

Openstack Essex Guide

for Ubuntu Precise



OpenStack Guide for Ubuntu Precise v1.3, 28 May 2012

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Preface

Introduction

I'm doing my internship with StackOps-Technologies in Madrid.

My project is about Networking as a Service in OpenStack with Quantum.

This documentation helps anybody who wants to install Essex in single-node or dual node.

N.B. : This document will [evolve](#) in the future.

Requirements

- One or two physical(s) / virtual(s) server(s).
- 2 disks for ESSEX-1 (for nova-volumes)
- 2 NIC on each server
- Ubuntu 12.04 LTS that you can download [here](#).
- Configuration files & scripts that you can download [here](#).

Contents

Architecture

Essex-1 : Installation & Configuration

OS, Networking, Nova, Glance, Quantum, Keystone, Horizon, Open-vSwitch

Essex-2 : Installation & Configuration (optional)

OS, Networking, Nova (Compute), Quantum, Open-vSwitch

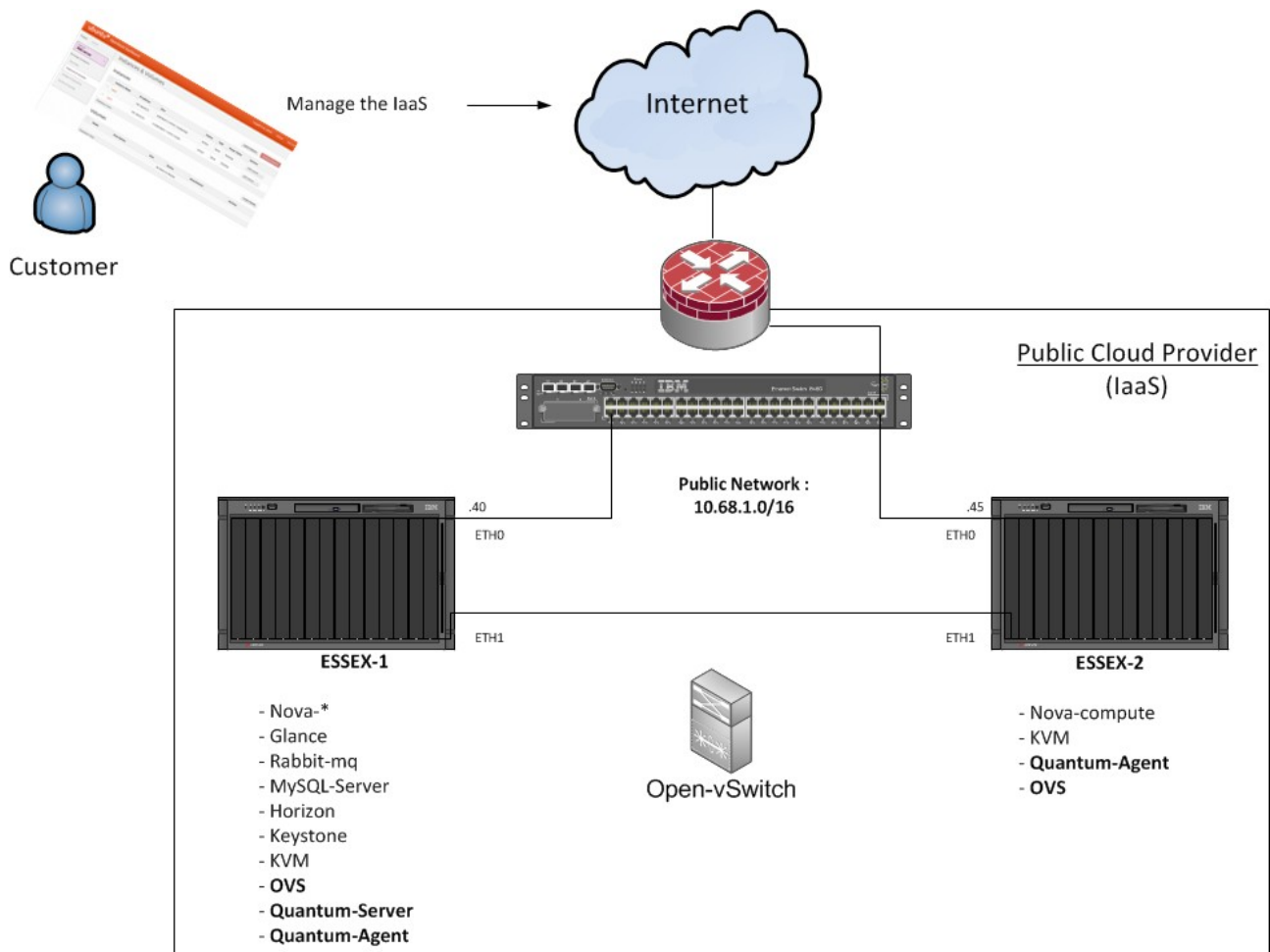
Conclusion

Credits

Architecture

For this documentation, I'm working in a dual-node configuration.

All the services will run on « **ESSEX-1** » server, and « **ESSEX-2** » will run nova-compute.



Essex-1 : 10.68.1.40

Essex-2 : 10.68.1.45

Router : 10.68.1.254

N.B. : Public Network is here in a private class, but it's for the example.

ESSEX-1 : Installation & Configuration

OS Installation

Install Ubuntu with this parameters :

- Time zone : **UTC**
- Hostname : **essex-1**
- Packages to install : **OpenSSH-Server & Virtual Host Machine**

After OS Installation, reboot the server .

N.B. : During the documentation, I'm always logged with root (*sudo -i*).

OS Preparation

```
apt-get update && apt-get -y dist-upgrade
```

Reboot the server.

Export the locale variable :

```
export LANG=C
```

Network configuration

Edit **/etc/network/interfaces** :

```
auto eth0
iface eth0 inet static
address 10.68.1.40
netmask 255.255.0.0
gateway 10.68.1.254
dns-nameservers 8.8.8.8
```

```
auto eth1
iface eth1 inet manual
up ifconfig eth2 up
```

Restart the service :

```
/etc/init.d/networking restart
```

Assumption : two NIC, **eth0** for public network and **eth1** used by Open-vSwitch for bridging (private network).

Edit the **/etc/sysctl.conf** file, uncomment "**net.ipv4.ip_forward=1**" and launch :

```
echo 1 > /proc/sys/net/ipv4/ip_forward
```

Edit the **/etc/hosts** file and add **essex-1** & **essex-2** hostnames with IP.

NTP configuration

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

Edit **/etc/ntp.conf** file :

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

Restart NTP service :

```
/etc/init.d/ntp restart
```

iSCSI tools

```
apt-get -y install tgt
```

```
apt-get -y install open-iscsi open-iscsi-utils
```

LVM Configuration (for nova-volumes) :

```
apt-get -y install lvm2
```

```
fdisk /dev/sdb
n, p, 1, [ENTER], +50G, w
```

```
pvccreate /dev/sdb1
vgcreate nova-volumes /dev/sdb1
```

Rabbitmq & Memcached

```
apt-get -y install rabbitmq-server memcached python-memcache
```

Database

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

Edit the **/etc/mysql/my.cnf** and change bind-address parameter :

```
bind-address = 0.0.0.0
```

Restart MySQL :

```
service mysql restart
```

Now create the user accounts in MySQL and grant them access on the according database :

```
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'@'essex-2' 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 ovs_quantum;
GRANT ALL PRIVILEGES ON ovs_quantum.* TO 'ovs_quantum'@'localhost' IDENTIFIED BY
'password';
FLUSH PRIVILEGES;
EOF
```


Keystone

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

Edit **/etc/keystone/keystone.conf** :

- set a value for **admin_token=password**
- change **connection** to :

```
connection = mysql://keystone:password@localhost:3306/keystone
```

Edit the **[catalog]** section like this :

```
[catalog]
driver = keystone.catalog.backends.templated.TemplatedCatalog
template_file = /etc/keystone/default_catalog.templates
```

Quantum with Keystone is not working very well [at this time](#). But if you want to try Quantum with Keystone, follow this step :

Add this section in **/etc/keystone/default_catalog.templates** :

```
catalog.RegionOne.network.publicURL = http://localhost:9696/
catalog.RegionOne.network.adminURL = http://localhost:9696/
catalog.RegionOne.network.internalURL = http://localhost:9696/
catalog.RegionOne.network.name = Quantum Service
```

Anyway :

Restart Keystone :

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

Then, download and execute "[keystone.sh](#)".

Create **novarc** file with :

```
export OS_TENANT_NAME=admin
export OS_USERNAME=admin
export OS_PASSWORD=password
export OS_AUTH_URL="http://essex-1:5000/v2.0/"
```

And load the variables :

```
source novarc
```

Edit the **.bashrc** file to export the variables all time :

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

Run '**keystone user-list**' to make sure Keystone is working.

Glance

```
apt-get -y install glance glance-api glance-client glance-common glance-registry
```

Edit **/etc/glance/glance-api-paste.ini** and give admin credentials :

```
admin_tenant_name = admin
admin_user = admin
admin_password = password
```

Do the same for **/etc/glance/glance-registry-paste.ini**

Edit **/etc/glance/glance-registry.conf** and modify SQL connection :

```
sql_connection = mysql://glance:password@localhost/glance
```

To use Glance with Keystone, add at the end of **/etc/glance/glance-registry.conf** and **/etc/glance/glance-api.conf** files :

```
[paste_deploy]
flavor = keystone
```

Synchronize Glance :

```
glance-manage version_control 0
glance-manage db_sync
```

Restart Glance :

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

We can add Ubuntu 12.04 LTS Cloud image in the index :

```
wget 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 12.04 LTS" is_public=true container_format=ovf  
disk_format=qcow2 < precise-server-cloudimg-amd64.img
```

Check if Glance works :

```
glance index
```

KVM, QEMU

To use Quantum, we need to modify the default configuration of QEMU.

Edit **/etc/libvirt/qemu.conf** :

```
clear_emulator_capabilities = 0  
user = "root"  
group = "root"  
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",  
]
```

Nova

Install the packages :

```
apt-get -y install nova-api nova-cert nova-common nova-compute nova-compute-kvm
```

```
apt-get -y install nova-doc nova-network nova-objectstore nova-scheduler
```

```
apt-get -y install nova-vncproxy nova-volume python-nova
```

```
apt-get -y install python-novaclient nova-consoleauth novnc
```

Copy "[**nova.conf**](#)" to **/etc/nova/**.

You need to change the Public Network parameters.

Edit **/etc/nova/nova-compute.conf** :

```
--libvirt_type=kvm
--libvirt_ovs_bridge=br-int
--libvirt_vif_type=ethernet
--libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtOpenVswitchDriver
```

Edit **/etc/nova/api-paste.ini** and give the correct credentials at the end :

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

To restart the “main” services is something very boring to do manually.

I give a [simple script](#) to do that.

Synchronise the database :

```
nova-manage db sync
```

Restart the services with the script.

Horizon

```
apt-get install -y libapache2-mod-wsgi openstack-dashboard
```

Edit **/etc/openstack-dashboard/local_settings.py** and configure the cache back-end :

```
CACHE_BACKEND = 'memcached://127.0.0.1:11211/'
```

Restart Apache :

```
service apache2 restart
```

Quantum

Quantum is a new project in OpenStack, and is in “*incubation*” for Essex. In the future (*Folsom*), it will be a core project.

N.B. : Quantum is “*bleeding edge*”, so don't worry if you meet some troubles. Check the log files and find the issue !

```
apt-get install -y quantum-server quantum-plugin-openvswitch python-keystone  
apt-get install -y python-keystoneclient openvswitch-datapath-source  
module-assistant auto-install openvswitch-datapath
```

Edit **/etc/quantum/plugins.ini** and change the default plugin :

```
[PLUGIN]  
provider = quantum.plugins.openvswitch.ovs_quantum_plugin.OVSQuantumPlugin
```

Open-vSwitch

```
apt-get install -y openvswitch-switch quantum-plugin-openvswitch-agent  
modprobe openvswitch_mod  
echo "openvswitch_mod">>/etc/modules
```

Edit **/etc/quantum/plugins/openvswitch/ovs_quantum_plugin.ini** and change the SQL connection to :

```
sql_connection = mysql://ovs_quantum:password@localhost:3306/ovs_quantum"
```

Copy “[quantum-agent.sh](#)” to **/etc/init.d**.

```
service openvswitch-switch start  
chmod +x /etc/init.d/quantum-agent.sh  
update-rc.d quantum-agent.sh defaults  
ovs-vsctl add-br br-int  
ovs-vsctl add-port br-int eth1  
/etc/init.d/quantum-agent.sh &
```

We can now create a private network :

```
nova-manage network create --label=public --fixed_range_v4=172.15.1.0/24  
--bridge_interface=br0
```

By default, this network will be common for every projects.

To configure floating IP for public network :

```
nova-manage floating create --ip_range=10.68.5.0/24
```

We can now check if all nova services are working :

```
nova-manage service list
```

If you can see “:-)” on each binary, that's good, we can continue.

ESSEX-2 : Installation & Configuration (Optional)

OS Installation

Install Ubuntu with this parameters :

- Time zone : **UTC**
- Hostname : **essex-1**
- Packages to install : **OpenSSH-Server & Virtual Host Machine**

After OS Installation, reboot the server .

OS Preparation

```
apt-get update && apt-get -y dist-upgrade
```

Reboot the server.

Export the locale variable :

```
export LANG=C
```

Network configuration

Edit /etc/network/interfaces :

```
auto eth0
iface eth0 inet static
address 10.68.1.45
netmask 255.255.0.0
gateway 10.68.1.254
dns-nameservers 8.8.8.8
```

```
auto eth1
iface eth1 inet manual
up ifconfig eth2 up
```

Restart the service :

```
/etc/init.d/networking restart
```

Assumption : two NIC, **eth0** for public network and **eth1** used by Open-vSwitch for bridging (private network).

Edit the **/etc/sysctl.conf** file, uncomment "**net.ipv4.ip_forward=1**" and launch :

```
echo 1 > /proc/sys/net/ipv4/ip_forward
```

Edit the **/etc/hosts** file and add **essex-1** & **essex-2** hostnames with IP.

NTP configuration

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

Edit **/etc/ntp.conf** file :

```
server essex-1
```

Restart NTP service :

```
/etc/init.d/ntp restart
```

iSCSI tools

```
apt-get install tgt
```

```
service tgt start
```

```
apt-get install open-iscsi open-iscsi-utils
```

KVM, QEMU

Edit **/etc/libvirt/qemu.conf** :

```
clear_emulator_capabilities = 0
user = "root"
group = "root"
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",
]
```


Nova

Install the packages :

```
apt-get -y install nova-api nova-cert nova-common nova-compute nova-compute-kvm  
apt-get -y install nova-doc nova-network nova-objectstore nova-scheduler  
apt-get -y install nova-vncproxy nova-volume python-nova  
apt-get -y install python-novaclient nova-consoleauth novnc
```

Copy "[nova.conf](#)" to **/etc/nova/**.
You need to change the Public Network parameters.

Edit **/etc/nova/nova-compute.conf** :

```
--libvirt_type=kvm  
--libvirt_ovs_bridge=br-int  
--libvirt_vif_type=ethernet  
--libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtOpenVswitchDriver
```

Restart the Nova services (with my [simple script](#) for example).

Open-vSwitch & Quantum-agent

```
apt-get install openvswitch-switch quantum-plugin-openvswitch-agent  
modprobe openvswitch_mod  
echo "openvswitch_mod">>/etc/modules
```

Edit **/etc/quantum/plugins/openvswitch/ovs_quantum_plugin.ini** and change the SQL connection to :

```
sql_connection = mysql://ovs_quantum:password@10.68.1.40:3306/ovs_quantum"
```

Copy "[quantum-agent](#)" to **/etc/init.d**.

Now, launch :

```
service openvswitch-switch start  
chmod +x /etc/init.d/quantum-agent.sh  
update-rc.d quantum-agent.sh defaults  
ovs-vsctl add-br br-int  
ovs-vsctl add-port br-int eth1  
/etc/init.d/quantum-agent.sh &
```

We can check if all nova services are working :

```
nova-manage service list
```

If you can see “:-)” on each binary, that's very good !

Conclusion

You can now log on to the dashboard with you favourite web browser with ***admin / password*** credentials.

Enjoy !

The screenshot shows the Ubuntu OpenStack Dashboard interface. The top header is orange with the Ubuntu logo and 'OpenStack Dashboard'. On the right of the header, it says 'Logged in as: admin', 'Settings', and 'Sign Out'. The left sidebar has a 'Project' dropdown set to 'Web-server' and a 'Manage Compute' section with links for 'Overview', 'Instances & Volumes', 'Images & Snapshots' (which is active), and 'Access & Security'. The main content area is titled 'Images & Snapshots'. It contains two sections: 'Images' and 'Instance Snapshots'. Each section has a 'Supprimer' button. The 'Images' section displays a table with 4 items:

<input type="checkbox"/>	Image Name	Type	Status	Public	Container Format	Actions
<input type="checkbox"/>	Debian 6.0.4	Image	Active	Oui	BARE	<button>Launch</button>
<input type="checkbox"/>	Web Server Appliance	Image	Active	Oui	OVF	<button>Launch</button>
<input type="checkbox"/>	MySQL Appliance	Image	Active	Oui	OVF	<button>Launch</button>
<input type="checkbox"/>	Ubuntu Server 12.04	Image	Active	Oui	OVF	<button>Launch</button>

Below the table, it says 'Displaying 4 items'. The 'Instance Snapshots' section displays a table with 1 item:

<input type="checkbox"/>	Image Name	Type	Status	Public	Container Format	Actions
<input type="checkbox"/>	Web Server Appliance	Image	Active	Oui	OVF	<button>Launch</button>

In Essex, *Quantum* UI is not incubated in Horizon, but you can download it on this [URL](#).

Credits

Thank's to :

All the **StackOps Team** of course ! :-)

Pedro Navarro Pérez : My mentor and friend.

Dan Wendlandt - Nicira Networks

Loïc Dachary – eNovance

Kord Campbell – Loggly

Razique Mahroua - Nuage & Co

All the OpenStack Community

Sources :

<http://www.hastexo.com/resources/docs/installing-openstack-essex-20121-ubuntu-1204-precise-pangolin> (Thank's to Martin for keystone.sh)

<http://cssoss.wordpress.com/2011/04/27/openstack-beginners-guide-for-ubuntu-11-04-installation-and-configuration/>

<http://docs.openstack.org/incubation/openstack-network/admin/content/>

<http://openvswitch.org/openstack/documentation/>

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