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# OpenStack Folsom Guide

Guide for Ubuntu Precise

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## Introduction

I'm writing this document a few weeks before Folsom stable release. I could not resist to share my experience with the community.

This document helps anyone who wants to deploy Folsom of OpenStack for development purpose.

**Table 1. Architecture and informations**

	controller	compute
Managment Network	192.168.0.1/24	192.168.0.2/24
Hostname	folsom-controller	folsom-compute
Services	MySQL, RabbitMQ, Nova, Cinder, Glance, Keystone, Quantum	nova-compute, KVM, nova-api



### Note

That's a basic architecture, of course **you can add many compute nodes as you want**.

Since Folsom code has not been release into stable Ubuntu Packages, we are going to use "Folsom Testing Packages [<https://launchpad.net/~openstack-ubuntu-testing/+archive/folsom-trunk-testing>]" which are built from master for each component.

# Requirements

You need at least two machines (virtual or physical) with 3 NIC (Management Network + VMs Traffic in tunnel mode + Public Network) for controller node and 2 NIC (Management Network + VMs Traffic in tunnel mode) for compute node. You need also to download Ubuntu 12.04 (LTS).



## Note

Run all commands as the root user

# Controller Node

## Operating System

1. Install Ubuntu with this parameters :

- Time zone : **UTC**
- Hostname : **folsom-controller**
- Packages : **OpenSSH-Server**

After OS Installation, reboot the server .

2. Add the repository and upgrade Ubuntu :

```
apt-get install -y python-software-properties
add-apt-repository ppa:openstack-ubuntu-testing/folsom-trunk-testing
add-apt-repository ppa:openstack-ubuntu-testing/folsom-deps-staging
apt-get update && apt-get -y dist-upgrade
```

Reboot the server.

3. Configure the network :

- Edit **/etc/network/interfaces** file :

```
# Management Network
auto eth0
    iface eth0 inet static
    address 192.168.0.1
    netmask 255.255.255.0
    gateway 192.168.0.254
    dns-nameservers 8.8.8.8

# VMs Networks
auto eth1
    iface eth1 inet static
    address 10.0.0.3
    netmask 255.255.255.0

# Public Bridge
auto eth2
    iface eth2 inet manual
    up ifconfig $IFACE 0.0.0.0 up
    up ip link set $IFACE promisc on
    down ip link set $IFACE promisc off
    down ifconfig $IFACE down
```

Then, restart network service :

```
service networking restart
```



### Note

If **eth1** is connected to a Switch, it should be in tagged mode.

- Enable **IP forwarding** :

```
sed -i -r 's/^\s*#(net\.ipv4\.ip_forward=1\.*)/\1/' /etc/sysctl.conf
echo 1 > /proc/sys/net/ipv4/ip_forward
```

- Edit the **/etc/hosts** file and add **folsom-controller** & **folsom-compute** hostnames with correct IP.

#### 4. Install Configure NTP :

- Install the package :

```
apt-get install -y ntp
```

- Configure **/etc/ntp.conf** file :

```
server ntp.ubuntu.com iburst
server 127.127.1.0
fudge 127.127.1.0 stratum 10
```

- Restart the service :

```
service ntp restart
```

## MySQL

#### 1. Install the packages :

```
apt-get -y install mysql-server python-mysqldb
```

#### 2. Allow connection from the network :

```
sed -i 's/127.0.0.1/0.0.0.0/g' /etc/mysql/my.cnf
```

#### 3. Restart the service :

```
service mysql restart
```

#### 4. Create Databases, Users, Rights :

```
mysql -u root -ppassword <<EOF
CREATE DATABASE nova;
GRANT ALL PRIVILEGES ON nova.* TO 'nova'@'localhost' \
    IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON nova.* TO 'nova'@'192.168.0.1' \
    IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON nova.* TO 'nova'@'192.168.0.2' \
    IDENTIFIED BY 'password';
CREATE DATABASE cinder;
GRANT ALL PRIVILEGES ON cinder.* TO 'cinder'@'localhost' \
    IDENTIFIED BY 'password';
CREATE DATABASE glance;
GRANT ALL PRIVILEGES ON glance.* TO 'glance'@'localhost' \
```

```
IDENTIFIED BY 'password';
CREATE DATABASE keystone;
GRANT ALL PRIVILEGES ON keystone.* TO 'keystone'@'localhost' \
IDENTIFIED BY 'password';
CREATE DATABASE quantum;
GRANT ALL PRIVILEGES ON quantum.* TO 'quantum'@'localhost' \
IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON quantum.* TO 'quantum'@'192.168.0.2' \
IDENTIFIED BY 'password';
FLUSH PRIVILEGES;
EOF
```

## RabbitMQ

1. Install the packages :

```
apt-get -y install rabbitmq-server
```

2. Change the default password :

```
rabbitmqctl change_password guest password
```

## Keystone

1. Install the packages :

```
apt-get -y install keystone python-keystone python-keystoneclient
```

2. Edit `/etc/keystone/keystone.conf` :

```
[DEFAULT]
admin_token = password
bind_host = 0.0.0.0
public_port = 5000
admin_port = 35357
compute_port = 8774
verbose = True
debug = True
log_file = keystone.log
log_dir = /var/log/keystone
log_config = /etc/keystone/logging.conf

[sql]
connection = mysql://keystone:password@localhost:3306/keystone
idle_timeout = 200

[identity]
driver = keystone.identity.backends.sql.Identity

[catalog]
driver = keystone.catalog.backends.sql.Catalog

(...)
```

3. Restart Keystone and create the tables in the database :

```
service keystone restart
keystone-manage db_sync
```

4. Load environment variables :

- Create **novarc** file :

```
export OS_TENANT_NAME=admin
export OS_USERNAME=admin
export OS_PASSWORD=password
export OS_AUTH_URL="http://localhost:5000/v2.0/"
export SERVICE_ENDPOINT="http://localhost:35357/v2.0"
export SERVICE_TOKEN=password
```

- Export the variables :

```
source novarc
echo "source novarc">>.bashrc
```

5. Download the data script [<https://github.com/EmilienM/openstack-folsom-guide/blob/master/scripts/keystone-data.sh>] and fill Keystone database with datas :

```
./keystone-data.sh
```

6. Download the endpoint script [<https://github.com/EmilienM/openstack-folsom-guide/blob/master/scripts/keystone-endpoints.sh>] and create the endpoints :

```
./keystone-endpoints.sh
```

## Glance

1. Install the packages :

```
apt-get -y install glance glance-api python-glanceclient glance-common
```

2. Configure Glance :

- Edit **/etc/glance/glance-api.conf** and **/etc/glance/glance-registry.conf** files and modify :

```
sql_connection = mysql://glance:password@localhost/glance
admin_tenant_name = service
admin_user = glance
admin_password = password
```

For **glance-api.conf**, modify :

```
notifier_strategy = rabbit
rabbit_password = password
```

- Restart Glance services :

```
service glance-api restart && service glance-registry restart
```

- Create Glance tables into the database :

```
glance-manage db_sync
```

- Download and import Ubuntu 12.04 UEC Image [<http://uec-images.ubuntu.com/releases/precise/release/ubuntu-12.04-server-cloudimg-amd64.tar.gz>] :

```
tar xzvf ubuntu-12.04-server-cloudimg-amd64.tar.gz
glance add name="Ubuntu" is_public=true container_format=ovf \
    disk_format=qcow2 < precise-server-cloudimg-amd64.img
```

- Check if the image has been introduced in the index :

```
glance image-list
```

```
+-----+-----+-----+-----+-----+-----+
| ID      | Name    | Disk Format | Container Format | Size       | Status |
+-----+-----+-----+-----+-----+-----+
| 9a17961 | Ubuntu  | qcow2       | ovf              | 1476395008 | active |
+-----+-----+-----+-----+-----+-----+
```

- If you want to install Glance Replicator (new in Folsom) :

<https://review.openstack.org/#/c/7615/>

More informations about it here [<http://www.stillhq.com/openstack/000007.html>].

## Nova

1. Install the packages :

```
apt-get -y install nova-api nova-cert nova-common \
    nova-scheduler python-nova python-novaclient nova-consoleauth novnc
```

2. Configure Nova :

- Edit **/etc/nova/api-paste.ini** file and modify :

```
admin_tenant_name = service
admin_user = nova
admin_password = password
```

You should also **delete** each composite with "**volume**".

We can do that manually or with this command :

```
sed -i '/volume/d' /etc/nova/api-paste.ini
```

- Edit **/etc/nova/nova.conf** file and modify :

```
[DEFAULT]

# MySQL Connection #
sql_connection=mysql://nova:password@192.168.0.1/nova

# nova-scheduler #
rabbit_password=password
scheduler_driver=nova.scheduler.simple.SimpleScheduler

# nova-api #
cc_host=192.168.0.1
auth_strategy=keystone
s3_host=192.168.0.1
ec2_host=192.168.0.1
nova_url=http://192.168.0.1:8774/v1.1/
ec2_url=http://192.168.0.1:8773/services/Cloud
keystone_ec2_url=http://192.168.0.1:5000/v2.0/ec2tokens
api_paste_config=/etc/nova/api-paste.ini
allow_admin_api=true
use_deprecated_auth=false
ec2_private_dns_show_ip=True
dmz_cidr=169.254.169.254/32
```

```
ec2_dmz_host=169.254.169.254
metadata_host=169.254.169.254
enabled_apis=ec2,osapi_compute,metadata

# Networking #
network_api_class=nova.network.quantumv2.api.API
quantum_url=http://192.168.0.1:9696
quantum_auth_strategy=keystone
quantum_admin_tenant_name=service
quantum_admin_username=quantum
quantum_admin_password=password
quantum_admin_auth_url=http://192.168.0.1:35357/v2.0
libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtHybridOVSBridgeDriver
linuxnet_interface_driver=nova.network.linux_net.LinuxOVSIfaceDriver
firewall_driver=nova.virt.libvirt.firewall.IptablesFirewallDriver

# Cinder #
volume_api_class=nova.volume.cinder.API

# Glance #
glance_api_servers=192.168.0.1:9292
image_service=nova.image.glance.GlanceImageService

# novnc #
novnc_enable=true
novncproxy_base_url=http://192.168.0.1:6080/vnc_auto.html
vncserver_proxyclient_address=127.0.0.1
vncserver_listen=0.0.0.0

# Misc #
logdir=/var/log/nova
state_path=/var/lib/nova
lock_path=/var/lock/nova
root_helper=sudo nova-rootwrap /etc/nova/rootwrap.conf
verbose=true
```

- Create Nova tables into the database :

```
nova-manage db sync
```

- Restart Nova services :

```
service nova-api restart
service nova-cert restart
service nova-consoleauth restart
service nova-scheduler restart
service novnc restart
```

## Open-vSwitch

1. Install the packages :

```
apt-get install -y openvswitch-switch
```

2. Start Open-vSwitch service & the agent :

```
service openvswitch-switch start
```

3. Configure Open-vSwitch :

```
ovs-vsctl add-br br-int
ovs-vsctl add-br br-ex
ovs-vsctl br-set-external-id br-ex bridge-id br-ex
ovs-vsctl add-port br-ex eth2
```

## Quantum

1. Install the packages :

```
apt-get -y install quantum-server python-cliff \
    quantum-plugin-openvswitch-agent \
    quantum-l3-agent quantum-dhcp-agent \
    python-pyparsing
```

2. Configure Quantum services :

- Edit **/etc/quantum/quantum.conf** file and modify :

```
core_plugin = \
    quantum.plugins.openvswitch.ovs_quantum_plugin.OVSQuantumPluginV2
auth_strategy = keystone
fake_rabbit = False
rabbit_password = password
```

- Edit **/etc/quantum/plugins/openvswitch/ovs\_quantum\_plugin.ini** file and modify :

```
[DATABASE]
sql_connection = mysql://quantum:password@localhost:3306/quantum
reconnect_interval = 2
[OVS]
tunnel_id_ranges = 1:1000
integration_bridge = br-int
tunnel_bridge = br-tun
local_ip = 10.0.0.3
[AGENT]
root_helper = sudo /usr/bin/quantum-rootwrap /etc/quantum/rootwrap.conf
```

- Edit **/etc/quantum/l3\_agent.ini** file and modify :

```
[DEFAULT]
debug = True
interface_driver = quantum.agent.linux.interface.OVSInterfaceDriver
auth_url = http://localhost:35357/v2.0
auth_region = RegionOne
admin_tenant_name = service
admin_user = quantum
admin_password = password
root_helper = sudo quantum-rootwrap /etc/quantum/rootwrap.conf
metadata_ip = 169.254.169.254
```

- Edit **/etc/quantum/api-paste.ini** file and modify :

```
admin_tenant_name = service
admin_user = quantum
admin_password = password
```

3. Start the services :

```
service quantum-server restart
```



```
service quantum-plugin-openvswitch-agent restart
service quantum-dhcp-agent restart
service quantum-l3-agent restart
```

4. Download my Quantum script [<https://github.com/EmilienM/openstack-folsom-guide/blob/master/scripts/quantum-networking.sh>]. Before launching it, you should modify networking informations inside the script. All is commented and you can customize belong your needs.

```
./quantum-networking.sh
```

## Cinder

1. Install the packages :

```
apt-get install -y cinder-api cinder-scheduler cinder-volume iscsitarget \
    open-iscsi iscsitarget-dkms python-cinderclient
```

2. Fix some packaging issues [<https://bugs.launchpad.net/cinder/+bug/1047059>] :

```
chown -R cinder:adm /var/log/cinder
mkdir /usr/lib/python2.7/dist-packages/volumes
chown -R cinder:cinder /usr/lib/python2.7/dist-packages/volumes
```

3. Configure & start the iSCSI services :

```
sed -i 's/false/true/g' /etc/default/iscsitarget
service iscsitarget start
service open-iscsi start
```

4. Configure Cinder :

- Edit **/etc/cinder/cinder.conf** file and modify :

```
[DEFAULT]
rootwrap_config = /etc/cinder/rootwrap.conf
sql_connection = mysql://cinder:password@localhost:3306/cinder
iscsi_helper = ietadm
volume_group = cinder-volumes
rabbit_password = password
logdir = /var/log/cinder
verbose = true
auth_strategy = keystone
```

- Edit **/etc/cinder/api-paste.ini** file and modify :

```
admin_tenant_name = service
admin_user = cinder
admin_password = password
```

- Create the volume :

```
fdisk /dev/sdb

[Create a Linux partition]

pvcreate /dev/sdb1
vgcreate cinder-volumes /dev/sdb1
```

- Create Cinder tables into the database :

```
cinder-manage db sync
```

- Restart the services ::

```
service cinder-api restart
service cinder-scheduler restart
service cinder-volume restart
```

## Horizon

Install the packages :

```
apt-get -y install apache2 libapache2-mod-wsgi openstack-dashboard \
memcached python-memcache
```

You can now login with admin / password credentials.

If you can't see the Quota view, keep in mind that's a bug [<https://bugs.launchpad.net/horizon/+bug/1040956>] with Quantum & Nova API.

## Compute Node

### Operating System

1. Install Ubuntu with this parameters :

- Time zone : **UTC**
- Hostname : **folsom-compute**
- Packages : **OpenSSH-Server**

After OS Installation, reboot the server .

2. Add the repository and upgrade Ubuntu :

```
apt-get install -y python-software-properties
add-apt-repository ppa:openstack-ubuntu-testing/folsom-trunk-testing
add-apt-repository ppa:openstack-ubuntu-testing/folsom-deps-staging
apt-get update && apt-get -y dist-upgrade
```

Reboot the server.

3. Configure the network :

- Edit **/etc/network/interfaces** file :

```
# Management Network
auto eth0
    iface eth0 inet static
        address 192.168.0.2
        netmask 255.255.255.0
        gateway 192.168.0.254
        dns-nameservers 8.8.8.8

# VMs Networks
auto eth1
    iface eth1 inet static
        address 10.0.0.4
```

```
netmask 255.255.255.0
```

Then, restart network service :

```
service networking restart
```



### Note

If **eth1** is connected to a Switch, it should be in tagged mode.

- Enable **IP forwarding** :

```
sed -i -r 's/^\s*#(net\.ipv4\.ip_forward=1\.*)/\1/' /etc/sysctl.conf  
echo 1 > /proc/sys/net/ipv4/ip_forward
```

- Edit the **/etc/hosts** file and add **folsom-controller** & **folsom-compute** hostnames with correct IP.

#### 4. Install & Configure NTP :

- Install the package :

```
apt-get install -y ntp
```

- Configure **/etc/ntp.conf** file :

```
server 192.168.0.1
```

- Restart the service :

```
service ntp restart
```

## Hypervisor

#### 1. Install the packages that we need :

```
apt-get install -y kvm libvirt-bin pm-utils
```

#### 2. Configure libvirt :

- Edit **/etc/libvirt/qemu.conf** file and add :

```
cgroup_device_acl = [  
    "/dev/null", "/dev/full", "/dev/zero",  
    "/dev/random", "/dev/urandom",  
    "/dev/ptmx", "/dev/kvm", "/dev/kqemu",  
    "/dev/rtc", "/dev/hpet", "/dev/net/tun",  
]
```

- Allow **Live Migrations** :

Edit **/etc/libvirt/libvirtd.conf** file :

```
listen_tls = 0  
listen_tcp = 1  
auth_tcp = "none"
```

Modify **libvirtd\_opts** variable in **/etc/init/libvirt-bin.conf** file :

```
env libvirtd_opts="-d -l"
```

Edit **/etc/default/libvirt-bin** file :

```
libvirtd_opts="-d -l"
```

3. • Restart libvirt :

```
service libvirt-bin restart
```

## Nova

1. Install the packages :

```
apt-get -y install nova-api-metadata nova-compute-kvm novnc
```

2. Configure Nova :

- Edit **/etc/nova/api-paste.ini** file and modify :

```
admin_tenant_name = service
admin_user = nova
admin_password = password
```

- Edit **/etc/nova/nova-compute.conf** file and modify :

```
[DEFAULT]
libvirt_type=kvm
libvirt_ovs_bridge=br-int
libvirt_vif_type=ethernet
libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtHybridOVSBridgeDriver
libvirt_use_virtio_for_bridges=True
```

- Edit **/etc/nova/nova.conf** file and modify :

```
[DEFAULT]

# MySQL Connection #
sql_connection=mysql://nova:password@192.168.0.1/nova

# nova-scheduler #
rabbit_host=192.168.0.1
rabbit_password=password
scheduler_driver=nova.scheduler.simple.SimpleScheduler

# nova-api #
cc_host=192.168.0.1
auth_strategy=keystone
s3_host=192.168.0.1
ec2_host=192.168.0.1
nova_url=http://192.168.0.1:8774/v1.1/
ec2_url=http://192.168.0.1:8773/services/Cloud
keystone_ec2_url=http://192.168.0.1:5000/v2.0/ec2tokens
api_paste_config=/etc/nova/api-paste.ini
allow_admin_api=true
use_deprecated_auth=false
ec2_private_dns_show_ip=True
dmz_cidr=169.254.169.254/32
ec2_dmz_host=169.254.169.254
metadata_host=169.254.169.254
enabled_apis=metadata

# Networking #
```

```
network_api_class=nova.network.quantumv2.api.API
quantum_url=http://192.168.0.1:9696
quantum_auth_strategy=keystone
quantum_admin_tenant_name=service
quantum_admin_username=quantum
quantum_admin_password=password
quantum_admin_auth_url=http://192.168.0.1:35357/v2.0
libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtHybridOVSBridgeDriver
linuxnet_interface_driver=nova.network.linux_net.LinuxOVSInterfaceDriver
firewall_driver=nova.virt.libvirt.firewall.IptablesFirewallDriver

# Compute #
compute_driver=libvirt.LibvirtDriver

# Cinder #
volume_api_class=nova.volume.cinder.API

# Glance #
glance_api_servers=192.168.0.1:9292
image_service=nova.image.glance.GlanceImageService

# novnc #
novnc_enable=true
novncproxy_base_url=http://192.168.0.2:6080/vnc_auto.html
vncserver_proxyclient_address=127.0.0.1
vncserver_listen=0.0.0.0

# Misc #
logdir=/var/log/nova
state_path=/var/lib/nova
lock_path=/var/lock/nova
root_helper=sudo nova-rootwrap /etc/nova/rootwrap.conf
verbose=true
```

- Restart Nova services :

```
service nova-api restart
service nova-compute restart
```

## Open-vSwitch

1. Install the packages :

```
apt-get install -y quantum-plugin-openvswitch-agent
```

2. Configure Open-vSwitch :

```
ovs-vsctl add-br br-int
```

3. Edit `/etc/quantum/plugins/openvswitch/ovs_quantum_plugin.ini` file and modify :

```
[DATABASE]
sql_connection = mysql://quantum:password@192.168.0.1:3306/quantum
reconnect_interval = 2
[OVS]
tunnel_id_ranges = 1:1000
integration_bridge = br-int
tunnel_bridge = br-tun
local_ip = 10.0.0.4
```

```
[AGENT]
root_helper = sudo /usr/bin/quantum-rootwrap /etc/quantum/rootwrap.conf
```

4. Start the Agent :

```
service quantum-plugin-openvswitch-agent restart
```

## Create your first VM

This section is going to be written very soon.

## Credits

### Thank's to ...

John Griffith - SolidFire

Martin Loschwitz - Hastexo

Adam Gandelman - Canonical

Dan Wendlandt - Nicira / VMware

## License

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