
# pvcreate /dev/sdb
# vgcreate cinder-volumes /dev/sdb
```

2. Update the LVM configuration to prevent scanning of cinder volumes' contents:

```
# vim /etc/lvm/lvm.conf
devices {
    ...
    filter = [ "a/sda/", "a/sdb/", "r/.*/"]
```

- Note: Do not replace the entire "devices" section, only the "filter" line.
- 3. Enable the centos-virt-xen and epel-release repositories:

# yum install centos-release-xen epel-release

4. Disable kernel updates from the centos-virt-xen repository:

```
# vim /etc/yum.repos.d/CentOS-Xen.repo
```

```
[centos-virt-xen]
exclude=kernel*
```

5. Install special packages needed from outside of the openstack-liberty repositories:

```
# yum install scsi-target-utils xen-runtime
```

6. Remove the epel-release repository again:

# yum remove epel-release

7. Install the cinder packages:

```
# yum install openstack-cinder python-oslo-policy
```

8. Configure cinder. Replace \*CINDER\_DBPASS\* , \*SERVER\_IP\* , \*RABBIT\_PASS\* and \*CINDER\_PASS\* with your own:

```
# vim /etc/cinder/cinder.conf
 [database]
 connection = mysql://cinder:*CINDER_DBPASS*@controller/cinder
 [DEFAULT]
 rpc_backend = rabbit
 auth_strategy = keystone
 my_ip = *SERVER_IP*
 enabled_backends = lvm
 glance_host = controller
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = cinder
 password = *CINDER_PASS*
 [lvm]
 volume_driver = cinder.volume.drivers.lvm.LVMVolumeDriver
 volume_group = cinder-volumes
 iscsi_protocol = iscsi
 iscsi_helper = tgtadm
 [oslo_concurrency]
 lock_path = /var/lib/cinder/tmp
```

9. Update the tgtd.conf configuration. There are other lines in this file. Don't change those, just add this one:

```
# vim /etc/tgt/tgtd.conf
include /var/lib/cinder/volumes/*
```

10. Enable and start the tgtd and cinder services:

```
# systemctl enable tgtd.service openstack-cinder-volume.service
# systemctl start tgtd.service openstack-cinder-volume.service
```

### 16. Fix cinder quotas for the demo project

This page is not based on the OpenStack Installation Guide. I found that a bug causes nova to believe that the demo project has a 0 quota for cinder volumes, even though neutron states that the quota is 10. Re-saving the value populates the value properly in nova.

- 1. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard
- 2. Log in using the admin credentials.
- 3. In the left-hand menu, under "Identity", click on "Projects":

🔲 openstack			admin 🝷				🛔 admin 👻
Project	~	Pr	ojects	S			
Admin	~				Filter Q	+ Create Pr	oject × Delete Projects
Identity	^						
	Projects		Name	Description	Project ID	Enabled	Actions
	Users		service	Service Project	484b6d2f3f3948bc8a397bd782ae2a3d	Yes	Manage Members 🔻
			demo	Demo Project	4c538a56f21842b3b26537f4bb87d2f9	Yes	Manage Members 💌
			admin	Admin Project	76f8c8fd7b1e407d97c4604eb2a408b3	Yes	Manage Members 🔻
		Displ	aying 3 items				

4. In the "Actions" drop-down for the "demo" project, select modify quotas:

Edit Project		×
Project Information *	Project Members Quota *	
Metadata Items *	128	
VCPUs *	20	
Instances *	10	
Injected Files *	5	
Injected File Content (Bytes) *	10240	•
Volumes *	10	×
Volume Snapshots *	10	×
Total Size of Volumes and Snapshots (GB) *	1000	•
RAM (MB) *	51200	÷
		Cancel Save

5. Don't make any changes. Just click "Save".

### 17. Launch a test Boot-From-Volume instance from Horizon

This page is not based on the OpenStack Installation Guide.

- 1. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard.
- 2. Log in using the demo credentials.
- 3. In the left-hand menu, under "Project", and then "Compute", click on "Instances". Click on Launch instance:

🗾 oper	nstack		l demo 🔻									4	demo 🔻
Project	^	In	stanc	es									
Compute	^			In	stance Nar	ne ~	Filter	ſ			Filter	🕰 Launch	Instance
	Overview		Instance	Image	IP		Key	_	Availability	_	Power	Time	
	Instances		Name	Name	Address	Size	Pair	Status	Zone	Task	State	since created	Actions
	Images						No it	ems to di	splay.				
	Access & Security	Disp	laying 0 items										
Network	~												
Identity	~												

4. Give the instance the name "test bfv", and select "Boot from image (creates a new volume)" and the "cirros-xen" image. Launch the instance:

Launch Instance	×
Details * Access & Security Networking *	Post-Creation Advanced Options
Availability Zone	Specify the details for launching an instance. The chart below shows the resources used by this project in relation to the project's quotas.
Instance Name * test bfv	Flavor Details
Flavor * 🕑	Namem1.tinyVCPUs1
m1.tiny	Root Disk 1 GB
	Total Disk 1 GB
Instance Boot Source * 🕢	RAM 512 MB
Boot from image (creates a new volume)	Project Limits
cirros-xen (11.9 MB)	Number of Instances 0 of 10 Used
Device size (GB) * 🕜	Number of VCPUs 0 of 20 Used
1 🖨	Total RAM 0 of 51,200 MB Used
	Cancel Launch

5. Once the instance enters "Active" status, click on its name:

🧧 open <mark>stack</mark>	🔲 demo 👻		🛔 demo 💌
Project	Instance D	etails: test bfv	
Compute	^		Create Snapshot 👻
Over	view Overview Log Co	nsole Action Log	
Instar	Instance Overv	view	
Volu	mes Information		
Ima	ages Name	test bfv	
Access & Sec	urity Status	d3/916d2-50dd-4ef2-a547-08027b9e0622 Active	
Network	Availability Zone     Created	nova Jan. 29, 2016, 2:08 p.m.	
Identity	Time Since Created	1 minute	
Identity	Specs		
	Flavor Flavor ID RAM VCPUs Disk	m1.tiny 1 512MB 1 VCPU 1GB	
	IP Addresses		
	Public	192.168.100.67	
	Security Groups		
	default	ALLOW IPv4 from default ALLOW IPv6 to ::/0 ALLOW IPv4 to 0.0.0.0/0 ALLOW IPv6 from default	
	Metadata		
	Key Name Image Name	None None	

6. Click on the "Console" tab, and you should see the instance booting. Wait for the login prompt:

🔲 openstack	I demo ▼
Project ^	Instance Details: test bfv
Compute ^ Overview	Overview Log Console Action Log
Instances	Instance Console
Volumes Images	If console is not responding to keyboard input: click the grey status bar below. <u>Click here to show only console</u> To exit the fullscreen mode, click the browser's back button.
Access & Security	Connected (unencrypted) to: XenServer Virtual Terminal Send CtrlAltDel
Network ~	<pre>[ 1.180441] mousedev: PS/2 mouse device common for all mice [ 1.220417] rtc_emos rtc_emos: rtc core: registered rtc_emos as rtc0 [ 1.220564] rtc_emos: probe of rtc_emos failed with error -38 [ 1.220772] device-mapper: uevent: version 1.0.3 [ 1.220932] device-mapper: ioctl: 4.22.0-ioctl (2011-10-19) initialised: dm-d evel@redhat.com [ 1.221052] EFI Variables Facility v0.08 2004-May-17 [ 1.221439] TCP cubic registered [ 1.221636] NET: Registered protocol family 10 [ 1.222659] NET: Registered protocol family 17 [ 1.222729] Registering the dns_resolver key type [ 1.222729] Registering the dns_resolver key type [ 1.222729] Registered taskstats version 1 [ 1.23800] blkfront: xvda: flush diskcache: enabled [ 1.235693] xvda: xvda1 [ 1.328095] Magic number: 1:252:3141 [ 1.328095] Magic number: 1:252:3141 [ 1.328351] blOS EDD facility v0.16 2004-Jun-25, 0 devices found [ 1.328351] BlOS EDD facility v0.16 2004-Jun-25, 0 devices found [ 1.328428] EDD information not available. [ 1.329642] Write protecting the kernel read-only data: 12288k [ 1.336735] Freeing unused kernel memory: 1596k freed [ 1.338111] Freeing unused kernel memory: 1184k freed</pre>

- 7. Once the login prompt has appeared, check that you can ping and SSH to the instance. The credentials are:
  - Username: cirros
  - Password: cubswin:)
- 8. In the left-hand menu, click on "Instances" again, select the "test instance" in the list and click on "Terminate Instances":

🔲 opensta	ck		🛾 demo 🔻								<b>å</b> (	lemo 🕶
Project	Confirm Terminate Instances ×							×				
Compute	You have selected "test instance". Please confirm your selection. Terminated instances are not recoverable.							×	🗙 Terminate Insta			
								Cancel	Terminate	Instance	es e	Time since created
	Images		test instance	cirros-xen	192.168.100.66	m1.tiny	-	Active	nova	None	Running	13 minutes
Access & Security		Displaying 1 item										
Network	×											
Identity	×											

### 18. Build KVM Host

#### This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/environment-networking-compute.html http://docs.openstack.org/liberty/install-guide-rdo/environment-ntp-other.html http://docs.openstack.org/liberty/install-guide-rdo/environment-packages.html

- 1. In this guide I am using a server with a small RAID-1 for the OS, and a large RAID-10 for the VMs. There are four network interfaces, although only the first two are in use.
- 2. Boot the KVM host with the CentOS 7.2.1511 DVD.
- 3. Set your time zone and language.
- 4. For "Software Selection", set this to "Infrastructure Server".
- 5. Keep automatic partitioning. Allow to install only on first disk.
- 6. Set the node's IPv4 address on the management network interface and disable IPv6. Give the connection the name "eth1". Set the node's hostname:

Editing eth1								
Connection name:	eth1							
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6	Settings		
Method: Manua	al					-		
Addresses								
Address		Netmask		Gateway		Add		
172.16.0.195		255.255.255.0		172.16.0.1		Delete		
		<b>k</b>				Delete		
DNS servers:	8.8.8							
Search domains	::							
DHCP client ID:								
Require IPv4 addressing for this connection to complete								
						Routes		
					Cancel	Save		

IETWORK & H	OST NAME			CENT	OS 7 INSTALLATIC
		Editing	eth1		
nnection name:	eth1				
General	Ethernet	802.1x Security	DCB	IPv4 Settings	IPv6 Settings
1ethod: Ignore	9				
Addresses					
Address		Prefix	Ga	teway	Add
					Delete
DNS servers:					
Search domain	s:				
IPv6 privacy ext	ensions: Disa	bled			
🔲 Require IPv6	addressing for t	this connection to complet	e		
					Routes
					Cancel Save

NETWORK & HOST NAME		CENTOS 7 INSTALLATION
Ethernet (em1)         Broadcom Corporation NetXtreme II BCM5709 Gigabit Ethernet         Image: State of the state o	Ethernet (em2) Connected Hardware Address 14:FE:B5:CA:C5:A2 Speed 1000 Mb/s IP Address 172.16.0.195 Subnet Mask 255.255.255.0 Default Route 172.16.0.1 DNS 8.8.8.8	
+ - Host name: compute2.openstack.lab.eco.rackspace.com		Configure

- 7. Click on "Begin Installation".
- 8. Set a good root password.
- 9. Once installation is complete, reboot the server, and remove the DVD/ISO from the server.
- 10. SSH in to server as root.
- 11. Stop and disable the firewalld service:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

#### 12. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
SELINUX=permissive
```

#### 13. Update all packages on the server:

# yum update

14. We need persistent network interface names, so we'll configure udev to give us these. Replace 00:00:00:00:00:00:00 with the MAC addresses of your KVM node:
```
# vim /etc/udev/rules.d/90-persistent-net.rules
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",ATTR{address}=="00:00:00:00:00:00

...,ATTR{dev_id}=="0x0", ATTR{type}=="1",KERNEL=="em*", NAME="eth0"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",ATTR{address}=="00:00:00:00:00:00:00

...,ATTR{dev_id}=="0x0", ATTR{type}=="1",KERNEL=="em*", NAME="eth1"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",ATTR{address}=="00:00:00:00:00:00:00

...,ATTR{dev_id}=="0x0", ATTR{type}=="1",KERNEL=="em*", NAME="eth1"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",ATTR{address}=="00:00:00:00:00:00:00

...,ATTR{dev_id}=="0x0", ATTR{type}=="1",KERNEL=="em*", NAME="eth2"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",ATTR{address}=="00:00:00:00:00:00:00

...,ATTR{dev_id}=="0x0", ATTR{type}=="1",KERNEL=="em*", NAME="eth3"
```

- Note: This file is case-sensitive, and the MAC addresses should be lower-case.
- 15. Rename the network interface configuration files to eth0 and eth1. Replace em1, em2, em3 and em4 with the names of your KVM node's interfaces:

```
# cd /etc/sysconfig/network-scripts
# mv ifcfg-eml ifcfg-eth0
# mv ifcfg-em2 ifcfg-eth1
# mv ifcfg-em3 ifcfg-eth2
# mv ifcfg-em4 ifcfg-eth3
```

16. Modify the interface configuration files, replacing any instances of em1, em2, em3, em4 (or whatever your interface names are) with eth0, eth1, eth2 and eth3 respectively:

```
# vim ifcfg-eth0
NAME=eth0
DEVICE=eth0
# vim ifcfg-eth1
NAME=eth1
DEVICE=eth1
# vim ifcfg-eth2
NAME=eth2
DEVICE=eth2
# vim ifcfg-eth3
NAME=eth3
DEVICE=eth3
```

17. Reboot the KVM node:

```
# systemctl reboot
```

- 18. SSH back in as root after the reboot.
- 19. Check that if config now shows eth0, eth1, eth2 and eth3:

```
# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
ether 14:fe:b5:ca:c5:a0 txqueuelen 1000 (Ethernet)
RX packets 1195904 bytes 1012346616 (965.4 MiB)
RX errors 0 dropped 0 overruns 0 frame 0
```

```
TX packets 366843 bytes 28571196 (27.2 MiB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
eth1: flags=4163<UP, BROADCAST, RUNNING, MULTICAST> mtu 1500
       inet 172.16.0.195 netmask 255.255.2 broadcast 172.16.0.255
       inet6 fe80::16fe:b5ff:feca:c5a2 prefixlen 64 scopeid 0x20<link>
       ether 14:fe:b5:ca:c5:a2 txqueuelen 1000 (Ethernet)
       RX packets 12004890 bytes 15236092868 (14.1 GiB)
       RX errors 0 dropped 156 overruns 0 frame 0
       TX packets 12647929 bytes 15934829339 (14.8 GiB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
eth2: flags=4163<UP, BROADCAST, RUNNING, MULTICAST> mtu 1500
       ether 14:fe:b5:ca:c5:a4 txqueuelen 1000 (Ethernet)
       RX packets 1985034 bytes 180158767 (171.8 MiB)
       RX errors 0 dropped 252 overruns 0 frame 0
       TX packets 0 bytes 0 (0.0 B)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
eth3: flags=4099<UP, BROADCAST, MULTICAST> mtu 1500
       ether 14:fe:b5:ca:c5:a6 txqueuelen 1000 (Ethernet)
       RX packets 0 bytes 0 (0.0 B)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 0 bytes 0 (0.0 B)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
       inet 127.0.0.1 netmask 255.0.0.0
       inet6 ::1 prefixlen 128 scopeid 0x10<host>
       loop txqueuelen 0 (Local Loopback)
       RX packets 9855259 bytes 517557258 (493.5 MiB)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 9855259 bytes 517557258 (493.5 MiB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

#### 20. Update the system hosts file with entries for all nodes:

#### # vim /etc/hosts

```
172.16.0.192 controller controller.openstack.lab.eco.rackspace.com
172.16.0.203 computel computel.openstack.lab.eco.rackspace.com
172.16.0.204 computel-vm computel-vm.openstack.lab.eco.rackspace.com
172.16.0.195 compute2 compute2.openstack.lab.eco.rackspace.com
172.16.0.196 block1 block1.openstack.lab.eco.rackspace.com
172.16.0.197 object1 object1.openstack.lab.eco.rackspace.com
172.16.0.198 object2 object2.openstack.lab.eco.rackspace.com
```

#### 21. Update the chrony configuration to use the controller as a time source:

```
# vim /etc/chrony.conf
```

```
server controller iburst
```

- Remove any other servers listed, leaving only "controller".
- 22. Restart the chrony service, and confirm that "controller" is listed as a source:

### 23. Enable the OpenStack-Liberty yum repository:

```
# yum install centos-release-openstack-liberty
```

### 24. Install the OpenStack client and SELINUX support:

# yum install python-openstackclient openstack-selinux

# CHAPTER 19

## 19. Install Compute (nova) on KVM Host

This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/nova-compute-install.html

http://docs.openstack.org/liberty/install-guide-rdo/cinder-storage-install.html

http://docs.openstack.org/liberty/install-guide-rdo/nova-verify.html

1. Install nova packages:

# yum install openstack-nova-compute sysfsutils

2. Format and mount the second array for instance storage:

```
# parted -s -- /dev/sdb mklabel gpt
# parted -s -a optimal -- /dev/sdb mkpart primary 2048s -1
# parted -s -- /dev/sdb align-check optimal 1
# parted /dev/sdb set 1 lvm on
# parted /dev/sdb unit s print
# mkfs.xfs /dev/sdb1
# mount /dev/sdb1 /var/lib/nova/instances
# tail -1 /etc/mtab >> /etc/fstab
# chown nova:nova /var/lib/nova/instances
```

3. Update the LVM configuration to prevent scanning of instances' contents:

```
# vim /etc/lvm/lvm.conf
devices {
    ...
    filter = [ "a/sda/", "a/sdb/", "r/.*/"]
```

- Note: Do not replace the entire "devices" section, only the "filter" line.
- 4. Configure nova. Replace \*SERVER\_IP\*, \*RABBIT\_PASS\*, \*NOVA\_PASS\* and \*CONTROLLER\_ADDRESS\* with your own:

```
# vim /etc/nova/nova.conf
 [DEFAULT]
 rpc_backend = rabbit
 auth_strategy = keystone
 my_ip = *SERVER_IP*
 network_api_class = nova.network.neutronv2.api.API
 security_group_api = neutron
 linuxnet_interface_driver = nova.network.linux_net.
↔NeutronLinuxBridgeInterfaceDriver
 firewall_driver = nova.virt.firewall.NoopFirewallDriver
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = nova
 password = *NOVA_PASS*
 [vnc]
 enabled = True
 vncserver_listen = 0.0.0.0
 vncserver_proxyclient_address = $my_ip
 novncproxy_base_url = http://*CONTROLLER_ADDRESS*:6080/vnc_auto.html
 [glance]
 host = controller
 [oslo_concurrency]
 lock_path = /var/lib/nova/tmp
 [libvirt]
 virt_type = kvm
```

5. Enable and start the nova and libvirt services:

```
# systemctl enable libvirtd.service openstack-nova-compute.service
# systemctl start libvirtd.service openstack-nova-compute.service
```

- 6. Log on to the control node as root.
- 7. Load the "admin" credential file:

# source admin-openrc.sh

8. Check the nova service list:

```
| Id | Binary
            | Host
                                                | Zone
→ | Status | State | Updated_at
                              | Disabled Reason |
 ______
| 1 | nova-consoleauth | controller.openstack.lab.eco.rackspace.com |...
→internal | enabled | up | 2016-02-09T17:19:38.000000 | -
                                                   | 2 | nova-scheduler | controller.openstack.lab.eco.rackspace.com |
→internal | enabled | up | 2016-02-09T17:19:41.000000 | -
                                                   | 3 | nova-conductor | controller.openstack.lab.eco.rackspace.com |
→internal | enabled | up | 2016-02-09T17:19:41.000000 | -
                                                   | 4 | nova-cert | controller.openstack.lab.eco.rackspace.com |
→internal | enabled | up | 2016-02-09T17:19:38.000000 | -
                                                   5 | nova-compute | compute1-vm.openstack.lab.eco.rackspace.com | nova
→ | enabled | up | 2016-02-09T17:19:39.000000 | - |
| 6 | nova-compute | compute2.openstack.lab.eco.rackspace.com
                                                | nova
→ | enabled | up | 2016-02-09T17:19:36.000000 | - |
```

• The list should include compute1-vm and compute2 running nova-compute.

# CHAPTER 20

## 20. Install Networking (neutron) on KVM Host

This page is based on the following OpenStack Installation Guide pages:

http://docs.openstack.org/liberty/install-guide-rdo/neutron-compute-install.html

### All steps except 2 have modifications for XenServer.

1. Install the neutron and ovs packages:

2. Configure neutron. Replace \*RABBIT\_PASS\* and \*NEUTRON\_PASS\* with your own:

```
# vim /etc/neutron/neutron.conf
 [DEFAULT]
 rpc_backend = rabbit
 auth_strategy = keystone
 [oslo_messaging_rabbit]
 rabbit_host = controller
 rabbit_userid = openstack
 rabbit_password = *RABBIT_PASS*
 [keystone_authtoken]
 auth_uri = http://controller:5000
 auth_url = http://controller:35357
 auth_plugin = password
 project_domain_id = default
 user_domain_id = default
 project_name = service
 username = neutron
 password = *NEUTRON_PASS*
 [oslo_concurrency]
 lock_path = /var/lib/neutron/tmp
```

- Make sure that any connection options under [database] are deleted or commented-out.
- Delete or comment-out any pre-existing lines in the [keystone\_authtoken] section.
- 3. Configure the neutron ovs agent. Replace **\*XAPI\_BRIDGE\*** with your own:

```
# vim /etc/neutron/plugins/ml2/openvswitch_agent.ini
[ovs]
integration_bridge = *XAPI_BRIDGE*
bridge_mappings = public:br-eth0
[securitygroup]
firewall_driver = neutron.agent.firewall.NoopFirewallDriver
```

4. Reconfigure nova to use neutron. Replace \*NEUTRON\_PASS\* and \*XAPI\_BRIDGE\* with your own:

```
# vim /etc/nova/nova.conf
[neutron]
url = http://controller:9696
auth_url = http://controller:35357
auth_plugin = password
project_domain_id = default
user_domain_id = default
region_name = RegionOne
project_name = service
username = neutron
password = *NEUTRON_PASS*
ovs_bridge = *XAPI_BRIDGE*
[DEFAULT]
linuxnet_ovs_integration_bridge = *XAPI_BRIDGE*
```

5. Enable and start the ovs service:

```
# systemctl enable openvswitch.service
# systemctl start openvswitch.service
```

6. Set up the ovs bridge to the public network:

```
# ovs-vsctl add-br br-eth0
# ovs-vsctl add-port br-eth0 eth0
```

### 7. Enable and start the neutron service:

```
# systemctl enable neutron-openvswitch-agent.service
# systemctl start neutron-openvswitch-agent.service
```

# CHAPTER 21

### 21. Update images for dual-hypervisor environment

This page is not based on the OpenStack Installation Guide.

- 1. Log on to the controller node as root.
- 2. Download the cirros image for KVM hypervisors:

# wget http://download.cirros-cloud.net/0.3.4/cirros-0.3.4-x86\_64-disk.img

3. Upload the image to glance:

- 4. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard
- 5. Log in using the admin credentials.

6. In the left-hand menu, under "Admin", and then "System", click on "Images". Click on the "cirros-kvm" image:

🧾 openstack	🔳 admin 👻		💄 adm	in 🔻
Project ~	Image Deta	ails: cirros-kvm		
Admin ^			Edit Image	•
System ^				
Overview	Image Overvie	W		
Hypervisors	Information			
Host Aggregates	Name ID	cirros-kvm fdf88ac1-0bb8-40bf-a45f-707c201fa8a5		
Instances	Owner Status	76f8c8fd7b1e407d97c4604eb2a408b3 Active		
Volumes	Public Protected	Yes No		
Flavors	Checksum Created	ee1eca47dc88f4879d8a229cc70a07c6 Feb. 1, 2016, 2:19 p.m.		
Images	Updated	Feb. 1, 2016, 2:19 p.m.		
Networks	Specs			
Defaults	Size Container Format	12.7 MB BARE		
Metadata Definitions	Disk Format	QCOW2		
System Information	Custom Properties			
Identity ~				

7. In the top-right drop-down, click on "Update Metadata":

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter Q	Existing Metadata Filter Q
Custom	No existing metadata
No available metadata	

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.



8. On the left-hand side, in the "custom" box, enter "hypervisor\_type", and then click on the + button:

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter Q	Existing Metadata Filter Q
Custom hypervisor_type +	No existing metadata
No available metadata	

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

|--|

10. Now, on the right-hand side, in the "hypervisor\_type" box, enter "kvm" and click "Save":

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter Q	Existing Metadata	Filter	Q
Custom +	hypervisor_type	kvm	-
No available metadata			
hypervisor_type (hypervisor_type)			
		× Cancel	🖹 Save

- 11. In the left-hand menu, under "Admin", and then "System", again click on "Images". This time click on the "cirros-xen" image.
- 12. Again click on "Update Metadata" in the drop-down. Follow the same steps, but set "hypervisor\_type" to "xen":

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter	Q	Existing Metadata	Filter	Q
Custom	+	hypervisor_type hypervisor_type	xen	-
No available metadata		vm_mode	xen	-
hypervisor_type (hypervisor_type)				

× Cancel

🖹 Save

# CHAPTER 22

### 22. Create Xen CentOS 7 Image

This page is not based on the OpenStack Installation Guide.

- 1. Log on to the control node as root.
- 2. Download the CentOS 7 ISO, and upload it to glance:

- 3. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard
- 4. Log in using the admin credentials.
- 5. In the left-hand menu, under "Admin", and then "System", click on "Hypervisors":

🧧 openstack	🗐 admin 👻								🛔 admin 🔻
Project ~	All Hypervisors								
Admin ^									
System ^	Hypervisor Summary								
Overview									
Hypervisors									
Host Aggregates	VCPU Usage Memor	y Usage		Local Dis	k Usage				
Instances	Used 0 of 96 Used 1GB	of 253.7	GB	Used 0Byte	s of 3.6TB				
Volumes	Hypervisor Compute Host								
Flavors	Hostname	Туре	VCPUs (used)	VCPUs (total)	RAM (used)	RAM (total)	Local Storage (used)	Local Storage (total)	Instances
Images	computed energetack lab acc rackanacc com	VOD	0	49	E12MP	12908	(Esta)	1 OTD	0
Networks	computer.openstack.tab.eco.tackspace.com	Xen	0	40	STOND	12030	oDytes	1.01D	0
Defaults	compute2.openstack.lab.eco.rackspace.com	QEIVIU	U	48	512MB	125.7GB	UBytes	1.818	U
Metadata Definitions	Displaying 2 items								
System Information									
Libertite									
identity *									

6. Click on the "Compute Host" tab:

openstack	I admin ▼							👗 admin 👻
Project v	All Hypervisors							
Admin     ^       System     ^       Overview       Hypenisors       Host Aggregates       Instances	Hypervisor Summary VCPU Usage Used 0 of 96	Memory Usage Used 1GB of 253.7GB	Loca Used 0	I Disk Usag Bytes of 3,0	le 6TB			
Volumes							Filter	Q
Images	Host			Zone	Status	State	Updated At	Actions
Networks	compute1-vm.openstack.lab.eco.	rackspace.com		nova	Enabled	Up	0 minutes	Disable Service
Defaults	compute2.openstack.lab.eco.rac	kspace.com		nova	Enabled	Up	0 minutes	Disable Service
Metadata Definitions	Displaying 2 items							
System Information	_							
Identity ~								

- 7. Next to "compute2", click on "Disable Service".
- 8. Enter a reason of "Building Xen image", and click "Disable Service":

Q
le Service
le Service

- 9. In the left-hand menu, under "Project", and then "Compute", click on "Instances". Click on "Launch Instance".
- 10. Give the instance the name "centos7-xen-build", use the flavor m1.small (for a 20GB disk), and select "Boot from image" and the "CentOS 7 ISO" image. Launch the instance:

## Launch Instance

Details *	Access & Security	Networking *	Post-Creation	Advanced Options	
Availability 2	Zone		Specify the deta	ails for launching an inst	ance.
nova		~	The chart below	shows the resources u	sed by this projec
Instance Nar	ne *		in relation to the	e project's quotas.	
centos7-xei	n-build		Flavor Detai	ls	
			Name	m1.small	
Flavor * 🕜			VCPUs	1	
m1.small		~	Root Disk	20 GB	
Instance Cou	ınt * 🛛		Ephemeral D	isk 0 GB	
1		\$	Total Disk	20 GB	
Instance Boo	ot Source * 🛛		RAM	2,048 MB	
Boot from i	mage	~	D		
Image Name	*		Project Limit	[S	0 of 10 Use
CentOS 7	ISO (376.0 MB)	~			
			Number of VCI	PUs	0 of 20 Used
			Total RAM	0 (	of 51,200 MB Used
				Ca	ncel Launch

11. Wait for the instance to enter "Active" state. Then click on the instance. Click on the "Console" tab, and then click on the grey "Connected (unencrypted) to: QEMU" bar so that keyboard input will be directed to the console:

×



12. Highlight "Install CentOS 7", and press Enter. Wait for the installer to start:

			CENTOS 7 INSTALLATION Bus Help!
CentOS	WELCOME TO C	ENTOS 7.	
	What language would y	ou like to use during the ins	tallation process?
	English	Enalish 🗡	English (United States)
	Afrikaans	Afrikaans	English (United Kingdom)
	አማርኛ	Amharic	English (India)
	العربية	Arabic	English (Australia)
	অসমীয়া	Assamese	English (Canada)
	Asturianu	Asturian	English (Denmark)
	Беларуская	Belarusian	English (New Zealand)
	Български	Bulgarian	English (Nigeria)
	বাংলা	Bengali	English (Hong Kong SAR China)
	Bosanski	Bosnian	English (Philippines)
	Català	Catalan	English (Singapore)
	Čeština	Czech	English (South Africa)
	Cymraeg	Welsh	English (Zambia)
	Dansk	Danish	English (Botswana)
		Dunish	
		Ð	
			Quit Continue

- 13. Set language and timezone.
- 14. Click on "Network & Hostname". Enable the network interface by setting the switch to "On":

NETWORK Done	& HOST NAME		CENTOS 7 INSTALLATION
Ether	net (ethO)	Ethernet (ethO) Connected Hardware Address FA:16:3E:37:23:97 Speed IP Address 192.168.100.111 Subnet Mask 255.255.255.0 Default Route 192.168.100.1 DNS 8.8.8.8	ON
+ – Host name:	host-192-168-100-111		Configure

- 15. Click on "Installation Source". Set the source to network, and then define a known-good mirror. You can use http://mirror.rackspace.com/CentOS/7.2.1511/os/x86\_64/.
- 16. Click on "Installation Destination". Select "I will configure partitioning" and click on "Done":

INSTALLATION DESTINATION	CENTOS 7 INSTALLATION
Done	🖽 us Help!
Device Selection	
Select the device(s) you'd like to install to. They will be left untouched until you click on the main mer	nu's "Begin Installation" button.
Local Standard Disks	
20 GiB	
xvda / 992.5 KiB free	
<u>k</u>	Disks left unselected here will not be touched.
Specialized & Network Disks	
Add a disk	
	Disks left unselected here will not be touched.
Other Storage Options	
Partitioning	
Automatically configure partitioning. I will configure partitioning.	
I would like to make additional space available.	
Encryption Encrypt my data. You'll set a passphrase next.	
Full disk summary and boot loader 1	disk selected; 20 GiB capacity; 992.5 KiB free

17. Click the arrow next to the word "Unknown" to expand that section and display the partition. Select "Reformat", set the file system to "ext4", and set the mount point to "/". Click Done:

		CENTOS 7 INSTALLATION
New CentOS 7 Installation	xvdal	
CentOS 7 installation yet. You can:	Mount Point:	Device (s):
Click here to create them automatically.	/	
<ul> <li>Create new mount points by clicking the '+' button.</li> </ul>	Desired Capacity: 20 GiB	(xvda)
<ul> <li>Or, assign new mount points to existing partitions after selecting them below.</li> </ul>		Modify
New mount points will use the following partitioning scheme:		riouny
LVM 👻	Device Type:	
✓ Unknown	Standard Partition 🔻 🗌 Encrypt	
Unknown 20 GiB >	File System: ext4   Reformat	
	Label:	Name:
		xvdal
		Update Settings
+ - C		Note: The settings you make on this screen will not be applied until you click on the main menu's
		'Begin Installation' button.
AVAILABLE SPACETOTAL SPACE992.5 KiB20 GiB		
<u>1 storage device selected</u>		Reset All

18. A yellow warning bar will appear. Click "Done" again, and then click on "Accept Changes".



19. Click on "Software Selection". Select "Infrastructure Server", and click "Done".

Base Environment	Add-Ons for Selected Environment
<ul> <li>Minimal Install Basic functionality.</li> <li>Compute Node Installation for performing computation and processing.</li> <li>Infrastructure Server Server for operating network infrastructure services.</li> <li>File and Print Server File, print, and storage server for enterprises.</li> <li>Basic Web Server Server for serving static and dynamic internet content.</li> <li>Virtualization Host Minimal virtualization host.</li> <li>Server with GUI Server for operating network infrastructure services, with a GUI.</li> <li>GNOME Desktop GNOME is a highly intuitive and user friendly desktop environment.</li> <li>KDE Plasma Workspaces The KDE Plasma Workspaces, a highly-configurable graphical user interface which includes a panel, desktop, system icons and desktop widgets, and many powerful KDE applications.</li> <li>Development and Creative Workstation Workstation for software, hardware, graphics, or content development.</li> </ul>	<ul> <li>Backup Server         Software to centralize your infrastructure's backups.</li> <li>DNS Name Server         This package group allows you to run a DNS name server (BIND) on         the system.</li> <li>Debugging Tools         Tools for debugging misbehaving applications and diagnosing         performance problems.</li> <li>Directory Client         Clients for integration into a network managed by a directory service.</li> <li>E-mail Server         Allows the system to act as a SMTP and/or IMAP e-mail server.</li> <li>FTP Server         Allows the system to act as an FTP server.</li> <li>File and Storage Server         CIFS, SMB, NFS, iSCSI, iSER, and iSNS network storage server.</li> <li>Guest Agents         Agents used when running under a hypervisor.</li> <li>Hardware Monitoring Utilities         A set of tools to monitor server hardware.</li> <li>High Availability         Infrastructure for highly available services and/or shared storage.</li> <li>Identity Management Server         Centralized management of users, servers and authentication policies.</li> <li>Infiniband Support         Software designed for supporting clustering and grid connectivity using         RDMA-based InfiniBand and iWARP fabrics.</li> <li>Java Platform</li> </ul>

- 20. Click "Begin Installation". Click on "Root Password" and set a good password.
- 21. Once installation is complete, click "Reboot".
- 22. When reboot completes, your connection to the console will likely die. Refresh the page, click on the "Console" tab again, and then click on the grey banner again.
- 23. The server will be attempting to boot from the ISO once more. Press any key to stop the countdown.
- 24. In the top-right of the page, click the "Create Snapshot" button:

🧧 openstack	🚍 admin 🔻	🛔 admin 👻
Project ^	Instance Details: centos7-xen-build	
Compute ^		Create Snapshot 👻
Overview	Overview Log Console Action Log	
Instances	Instance Console	
Volumes	If console is not responding to keyboard input: click the grey status bar below. Click here to show only console	
Images	To exit the fullscreen mode, click the browser's back button.	
Access & Security		
Network ×	Connected (unencrypted) to: QEMU	Send CtrlAltDel
Admin ~		
Identity ~		

25. Call the image "centos7-xen-initialkick" and click on "Create Snapshot":

Create Snapshot	×
Snapshot Name * centos7-xen-initialkick	<b>Description:</b> A snapshot is an image which preserves the disk state of a running instance.
	Cancel Create Snapshot

- 26. Horizon will show the "Images" page. Wait until "centos7-xen-initialkick" reaches "Active" status, and then click on the image.
- 27. In the top-right drop-down, click on "Update Metadata".
- 28. On the left-hand side, in the "custom" box, enter "vm\_mode" and click on the + button.
- 29. On the right-hand side, in the "vm\_mode" box, enter "hvm".
- 30. On the left-hand side, in the "custom" box, enter "hypervisor\_type" and click on the + button.
- 31. On the right-hand side, in the "hypervisor\_type" box, enter "xen", and click on the "Save" button:

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter Q	Existing Metadata	Filter Q
Custom	auto_disk_config	True -
No available metadata	base_image_ref	d3cd60e2-753d
	hypervisor_type	xen –
	image_type	snapshot –
	instance_uuid	25b6d5dc-da58
	os_type	linux –
	user_id	31766cbe74d54 -
	vm_mode	hvm – v
hypervisor_type (hypervisor_type)		
		★ Cancel Save

- 32. In the left-hand menu, under "Project", and then "Compute", click on "Instances".
- 33. Highlight the "centos7-xen-build" instance, and click on "Terminate Instances".

🔲 openstack			admin 👻											💄 admin 👻
Project	Instances													
Compute ^ Filter Filter			Filter	🛆 Lau	unch Instance	× Terminate Inst	ances More Actions -							
	Overview		Instance	Image	IP Address	Size	Key	Status	Availa	bility	Task	Power	Time since	Actions
I	nstances		Name	Name			Fall		Zone			State	created	
	Volumes		centos7- xen-build	CentOS 7 ISO	192.168.100.72	m1.small	-	Active	nova		None	Running	21 minutes	Create Snapshot 👻
Images Displaying 1 item														
Access &	Security													

34. Click "Terminate Instance" again to confirm:

Confirm Terminate Instances	×
You have selected "centos7-xen-build". Please confirm your selection. Terminated instances are not recoverable.	
Cancel Terminate Instan	ces

35. Click on "Launch Instance". Give the instance the name "centos7-xen-build", use the flavor m1.small (for a 20GB disk), and select "Boot from image" and the "centos7-xen-initialkick" image. Launch the instance:

×

## Launch Instance

Details *	Access & Security	Networking *	Post-Creation	Advanced Options			
Availability Z	lone		Specify the deta	ails for launching an instance.			
nova		~	The chart below shows the resources used by this project				
Instance Nan	ne *		in relation to the project's quotas.				
centos7-xer	n-build		Nama				
Flavor * 🙆			Name	milismaii			
			VCPUs	1			
m1.small		<u> </u>	Root Disk	20 GB			
have been disa	abled.	gerequirements	Ephemeral D	isk 0 GB			
Instance Cou	int * 🛛		Total Disk	20 GB			
1		•	RAM	2,048 MB			
Instance Boo	ot Source * 🕑		Project Limit	te			
Boot from i	mage	~	Number of Inst	tances 0 of 10 Use			
Image Name	*						
centos7-xe	n-initialkick (476.7 MB)	~	Number of VC	PUs 0 of 20 Use			
			Total RAM	0 of 51,200 MB Use			
			•				
				Cancel			

- 36. Wait for the instance to enter "Active" state. SSH to the new instance as "root", using the root password used during setup.
- 37. Delete the static hostname file:

# rm /etc/hostname

38. Stop and disable the firewalld service:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

### 39. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
```

SELINUX=permissive

### 40. Update all packages on the server:

```
# yum update
```

41. Download and install the XenServer tools:

```
# wget http://boot.rackspace.com/files/xentools/xs-tools-6.5.0-20200.iso
# mkdir /mnt/cdrom
# mount -o loop xs-tools-6.5.0-20200.iso /mnt/cdrom
# cd /mnt/cdrom/Linux
# rpm -Uvh xe-guest-utilities-xenstore-6.5.0-1427.x86_64.rpm xe-guest-utilities-6.
$\leftarrow 5.0-1427.x86_64.rpm
# cd ~
# umount /mnt/cdrom
# rm xs-tools-6.5.0-20200.iso
```

### 42. Reboot the instance:

# systemctl reboot

43. Wait for the server to reboot, and then log back in as root.

#### 44. Install the nova-agent:

45. Create a CentOS 7.2-compatible systemd unit file for the nova-agent service:

```
# vim /usr/lib/systemd/system/nova-agent.service
[Unit]
Description=nova-agent service
After=xe-linux-distribution.service
[Service]
EnvironmentFile=/etc/nova-agent.env
ExecStart=/usr/sbin/nova-agent -n -l info /usr/share/nova-agent/nova-agent.py
[Install]
WantedBy=multi-user.target
```

46. Create a python environment file for the nova-agent service:

```
# vim /etc/nova-agent.env
```

```
LD_LIBRARY_PATH="${LD_LIBRARY_PATH}:/usr/share/nova-agent/1.39.1/lib"
PYTHONPATH="${PYTHONPATH}:/usr/share/nova-agent/1.39.1/lib/python2.6/site-

opackages:/usr/share/nova-agent/1.39.1/lib/python2.6/"
```

47. Reload systemd to import the new unit file:

```
# systemctl daemon-reload
```

48. Enable and start the nova-agent service:

```
# systemctl enable nova-agent.service
# systemctl start nova-agent.service
```

### 49. Remove the static network configuration file:

```
# rm /etc/sysconfig/network-scripts/ifcfg-eth0
```

50. Clear the root bash history:

# rm /root/.bash\_history; history -c

51. In horizon, click the "Create Snapshot" button next to the Instance. Name the image "CentOS 7 (Xen)":

### **Create Snapshot**

Ŀ.

Snapshot Name *	
CentOS 7 (Xen)	Description:
	A snapshot is an image which preserves the disk state of a running instance.

52.	Wait for the image to go to "Active" state and then	, from the drop-down box	next to the image,	click on "	Update
	Metadata".				

- 53. On the left-hand side, in the "Custom" box, enter "xenapi\_use\_agent", and then click the + button.
- 54. On the right-hand side, in the "xenapi\_use\_agent", enter "true" and then click the Save button:

×

Create Snapshot

Cancel

You can specify resource metadata by moving items from the left column to the right column. In the left columns there are metadata definitions from the Glance Metadata Catalog. Use the "Other" option to add metadata with the key of your choice.

Available Metadata Filter Q	Existing Metadata	Filter Q
Custom +	base_image_ref	d3cd60e2-753d
No available metadata	hypervisor_type	xen –
	image_type	snapshot –
	instance_uuid	87f0c0e7-799c-4 -
	os_type	linux –
	user_id	31766cbe74d54 -
	vm_mode	hvm –
	xenapi_use_agent	true –
<pre>xenapi_use_agent (xenapi_use_agent)</pre>		
		🗙 Cancel 🖺 Save

55. In the drop-down box next to the image, click on "Edit Image".

56. Check the "public" and "protected" boxes, and click on "Update Image":

x

# Update Image

Name *	
CentOS 7 (Xen)	Description:
Description	Edit the image details.
Kernel ID	
Ramdisk ID	
Architecture	
Format *	
VHD - Virtual Hard Disk ~	
Minimum Disk (GB) 🕜	
20	
Minimum RAM (MB) 📀	
0	
Public	
✓ Protected	
	Cancel Update Image

### 57. Select the "centos7-xen-initialkick" image, and click on "Delete Images". Click "Delete Images" to confirm:

🧧 openstack	■ admin ▼ & ad									🛔 admin 👻		
Project ^	Im	ages										
Compute ^					# Project (5)	🖻 Shared with Me (0)	Public (3)		+ Create Ima	ge	× Delete Images	
Overview		Image Name	Туре	Status	Public	Protected	Format	Sia	Size Ac		Actions	
Instances		CentOS 7 (Xen)	Snapshot	Active	No	No	VHD	843.8 MB		Laur	Launch Instance 👻	
Volumes		centos7-xen-initialkick	Snapshot	Active	No	No	VHD	47	6.7 MB	Laur	nch Instance 👻	

- 58. In the left-hand menu, under "Project" and then "Compute", click on "Instances".
- 59. Highlight the "centos7-xen-build" instance, and click on "Terminate Instances". Click "Terminate Instances" to confirm:

Confirm Terminate Instances	×
You have selected "centos7-xen-build". Please confirm your selection. Terminated instances are not recoverable.	
Cancel Terminate Instance	es

60. In the left-hand menu, under "Admin" and then "System" click on "Hypervisors". Next to "compute2", click on "Enable Service".
# CHAPTER 23

#### 23. Launch test Xen CentOS 7 Instance

This page is not based on the OpenStack Installation Guide.

- 1. From a web browser, access http://\*CONTROLLER ADDRESS\*/dashboard.
- 2. Log in using the demo credentials.
- 3. In the left-hand menu, under "Project", and then "Compute", click on "Access & Security". Click on the "Key Pairs" tab:

Denstack	🔲 demo 🔻		🚢 demo 🔻
Project ^	Access & Security		
Compute ^	Security Groups Key Pairs API Access		
Overview		Filter Q	+ Create Key Pair
Instances	Key Pair Name	Fingerprint	Actions
Volumes		No items to display.	
Images	Displaying 0 items		
Access & Security			
Network ~			

4. If you have an SSH keypair already available which you would like to use, click on "Import Key Pair". Give the key a name and then paste in your public key:

### Import Key Pair

Key Pair Name	*		
alex-rax			Description:
Public Key *			Key Pairs are how you login to your instance after it is launched.
		^	Choose a key pair name you will recognise and paste your SSH public key into the space provided.
			SSH key pairs can be generated with the ssh-keygen command:
			ssh-keygen -t rsa -f cloud.key
		~	This generates a pair of keys: a key you keep private (cloud.key) and a public key (cloud.key.pub). Paste the contents of the public key file here.
		.::	After launching an instance, you login using the private key (the username might be different depending on the image you launched):
			ssh -i cloud.key <username>@<instance_ip></instance_ip></username>
			Cancel Import Key Pair
🗖 open <mark>stack</mark>	🔳 demo 💌		🛓 demo
roject ^	Access & Security		
roject ^	Access & Security Security Groups Key Pairs API Acce	\$\$	
roject ^ ompute ^ Overviev	Access & Security Security Groups Key Pairs API Acce	SS	Filter Q + Create Key Pair \$ Import Key Pair \$ Delete Key Pairs
roject ^ ompute ^ Overview Instance:	Access & Security Security Groups Key Pairs API Acce	Fingerprint	Filter     Create Key Pair     Import Key Pair       Actions
roject ^ ompute ^ Overview Instance: Volume:	Access & Security Security Groups Key Pairs API Acce Key Pair Name alex-rax	Fingerprint	Filter     Q     + Create Key Pair     LImport Key Pair     X Delete Key Pairs       Actions       Delete Key Pair
roject ^ ompute ^ Overview Instance: Volume: Image:	Access & Security Security Groups Key Pairs API Acce	Fingerprint	Filter     Create Key Pair     Import Key Pair     Celete Key Pairs       Actions     Delete Key Pair
roject ^ ompute ^ Overview Instance Volume Image Access & Security	Access & Security Security Groups Key Pairs API Acce  Key Pair Name alex-rax Displaying 1 tem	Fingerprint	Filter     Q     + Create Key Pair     ▲ Import Key Pair     × Delete Key Pairs       Actions       Delete Key Pair
roject ^ ompute ^ Overview Instance Volume: Image Access & Security etwork ~	Access & Security Security Groups Key Pairs API Acce  Key Pair Name alex-rax Displaying 1 tem	Fingerprint	Filter     Create Key Pair     Import Key Pair       Actions       Delete Key Pair

5. Alternatively, if you would like to create a new pair, click on "Create Key Pair. Give the key a name and click on "Create Key Pair. Download the key for use in your SSH client:

×

×

### Create Key Pair

Koy Dair Nama *						
created		Description:				
		Key pairs are ssh credentials which are injected into images when they are launched. Creating a new key pair registers the public key and downloads the private key (a .pem file).				
		Protect and use the key as you would any normal ssh private key.				
		Cancel Create Key Pair				
🔲 open <mark>stack</mark>	ा demo ▼	🔺 demo				
<sup>o</sup> roject ^	Download Key Pair					
ompute ^	The key pair "created" should	download automatically. If not use the link below.				
Overview	The key pair "created" should Download key pair "created"	download automatically. If not use the link below.				
ompute ^ Overview Instances Volumes Images	The key pair "created" should	download automatically. If not use the link below.				
Compute ^ Overview Instances Volumes Images Access & Security	The key pair "created" should	download automatically. If not use the link below.				
Compute ^ Overview Instances Volumes Images Access & Security Ietwork ~	The key pair "created" should Download key pair "created"	download automatically. If not use the link below.				

6. In the left-hand menu, under "Project", and then "Compute", click on "Instances".

7. Click on "Launch Instance". Name the instance "centos7-test", select the "m1.small" flavor, and "boot from image". Choose the "CentOS 7 (Xen)" image. Before clicking on "Launch", click on the "Access & Security" tab:

Launch Instance		X				
Details * Access & Security Networking *	Post-Creation Ad	dvanced Options				
Availability Zone          nova       ~         Instance Name *	Specify the details for launching an instance. The chart below shows the resources used by this p in relation to the project's quotas. Flavor Details Name m1.small					
Flavor * m1.small Some flavors not meeting minimum image requirements have been disabled.	Name VCPUs Root Disk Ephemeral Disk	m1.small 1 20 GB 0 GB				
Instance Count * 🚱	Total Disk RAM	20 GB 2,048 MB				
Instance Boot Source * 🚱 Boot from image 🗸 🗸	Project Limits Number of Instanc	ces 0 of 10 Used				
CentOS 7 (Xen) (843.8 MB)	Total RAM	0 of 51,200 MB Used				
		Cancel Launch				

8. Ensure that the key pair you just created or imported is selected, and then click on Launch:

Launch	Instance			:
Details *	Access & Security	Networking *	Post-Creation	Advanced Options
Key Pair 🛛		~ <b>+</b>	Control acces groups, and ot	s to your instance via key pairs, security ther mechanisms.
Security Gro	ups 🕜			

- 9. Wait for the instance to go to "Active" state, and then SSH to the server as "root", using the key pair you just created or imported.
- 10. When you are satisfied that the test instance is working, select it and then click on "Terminate Instances". Click on "Terminate Instances" to confirm.

🔲 openst	tack		demo 🕶												💄 demo 💌
Project	^	Ins	stances	;											
Compute				In	stance Name	Filter				Filter	🛆 Laun	ch Instance	🗙 Terminate Inst	ances	More Actions -
	Overview		Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availa Zone	ability	Task	Power State	Time since created	Action	s
	Instances														
	Volumes		centos7-test	CentOS 7 (Xen)	192.168.100.77	m1.small	alex-rax	Active	nova		None	Running	4 minutes	Creat	te Snapshot 💌
	Images	Displa	ying 1 item												
,	Access & Security														
Network	~														
Identity	~														

## CHAPTER 24

### 24. Create KVM CentOS 7 Image

This page is not based on the OpenStack Installation Guide.

- 1. From a web browser, access  $http://*CONTROLLER_ADDRESS*/dashboard.$
- 2. Log in using the admin credentials.
- 3. In the left-hand menu, under "Admin", and then "System", click on "Hypervisors":

Denstack	📾 admin 👻								💄 admin 🔻
Project ~	All Hypervisors								
Admin ^	Hypervisor Summary								
System ^									
Overview									
Hypervisors									
Host Aggregates	VCPU Usage Memo	ry Usage	CD	Local Disk	Usage				
Instances		5 01 233.1	GD	Used Ubytes	01 3.01 D				
Volumes	Hypervisor Compute Host								
Flavors	Hostname	Туре	VCPUs (used)	VCPUs (total)	RAM (used)	RAM (total)	Local Storage (used)	Local Storage (total)	Instances
Images	compute1.openstack.lab.eco.rackspace.com	xen	0	48	512MB	128GB	0Bytes	1.8TB	0
Networks	compute2.openstack.lab.eco.rackspace.com	QEMU	0	48	512MB	125.7GB	0Bytes	1.8TB	0
Defaults	Displaying 2 items								
Metadata Definitions									
System Information									
Identity ~									

4. Click on the "Compute Host" tab:

🧧 openstack	🗐 admin 🔻						🛔 admin 🔻
Project ~	All Hypervisors						
Admin ^							
System ^	Typervisor Summary						
Overview							
Hypervisors							
Host Aggregates	VCPU Usage	Memory Usage	Local Disk Us	age			
Instances	Used 0 of 96	Used 1GB of 253.7GB	Used 0Bytes of	3.6TB			
Volumes	Hypervisor Compute Host						
Flavors						Filter	Q
Images	Host		Zone	Status	State	Updated At	Actions
Networks	compute1-vm.openstack.lab.eco.	rackspace.com	nova	Enabled	Up	0 minutes	Disable Service
Defaults	compute2.openstack.lab.eco.rac	kspace.com	nova	Enabled	Up	0 minutes	Disable Service
Metadata Definitions	Displaying 2 items						
System Information							
Identity ~							
Identity ~							

- 5. Next to "compute1-vm", click on "Disable Service".
- 6. Enter a reason of "Building KVM image", and click "Disable Service":

Host *	
compute1-vm.openstack.lab.eco.rackspace.com	Description:
Reason	Disable the compute service.
Building KVM Image	

- 7. In the left-hand menu, under "Project", and then "Compute", click on "Instances". Click on "Launch Instance".
- 8. Give the instance the name "centos7-kvm-build", use the flavor m1.small (for a 20GB disk), and select "Boot from image" and the "CentOS 7 ISO" image. Launch the instance:

×

#### Launch Instance

Ŀ.

Details *	Access & Security	Networking *	Post-Creation	Advanced Options	
Availability Z	Zone		Specify the deta	ils for launching an instance.	
nova		~	The chart below	shows the resources used by this proj	ject
Instance Nan	ne *		in relation to the	project's quotas.	
centos7-kvn	n-build		Flavor Detail	S	
			Name	m1.small	
Flavor * 🕜			VCPUs	1	
m1.small		~	Root Disk	20 GB	
Instance Cou	int * 🕜		Ephemeral Di	sk 0 GB	
1		•	Total Disk	20 GB	
Instance Boo	ot Source * 🕜		RAM	2,048 MB	
Boot from i	mage	~	Designation	_	
Image Name	*		Project Limit	S 1 of 10 11	
CentOS 7 I	ISO (376.0 MB)	~			
	x <i>r</i>		Number of VCF	PUs 1 of 20 U	lsed
			Total RAM	2.048 of 51.200 MB U	
				Cancel	ch

- 9. Wait for the instance to enter "Active" state. Then, in the left-hand menu, under "Project", and then "Compute", click on "Volumes". Click on "Create Volume".
- 10. Name the image "centos7-kvm-build", and set the size to 20 GB. Click "Create Volume":

### **Create Volume**

Volume Name						
centos7-kvm-build	Description:					
Description	Volumes are block devices instances.	Volumes are block devices that can be attached to instances.				
	Volume Type D	escription:				
	If "No volume type" is select without a volume type.	cted, the volume will be created				
Volume Source	Volume Limits					
No source, empty volume	✓ Total Gigabytes (0 GB)	1,000 GB Available				
Туре	Number of Volumes (0)	10 Available				
No volume type	~					
Size (GB) *						
20	2					
Availability Zone						
nova	~					
	(	Cancel Create Volume				

- 11. Once the volume enters "Available" status, click the "Actions" drop-down next to the volume, and select "Manage Attachments".
- 12. Under "Attach to instance", select "centos7-kvm-build", and click "Attach Volume":

×

Ŀ.

Manage Volume Attachments						
Instance	Device	Actions				
	No items to display.					
Displaying 0 items						
Attach To Instance						
Attach to Instance * 🕑						
centos7-kvm-build (d5144aed-0052-4a05-b	5da-fe5f939f9753)	~				
		Cancel Attach Volume				

13. In the left-hand menu, under "Project", and then "Compute", click on "Instances". Under the "Actions" dropdown for the "centos7-kvm-build" instance, click on "Hard Reboot Instance". Click on "Hard Reboot Instance" to confirm:

#### Confirm Hard Reboot Instance

You have selected "centos7-kvm-build". Please confirm your selection. Restarted instances will lose any data not saved in persistent storage.



14. Wait for the instance to go back to "Active" state, and then click on the instance. Click on the "Console" tab, and then click on the grey "Connected (unencrypted) to: QEMU" bar so that keyboard input will be directed to the console:

×

🧧 openstack	(	I admin ▼	💄 admin 👻
Project	^	Instance Details: centos7-kvm-build	
Compute	^		Create Snapshot 👻
	Overview	Overview Log Console Action Log	
	Instances	Instance Console	
	Volumes	If console is not recoording to keyboard input: click the area status for below. Click here to show only console	
	Images	To exit the fullscreen mode, click the browser's back button.	
Acce	ess & Security	Connected (unconstant) to OFINI Bestance (00000044)	Sand CtrlAltDol
Network	~	Connecteo (unencrypteo) to: QEMO (Instance-00000011)	Send CuriAitber
Admin	~		
Identity	~		
		CentOS 7	
		Install CentOS 7 Test this media & install CentOS 7	
		Troubleshooting >	
		Press Tab for full configuration options on menu items.	

- 15. Highlight "Install CentOS 7", and Enter.
- 16. Wait for the installer to boot:

	Images	If console is not responding to key To exit the fullscreen mode, click t	/board input: click the grey status b the browser's back button.	ar below. <u>Click here to show only c</u>	onsole	
	Access & Security		Connected (un	encrypted) to: QEMU (instance-0000	10011)	Send CtrlAltDel
Network	~				CEN	
Admin	~	<u>æ</u>			 = u	Help!
Identity	~					
		CentOS	WELCOME TO C	ENTOS 7.		
			What language would y	you like to use during the ins	tallation process?	
			English	English 🔪	English (United States)	
			Afrikaans	Afrikaans	English (United Kingdom)	
			አማርኛ	Amharic	English (India)	
			العربية	Arabic	English (Australia)	
		Ν	অসমীয়া	Assamese	English (Canada)	
		NS.	Asturianu	Asturian	English (Denmark)	
			Беларуская	Belarusian	English (New Zealand)	
			Български	Bulgarian	English (Nigeria)	
			বাংলা	Bengali	English (Hong Kong SAR China)	
			Bosanski	Bosnian	English (Philippines)	
			Català	Catalan	English (Singapore)	
			Čeština	Czech	English (South Arrica) English (Zambia)	
			Cymraeg	Welsh	English (Zimbabwe)	
			Dansk	Danish	English (Botswana)	
				Ø		
						Quit Continue
		(daabbaard (aasiast (innerse (				

- 17. Select language and set the timezone.
- 18. Click on "network & hostname" and activate the network interface by setting the switch to "On":

i	NETWORK & HOST NAME		CENTOS 7 INSTALLATION
	Red Hat, Inc Virtio network device	Ethernet (ethO)	ON
		Hardware Address FA:16:3E:7A:CO:4B	
		Speed	
		IP Address 192.168.100.80	
		Subnet Mask 255.255.255.0	
R.		Default Route 192.168.100.1	
		DNS 8.8.8	
	+ -		Configure
	Host name: host-192-168-100-80		

- 19. Click on "Installation Source". Set the source to network, and then define a known-good mirror. You can use http://mirror.rackspace.com/CentOS/7.2.1511/os/x86\_64/.
- 20. Click on "Installation Destination". Select "I will configure partitioning" and click on "Done":

	CENTOS 7 INSTALLATION
Device Selection	
Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begi	n Installation" button.
Local Standard Disks	
20 GiB	
Virtio Block Device	
vda / 20 GiB free	
Disks left u	nselected here will not be touched.
Specialized & Network Disks	
Add a disk	
Disks left ur	nselected here will not be touched.
Other Storage Options	
Partitioning	
Automatically configure partitioning. I will configure partitioning.	
I would like to make additional space available.	
Encryption	
Encrypt my data. You'll set a passphrase next.	
Full disk summary and boot loader 1 disk sele	ected; 20 GiB capacity; 20 GiB free

21. Under "New mount points will use the following partition scheme", select "Standard Partition".

22. Click on the + button. Set the mount point to / and click "Add mount point":

MANUAL PARTITIONING				CENTOS 7 INSTALLATI	ON
Done				Help	)!
<ul> <li>New CentOS 7 Installation         You haven't created any mount points for your CentOS 7 installation yet. You can:         </li> <li><u>Click here to create them automatically.</u></li> <li>Create new mount points by clicking the '+' button.</li> <li>New mount points will use the following partitioning scheme:</li> </ul>					
Standard Partition	ADD A NEW M More custom after creating Mount Point: Desired Capacity:	OUNT POINT ization options are availabl the mount point below. / / /boot /home /var	e int	installation, you'll be able to view their details here.	
<u>1 storage device selected</u>				Reset /	ALL

23. Set "File System" to "ext4", and then click "Done":

MANUAL PARTITIONING			CENTOS 7 INSTALLATION Bus Help!
New CentOS 7 Installation		vdəl	
SYSTEM /	20 GiB >	Mount Point:	Device (s):
Vai		Desired Capacity:	Virtio Block Device (vda)
			Modify
		Device Type: Standard Partition  Encrypt File System: ext4 Reformat	
		Label:	Name: vdal
+ - C AVAILABLE SPACE 992.5 KiB TOTAL SPACE 20 GiB			Update Settings Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.
1 storage device selected			Reset All

24. A yellow warning bar will appear. Click "Done" again, and then click on "Accept Changes":

MANUAL PARTI	TIONIN	G						7 INSTALLATION Help!
▼ New CentC	OS 7 Ins	tallation		vdal				
SYSTEM / vdal		20	GiB >	Mount Poi	nt:	Device(s):		
	SUMMA Your cu	<b>RY OF CHANGE</b>	<b>S</b> result in the	e following cha	anges taking effe	ect after you return to the main men	u and begin installation:	
	Order	Action	Туре		Device Name	Mount point	-	
	1 2 3	Destroy Format Create Format Create Device	Unknown partition ta partition	able (MSDOS)	vda vda vdal			
	4	Create Format	ext4		VOAT	7		
					Cancel	& Return to Custom Partitioning	Accept Changes	Indata Cattings
+ - AVAILABLE SPACE 992.5 KiB	CTOTAL 200	SPACE GIB				Note: not be	The settings you make applied until you click 'Begin I	on this screen will on the main menu's nstallation' button.
<u>1 storage device</u>	e selected	<u>1</u>						Reset All

- 25. Click "Begin installation". Click on "Root Password" and set a good password.
- 26. Once installation is complete, click "Reboot".
- 27. The server will be attempting to boot from the ISO once more. Press any key to stop the countdown.
- 28. In the left-hand menu, under "Project" and then "Compute", click on "Instances". Select the "centos7-kvmbuild" instance, and then click on "Terminate Instances". Click "Terminate Instances" to confirm:

🗾 openstack	<b></b>	ladmin •	admin 🔻
Project ^	Ins	Confirm Terminate Instances	
Compute ^		You have selected "centos7-kvm-build". Please confirm your selection. Terminated instances are not recoverable.	ctions -
Overview		Cancel Terminate lactorean me since Actions	
Instances		Cancer reminiate instances aated	
Volumes		centos /*         centos /* <thcentos *<="" th="">         centos /*         <thcm< th="">         centos /*         <thcm< th="">         centos /*         centos /*</thcm<></thcm<></thcentos>	ihot 👻
Images	Display	aying 1 8em	
Access & Security			
Network ~			

- 29. In the left-hand menu, under "Project" and then "Compute", click on Volumes.
- 30. Click on the "Actions" drop-down next to "centos7-kvm-build", and click on "Upload to Image". Name the image "centos7-kvm-initialkick", and set the "Disk Format" to "QCOW2". Upload the image:

Cancel

Upload

×

#### Upload Volume to Image

centos7-kvm-build	Description:
Image Name *	Upload the volume to the Image Service as an image. This is equivalent to the cinder upload-to-image
centos7-kvm-initialkick	command.
Disk Format	Choose "Disk Format" for the image. The volume images are created with the QEMU disk image utility.
QCOW2 - QEMU Emulator	~

- 31. The volume will go to "Uploading" state. Wait for this to return to "Available" state.
- 32. In the left-hand menu, under "Project" and then "Compute", click on "Images". Click on the "centos7-kvminitialkick" image, which should be in "Active" state.
- 33. In the top-right drop-down, click on "Update Metadata".
- 34. On the left-hand side, in the "custom" box, enter "hypervisor\_type" and click on the + button.
- 35. On the right-hand side, in the "hypervisor\_type" box, enter "kvm".
- 36. On the left-hand side, in the "custom" box, enter "auto\_disk\_config", and click on the + button.
- 37. On the right-hand side, in the "auto\_disk\_config" box, enter "true".
- 38. On the left-hand side, in the "custom" box, enter "hw\_qemu\_guest\_agent" and click on the + button.
- 39. On the right-hand side, in the "hw\_qemu\_guest\_agent" box, enter "true", and click on the "Save" button:

Update Image M	letadata				
You can specify resource me are metadata definitions from choice.	etadata by moving it the Glance Metad	tems from the le ata Catalog. Us	oft column to the right column e the "Other" option to add m	. In the left column netadata with the k	is there ey of your
Available Metadata	Filter	Q	Existing Metadata	Filter	٩
Custom		+	auto_disk_config	true	-
No available metadata			hw_qemu_guest_ag	true	-
			hypervisor_type	kvm	-
	-1-1				
auto_disk_config (auto_	disk_config)				
				× Cancel	🖺 Save

40. In the left-hand menu, under "Project", and then "Compute", click on "Volumes". Highlight the "centos7-kvmbuild" volume, and click on "Delete Volumes". Click "Delete Volumes" to confirm:

🧧 openstack	🔳 ad	lmin 🕶											🛔 admin 👻
Project ^	Vol	umes											
Compute   Volumes Volume Snapshots													
Overview	view					Filter Q + Create Volum					ne 🛛 🛱 Accept Transfer		× Delete Volumes
Instances		Name	Description	Size	Status	Туре	Attached To	Availab	ility Zone	Boota	able	Encrypted	Actions
Volumes		centos7-kvm-build	-	20GB	Available	-		nova		No		No	Edit Volume 👻
Images	Display	ying 1 item											
Access & Security													
Network ~													
Admin ~													
Identity ~													

- 41. In the left-hand menu, under "Project" and then "Compute", click on "Instances".
- 42. Click on "Launch Instance". Give the instance the name "centos7-kvm-build", use the flavor m1.small (for a 20GB disk), and select "Boot from image" and the "centos7-kvm-initialkick" image. Launch the instance:

Launch Instance			×
Details * Access & Security Networking *	Post-Creation	Advanced Options	
Availability Zone       nova     ~       Instance Name *	Specify the details The chart below s in relation to the p Flavor Details	s for launching an instance. hows the resources used by this p project's quotas.	oroject
centos7-kvm-build	Name VCPUs	m1.small 1	
m1.small	Root Disk Ephemeral Disl	20 GB k 0 GB	
1 Instance Boot Source * €	Total Disk RAM	20 GB 2,048 MB	
Boot from image  V Image Name *	Project Limits Number of Instar	n <b>ces</b> 0 of 10	Used
centos7-kvm-initialkick (1.2 GB)	Number of VCPL	<b>Js</b> 0 of 20	Used
	Total RAM	0 of 51,200 ME	Used
		Cancel	inch

- 43. Wait for the instance to enter "Active" state. SSH to the new instance as "root", using the root password used during setup.
- 44. Delete the static hostname file:

# rm /etc/hostname

45. Stop and disable the firewalld:

```
# systemctl disable firewalld.service
# systemctl stop firewalld.service
```

46. Disable SELINUX:

```
# setenforce 0
# vim /etc/sysconfig/selinux
```

SELINUX=permissive

#### 47. Update all packages on the instance:

# yum update

#### 48. Install the qemu guest agent, cloud-init and cloud-utils:

# yum install qemu-guest-agent cloud-init cloud-utils

49. Enable and start the qemu-guest-agent service:

```
# systemctl enable qemu-guest-agent.service
# systemctl start qemu-guest-agent.service
```

50. Enable kernel console logging:

# vim /etc/sysconfig/grub

• Append "console=ttyS0 console=tty0" to the end of the GRUB\_CMDLINE\_LINUX setting. For example:

GRUB\_CMDLINE\_LINUX="crashkernel=auto rhgb quiet console=ttyS0 console=tty0"

#### 51. Rebuild the grub config file:

# grub2-mkconfig -o /boot/grub2/grub.cfg

52. Disable user creation at instance creation time:

# vim /etc/cloud/cloud.cfg

disable\_root: 0

- Also delete the "default\_user:" section under "system\_info".
- 53. Delete the static network configuration file:

# rm /etc/sysconfig/network-scripts/ifcfg-eth0

54. Clear the root bash history:

# rm /root/.bash\_history; history -c

55. In horizon, click the "Create Snapshot" button next to the Instance. Name the image "CentOS 7 (KVM)":

Create Snapshot	×
Snapshot Name * CentOS 7 (KVM)	<b>Description:</b> A snapshot is an image which preserves the disk state of a running instance.
	Cancel Create Snapshot

- 56. Wait for the image to go to "Active" state and then, in the drop-down box next to the image, click on "Edit Image".
- 57. Check the "public" and "protected" boxes, and click on "Update Image":

7

×

## Update Image

Ŀ.

Name *					_					
CentOS	7 (KVM)				D	escri	ption:			
Descriptio	on				Ed	it the ima	age details.			
Kernel ID					)					
Ramdisk	ID				J					
Architect	ure									
Format *					)					
QCOW	2 - QEMU Disk (GB	) @	ulator	~	ļ					
20				•	]					
Minimum	RAM (ME	3) <b>O</b>								
0				*	]					
Public										
Protect	ted									
								Can	cel Up	odate Image
58. Select	t the "cen	itos7	-kvm-initialkick" im	age, and c	lick on	"Delete	Images". C	Click "Del	lete Image	s" to confirm:
🚺 openstack		<b>=</b> a	admin 🕶							🛔 admin 👻
Project	^	Im	ages							
Compute	^				1	# Project (6)	🖻 Shared with Me (0)	) 🖀 Public (5)	+ Create Ima	age 🗙 Delete Images
	Overview		Image Name	Туре	Status	Public	Protected	Format	Size	Actions
	Instances		CentOS 7 (KVM)	Snapshot	Active	Yes	Yes	QCOW2	1.5 GB	Launch Instance 💌
	Images		centos7-kvm-initialkick	Image	Active	No	No	QCOW2	1.2 GB	Launch Instance -

- 59. In the left-hand menu, under "Project" and then "Compute", click on "Instances".
- 60. Highlight the "centos7-kvm-build" instance, and click on "Terminate Instances". Click "Terminate Instances" to confirm:

#### **Confirm Terminate Instances**

You have selected "centos7-kvm-build". Please confirm your selection. Terminated instances are not recoverable.



×

61. In the left-hand menu, under "Admin" and then "System" click on "Hypervisors". Next to "compute1-vm", click on "Enable Service".

## CHAPTER 25

#### 25. Create test KVM CentOS 7 Instance

This page is not based on the OpenStack Installation Guide.

- 1. From a web browser, access http://\*CONTROLLER\_ADDRESS\*/dashboard.
- 2. Log in using the demo credentials.
- 3. In the left-hand menu, under "Project", and then "Compute", click on "Instances".
- 4. Click on "Launch Instance". Name the instance "centos7-test", select the "m1.small" flavor, and "boot from image". Choose the "CentOS 7 (Xen)" image. Before clicking on "Launch", click on the "Access & Security" tab:

Launch Instance			ж		
Details * Access & Security Networking *	Post-Creation A	dvanced Options			
Availability Zone       nova     ~       Instance Name *	Specify the details The chart below sh in relation to the pr Flavor Details	for launching an ins ows the resources u oject's quotas.	tance. used by this project		
Centos7-test	Name	m1.small			
Flavor * 🛛	VCPUs	1			
m1.small	Root Disk	20 GB			
Some flavors not meeting minimum image requirements have been disabled.	Ephemeral Disk	Disk 0 GB			
Instance Count * 🕢	Total Disk	20 GB			
1	RAM	2,048 MB			
Instance Boot Source * 🛛					
Boot from image	Project Limits Number of Instan	ces	0 of 10 Used		
Image Name *					
CentOS 7 (KVM) (1.5 GB)	Number of VCPU	S	0 of 20 Used		
	Total RAM	0	of 51,200 MB Used		
		Ca	ancel Launch		

#### 5. Ensure that the key pair you just created or imported on page 23 is selected, and then click on Launch:

Launch	Instance				×
Details *	Access & Security	Networking *	Post-Creation	Advanced Options	
Key Pair <table-cell> alex-rax Security Groo</table-cell>	ups 🕑 ault	~ <b>+</b>	Control access groups, and ot	s to your instance via key pairs, securit her mechanisms.	У
				Cancel	ch

- 6. Wait for the instance to go to "Active" state, and then SSH to the server as "root", using the key pair you previously created or imported.
- 7. When you are satisfied that the test instance is working, select it and then click on "Terminate Instances". Click on "Terminate Instances" to confirm:

🧧 openstack			demo 💌											🛔 demo 🔻
Project	^	Instances												
Compute	^	Instance Name 🗸 Filter Filter ALaunch Instance X Terminate Instances More Action									ances More Actions -			
Oven	view		Instance	Image	IP Address	Size	Key	Status	Avail	lability	Task	Power	Time since	Actions
Instances			Name	Name			Fall		Zone			State	createu	
Volur	mes		centos7-test	CentOS 7 (KVM)	192.168.100.93	m1.small	alex-rax	Active	nova		None	Running	0 minutes	Create Snapshot 💌
Images Displaying 1 item														
4 0.0														