OpenStack installation and configuration

In this article, I will explore how to install and configure OpenStack in an easy way.

Let start to discuss OpenStack little bit. It is a broad and very complicated system because it uses a lot of services which work together via API. It supports a lot of Hypervisors (KVM, XEN, Qemu, ESXI, HyperV). I will describe some of the services as following:

Nova - Controls all compute nodes (which are hypervisors - KVM, XEN, Qemu, ESXI, HyperV).

Horizon - The dashboard, WEB user interface.

Keystone - Identity service. Identifies the tenant users and gives access to the internal resources.

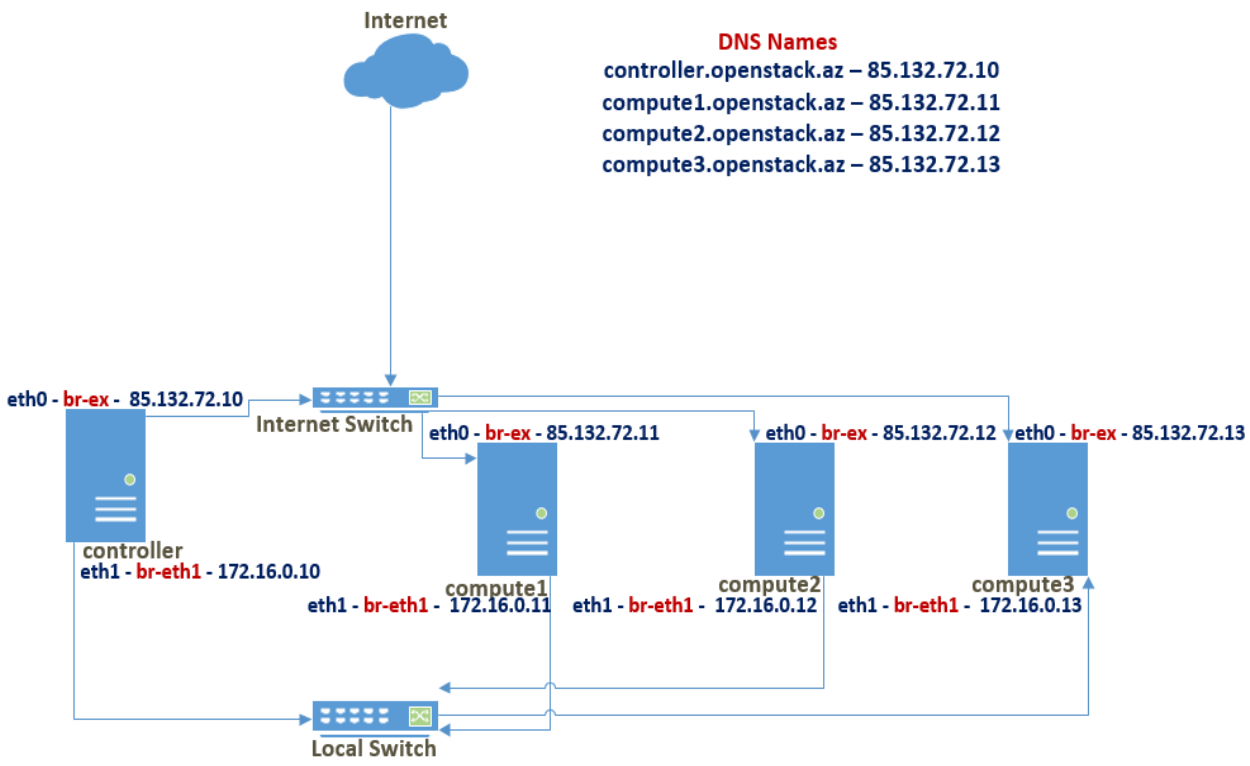
Swift - Object storage service. Represent access to the object storage via API.

Glance - Image manager. Controls images for virtual instances.

Cinder - Block storage service. Controls block devices used by virtual instances.

Neutron - A Software Defined Networking service. Controls network resources between instances, Controller and Compute nodes via OpenvSwitch (software-based network switch) which supports VXLAN. Agents are used as a communication point. It is the most complicated service in the OpenStack.

The configuration of OpenStack is consists of one **Controller** and three **Compute** nodes with **CentOS7.2** operating system. The network topology will be as following:



Prior to starting the installation and configuration we must use DNS names or **/etc/hosts** file for all Linux machines. I use **openstack.az** domain name and my **A** records as following:

```
controller      IN      A       85.132.72.10
compute1        IN      A       85.132.72.11
compute2        IN      A       85.132.72.12
compute3        IN      A       85.132.72.13
```

root password for all servers is the same.

The following steps must be performed on all servers (controller and compute nodes).

Change network card name to legacy **ethX** format.

Add **net.ifnames=0 biosdevname=0** to the end of the **GRUB_CMDLINE_LINUX** variable in the **/etc/default/grub** file:

```
[root@controller ~]# cat /etc/default/grub
GRUB_TIMEOUT=5
GRUB_DEFAULT=saved
GRUB_DISABLE_SUBMENU=true
GRUB_TERMINAL_OUTPUT="console"
```

```
GRUB_CMDLINE_LINUX="rd.lvm.lv=centos_controller/root
rd.lvm.lv=centos_controller/swap rhgb quiet net.ifnames=0 biosdevname=0"
GRUB_DISABLE_RECOVERY="true"
```

Create **/etc/sysconfig/network-scripts/ifcfg-eth0** file and add the following lines to it (Do not forget to change IP address for all servers):

```
TYPE=Ethernet
BOOTPROTO=none
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
IPV6_FAILURE_FATAL=no
NAME=eth0
DEVICE=eth0
ONBOOT=yes
IPADDR=85.132.72.10
PREFIX=24
GATEWAY=85.132.72.1
DNS1=8.8.8.8
DNS2=8.8.4.4
DOMAIN=openstack.az
```

Create **/etc/sysconfig/network-scripts/ifcfg-eth1** file and add the following lines to it (Do not forget to change IP address for all servers):

```
TYPE=Ethernet
BOOTPROTO=none
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
IPV6_FAILURE_FATAL=no
NAME=eth1
DEVICE=eth1
ONBOOT=yes
IPADDR0=172.16.0.10
PREFIX0=24
```

Update **GRUB** configuration file and reboot all servers:

```
[root@controller ~]# grub2-mkconfig -o /boot/grub2/grub.cfg
[root@controller ~]# reboot
```

Perform the system update, install required tools and update the system time (at the end restart the system):

```
[root@controller ~]# yum update -y
[root@controller ~]# yum -y install net-tools vim ntpdate ntp yum-utils git
[root@controller ~]# yum -y install epel-release
[root@controller ~]# yum -y install nload trafshow htop sshpass bind-utils
[root@controller ~]# yum -y install erlang --skip-broken
[root@controller ~]# ntpdate 0.asia.pool.ntp.org
```

Disable firewall, NetworkManager, SeLinux and add the environment variables:

```
[root@controller ~]# systemctl disable firewalld
[root@controller ~]# systemctl stop firewalld
[root@controller ~]# systemctl stop NetworkManager
[root@controller ~]# systemctl disable NetworkManager
[root@controller ~]# cat /etc/selinux/config | grep -v '^#' | grep disabled
SELINUX=disabled
[root@controller ~]# cat /etc/environment
LANG=en_US.utf-8
LC_ALL=en_US.utf-8
[root@controller ~]# reboot
```

Take snapshot of your virtual machines and install OpenStack repositories:

```
[root@controller ~]# yum install -y centos-release-openstack-mitaka
[root@controller ~]# yum repolist | grep OpenStack
centos-openstack-mitaka/x86_64        CentOS-7 - OpenStack mitaka
1,252

[root@controller ~]# yum --enablerepo=epel info erlang
[root@controller ~]# yum --enablerepo=epel -y install erlang
```

The following steps must be performed only on the **controller.openstack.az**

```
[root@controller ~]# yum install -y openstack-packstack
```

Generate the answer file for our OpenStack configuration:

```
[root@controller ~]# packstack --gen-answer-file=/root/answer.txt
```

Content of the **answer.txt** file will be as indicated below:

```
# cat /root/answer.txt | grep -v '^#' | grep -v '^$'
[general]
CONFIG_SSH_KEY=/root/.ssh/id_rsa.pub
# Password for API and horizon interface
CONFIG_DEFAULT_PASSWORD=My0PensT@ckp@44w0rd
CONFIG_SERVICE_WORKERS=%{::processorcount}
CONFIG_MARIADB_INSTALL=y
CONFIG_GLANCE_INSTALL=y
CONFIG_CINDER_INSTALL=y
CONFIG_MANILA_INSTALL=n
CONFIG_NOVA_INSTALL=y
```

```
CONFIG_NEUTRON_INSTALL=y
CONFIG_HORIZON_INSTALL=y
CONFIG_SWIFT_INSTALL=y
CONFIG_CEILOMETER_INSTALL=y
CONFIG_AODH_INSTALL=y
CONFIG_GNOCCHI_INSTALL=y
CONFIG_SAHARA_INSTALL=n
CONFIG_HEAT_INSTALL=n
CONFIG_TROVE_INSTALL=n
CONFIG_IRONIC_INSTALL=n
CONFIG_CLIENT_INSTALL=y
CONFIG_NTP_SERVERS=0.asia.pool.ntp.org
CONFIG_NAGIOS_INSTALL=y
EXCLUDE_SERVERS=
CONFIG_DEBUG_MODE=n
CONFIG_CONTROLLER_HOST=85.132.72.10
CONFIG_COMPUTE_HOSTS=85.132.72.11,85.132.72.12,85.132.72.13
CONFIG_NETWORK_HOSTS=85.132.72.10
CONFIG_VMWARE_BACKEND=n
CONFIG_UNSUPPORTED=n
CONFIG_USE_SUBNETS=n
CONFIG_VCENTER_HOST=
CONFIG_VCENTER_USER=
CONFIG_VCENTER_PASSWORD=
CONFIG_VCENTER_CLUSTER_NAMES=
CONFIG_STORAGE_HOST=85.132.72.10
CONFIG_SAHARA_HOST=85.132.72.10
CONFIG_USE_EPEL=n
CONFIG_REPO=
CONFIG_ENABLE_RDO_TESTING=n
CONFIG_RH_USER=
CONFIG_SATELLITE_URL=
CONFIG_RH_SAT6_SERVER=
CONFIG_RH_PW=
CONFIG_RH_OPTIONAL=y
CONFIG_RH_PROXY=
CONFIG_RH_SAT6_ORG=
CONFIG_RH_SAT6_KEY=
CONFIG_RH_PROXY_PORT=
CONFIG_RH_PROXY_USER=
CONFIG_RH_PROXY_PW=
CONFIG_SATELLITE_USER=
CONFIG_SATELLITE_PW=
CONFIG_SATELLITE_AKEY=
CONFIG_SATELLITE_CACERT=
CONFIG_SATELLITE_PROFILE=
CONFIG_SATELLITE_FLAGS=
CONFIG_SATELLITE_PROXY=
CONFIG_SATELLITE_PROXY_USER=
CONFIG_SATELLITE_PROXY_PW=
CONFIG_SSL_CACERT_FILE=/etc/pki/tls/certs/selfcert.crt
CONFIG_SSL_CACERT_KEY_FILE=/etc/pki/tls/private/selfkey.key
CONFIG_SSL_CERT_DIR=~/packstackca/
```

```
CONFIG_SSL_CACERT_SELFSIGN=y
CONFIG_SELFSIGN_CACERT_SUBJECT_C=--
CONFIG_SELFSIGN_CACERT_SUBJECT_ST=State
CONFIG_SELFSIGN_CACERT_SUBJECT_L=City
CONFIG_SELFSIGN_CACERT_SUBJECT_O=openstack
CONFIG_SELFSIGN_CACERT_SUBJECT_OU=packstack
CONFIG_SELFSIGN_CACERT_SUBJECT_CN=controller.openstack.az
CONFIG_SELFSIGN_CACERT_SUBJECT_MAIL=admin@controller.openstack.az
CONFIG_AMQP_BACKEND=rabbitmq
CONFIG_AMQP_HOST=85.132.72.10
CONFIG_AMQP_ENABLE_SSL=n
CONFIG_AMQP_ENABLE_AUTH=n
CONFIG_AMQP_NSS_CERTDB_PW=PW_PLACEHOLDER
CONFIG_AMQP_AUTH_USER=amqp_user
CONFIG_AMQP_AUTH_PASSWORD=PW_PLACEHOLDER
CONFIG_MARIADB_HOST=85.132.72.10
CONFIG_MARIADB_USER=root
CONFIG_MARIADB_PW=515ab918190c4234
CONFIG_KEYSTONE_DB_PW=8416870b005046cf
CONFIG_KEYSTONE_DB_PURGE_ENABLE=True
CONFIG_KEYSTONE_REGION=RegionOne
CONFIG_KEYSTONE_ADMIN_TOKEN=fe8f91a28e4c4499a3203b1c21db28a9
CONFIG_KEYSTONE_ADMIN_EMAIL=root@localhost
CONFIG_KEYSTONE_ADMIN_USERNAME=admin
CONFIG_KEYSTONE_ADMIN_PW=My0PensT@ckp@44w0rd
CONFIG_KEYSTONE_DEMO_PW=265296c9b01543ab
CONFIG_KEYSTONE_API_VERSION=v2.0
CONFIG_KEYSTONE_TOKEN_FORMAT=UUID
CONFIG_KEYSTONE_SERVICE_NAME=httpd
CONFIG_KEYSTONE_IDENTITY_BACKEND=sql
CONFIG_KEYSTONE_LDAP_URL=ldap://85.132.72.10
CONFIG_KEYSTONE_LDAP_USER_DN=
CONFIG_KEYSTONE_LDAP_USER_PASSWORD=
CONFIG_KEYSTONE_LDAP_SUFFIX=
CONFIG_KEYSTONE_LDAP_QUERY_SCOPE=one
CONFIG_KEYSTONE_LDAP_PAGE_SIZE=-1
CONFIG_KEYSTONE_LDAP_USER_SUBTREE=
CONFIG_KEYSTONE_LDAP_USER_FILTER=
CONFIG_KEYSTONE_LDAP_USER_OBJECTCLASS=
CONFIG_KEYSTONE_LDAP_USER_ID_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_NAME_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_MAIL_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_ENABLED_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_ENABLED_MASK=-1
CONFIG_KEYSTONE_LDAP_USER_ENABLED_DEFAULT=TRUE
CONFIG_KEYSTONE_LDAP_USER_ENABLED_INVERT=n
CONFIG_KEYSTONE_LDAP_USER_ATTRIBUTE_IGNORE=
CONFIG_KEYSTONE_LDAP_USER_DEFAULT_PROJECT_ID_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_ALLOW_CREATE=n
CONFIG_KEYSTONE_LDAP_USER_ALLOW_UPDATE=n
CONFIG_KEYSTONE_LDAP_USER_ALLOW_DELETE=n
CONFIG_KEYSTONE_LDAP_USER_PASS_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_USER_ENABLED_EMULATION_DN=
```

```
CONFIG_KEYSTONE_LDAP_USER_ADDITIONAL_ATTRIBUTE_MAPPING=
CONFIG_KEYSTONE_LDAP_GROUP_SUBTREE=
CONFIG_KEYSTONE_LDAP_GROUP_FILTER=
CONFIG_KEYSTONE_LDAP_GROUP_OBJECTCLASS=
CONFIG_KEYSTONE_LDAP_GROUP_ID_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_GROUP_NAME_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_GROUP_MEMBER_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_GROUP_DESC_ATTRIBUTE=
CONFIG_KEYSTONE_LDAP_GROUP_ATTRIBUTE_IGNORE=
CONFIG_KEYSTONE_LDAP_GROUP_ALLOW_CREATE=n
CONFIG_KEYSTONE_LDAP_GROUP_ALLOW_UPDATE=n
CONFIG_KEYSTONE_LDAP_GROUP_ALLOW_DELETE=n
CONFIG_KEYSTONE_LDAP_GROUP_ADDITIONAL_ATTRIBUTE_MAPPING=
CONFIG_KEYSTONE_LDAP_USE_TLS=n
CONFIG_KEYSTONE_LDAP_TLS_CACERTDIR=
CONFIG_KEYSTONE_LDAP_TLS_CACERTFILE=
CONFIG_KEYSTONE_LDAP_TLS_REQ_CERT=demand
CONFIG_GLANCE_DB_PW=1de6f97dfc8a44bc
CONFIG_GLANCE_KS_PW=523b0e96696a44a8
CONFIG_GLANCE_BACKEND=file
CONFIG_CINDER_DB_PW=e5e15d13737f4f51
CONFIG_CINDER_DB_PURGE_ENABLE=True
CONFIG_CINDER_KS_PW=25e60e7a2d9c4987
CONFIG_CINDER_BACKEND=lvm
CONFIG_CINDER_VOLUMES_CREATE=y
CONFIG_CINDER_VOLUMES_SIZE=20G
CONFIG_CINDER_GLUSTER_MOUNTS=
CONFIG_CINDER_NFS_MOUNTS=
CONFIG_CINDER_NETAPP_LOGIN=
CONFIG_CINDER_NETAPP_PASSWORD=
CONFIG_CINDER_NETAPP_HOSTNAME=
CONFIG_CINDER_NETAPP_SERVER_PORT=80
CONFIG_CINDER_NETAPP_STORAGE_FAMILY=ontap_cluster
CONFIG_CINDER_NETAPP_TRANSPORT_TYPE=http
CONFIG_CINDER_NETAPP_STORAGE_PROTOCOL=nfs
CONFIG_CINDER_NETAPP_SIZE_MULTIPLIER=1.0
CONFIG_CINDER_NETAPP_EXPIRY_THRES_MINUTES=720
CONFIG_CINDER_NETAPP_THRES_AVL_SIZE_PERC_START=20
CONFIG_CINDER_NETAPP_THRES_AVL_SIZE_PERC_STOP=60
CONFIG_CINDER_NETAPP_NFS_SHARES=
CONFIG_CINDER_NETAPP_NFS_SHARES_CONFIG=/etc/cinder/shares.conf
CONFIG_CINDER_NETAPP_VOLUME_LIST=
CONFIG_CINDER_NETAPP_VFILER=
CONFIG_CINDER_NETAPP_PARTNER_BACKEND_NAME=
CONFIG_CINDER_NETAPP_VSERVER=
CONFIG_CINDER_NETAPP_CONTROLLER_IPS=
CONFIG_CINDER_NETAPP_SA_PASSWORD=
CONFIG_CINDER_NETAPP_ESERIES_HOST_TYPE=linux_dm_mp
CONFIG_CINDER_NETAPP_WEBSERVICE_PATH=/devmgr/v2
CONFIG_CINDER_NETAPP_STORAGE_POOLS=
CONFIG_IRONIC_DB_PW=PW_PLACEHOLDER
CONFIG_IRONIC_KS_PW=PW_PLACEHOLDER
CONFIG_NOVA_DB_PURGE_ENABLE=True
```

```
CONFIG_NOVA_DB_PW=8ebb03ccc7b14662
CONFIG_NOVA_KS_PW=281c14a5b3c74632
CONFIG_NOVA_SCHED_CPU_ALLOC_RATIO=16.0
CONFIG_NOVA_SCHED_RAM_ALLOC_RATIO=1.5
CONFIG_NOVA_COMPUTE_MIGRATE_PROTOCOL=tcp
CONFIG_NOVA_COMPUTE_MANAGER=nova.compute.manager.ComputeManager
CONFIG_VNC_SSL_CERT=
CONFIG_VNC_SSL_KEY=
CONFIG_NOVA_PCI_ALIAS=
CONFIG_NOVA_PCI_PASSTHROUGH_WHITELIST=
CONFIG_NOVA_COMPUTE_PRIVIF=
CONFIG_NOVA_NETWORK_MANAGER=nova.network.manager.FlatDHCPManager
CONFIG_NOVA_NETWORK_PUBIF=eth0
CONFIG_NOVA_NETWORK_PRIVIF=
CONFIG_NOVA_NETWORK_FIXEDRANGE=192.168.32.0/22
CONFIG_NOVA_NETWORK_FLOATRANGE=10.3.4.0/22
CONFIG_NOVA_NETWORK_AUTOASSIGNFLOATINGIP=n
CONFIG_NOVA_NETWORK_VLAN_START=100
CONFIG_NOVA_NETWORK_NUMBER=1
CONFIG_NOVA_NETWORK_SIZE=255
CONFIG_NEUTRON_KS_PW=d74354036c544de8
CONFIG_NEUTRON_DB_PW=67b23ec175db4b19
CONFIG_NEUTRON_L3_EXT_BRIDGE=br-ex
CONFIG_NEUTRON_METADATA_PW=311385b3f5fe474d
CONFIG_LBAAS_INSTALL=n
CONFIG_NEUTRON_METERING_AGENT_INSTALL=y
CONFIG_NEUTRON_FWAAS=n
CONFIG_NEUTRON_VPNAAS=n
CONFIG_NEUTRON_ML2_TYPE_DRIVERS=vxlan
CONFIG_NEUTRON_ML2_TENANT_NETWORK_TYPES=vxlan
CONFIG_NEUTRON_ML2_MECHANISM_DRIVERS=openvswitch
CONFIG_NEUTRON_ML2_FLAT_NETWORKS=*
CONFIG_NEUTRON_ML2_VLAN_RANGES=
CONFIG_NEUTRON_ML2_TUNNEL_ID_RANGES=
CONFIG_NEUTRON_ML2_VXLAN_GROUP=
CONFIG_NEUTRON_ML2_VNI_RANGES=10:100
CONFIG_NEUTRON_L2_AGENT=openvswitch
CONFIG_NEUTRON_ML2_SUPPORTED_PCI_VENDOR_DEVS=['15b3:1004', '8086:10ca']
CONFIG_NEUTRON_ML2_SRIOV_AGENT_REQUIRED=n
CONFIG_NEUTRON_ML2_SRIOV_INTERFACE_MAPPINGS=
CONFIG_NEUTRON_LB_INTERFACE_MAPPINGS=
CONFIG_NEUTRON_OVS_BRIDGE_MAPPINGS=physnet1:br-eth1
CONFIG_NEUTRON_OVS_BRIDGE_IFACES=br-eth1:eth1
CONFIG_NEUTRON_OVS_BRIDGES_COMPUTE=
CONFIG_NEUTRON_OVS_TUNNEL_IF=eth1
CONFIG_NEUTRON_OVS_TUNNEL_SUBNETS=
CONFIG_NEUTRON_OVS_VXLAN_UDP_PORT=4789
CONFIG_MANILA_DB_PW=PW_PLACEHOLDER
CONFIG_MANILA_KS_PW=PW_PLACEHOLDER
CONFIG_MANILA_BACKEND=generic
CONFIG_MANILA_NETAPP_DRV_HANDLES_SHARE_SERVERS=false
CONFIG_MANILA_NETAPP_TRANSPORT_TYPE=https
CONFIG_MANILA_NETAPP_LOGIN=admin
```

```
CONFIG_MANILA_NETAPP_PASSWORD=
CONFIG_MANILA_NETAPP_SERVER_HOSTNAME=
CONFIG_MANILA_NETAPP_STORAGE_FAMILY=ontap_cluster
CONFIG_MANILA_NETAPP_SERVER_PORT=443
CONFIG_MANILA_NETAPP_AGGREGATE_NAME_SEARCH_PATTERN=(.*)
CONFIG_MANILA_NETAPP_ROOT_VOLUME_AGGREGATE=
CONFIG_MANILA_NETAPP_ROOT_VOLUME_NAME=root
CONFIG_MANILA_NETAPP_VSERVER=
CONFIG_MANILA_GENERIC_DRV_HANDLES_SHARE_SERVERS=true
CONFIG_MANILA_GENERIC_VOLUME_NAME_TEMPLATE=manila-share-%s
CONFIG_MANILA_GENERIC_SHARE_MOUNT_PATH=/shares
CONFIG_MANILA_SERVICE_IMAGE_LOCATION=https://www.dropbox.com/s/vi5oeh10q1qkck
h/ubuntu_1204_nfs_cifs.qcow2
CONFIG_MANILA_SERVICE_INSTANCE_USER=ubuntu
CONFIG_MANILA_SERVICE_INSTANCE_PASSWORD=ubuntu
CONFIG_MANILA_NETWORK_TYPE=neutron
CONFIG_MANILA_NETWORK_STANDALONE_GATEWAY=
CONFIG_MANILA_NETWORK_STANDALONE_NETMASK=
CONFIG_MANILA_NETWORK_STANDALONE_SEG_ID=
CONFIG_MANILA_NETWORK_STANDALONE_IP_RANGE=
CONFIG_MANILA_NETWORK_STANDALONE_IP_VERSION=4
CONFIG_MANILA_GLUSTERFS_SERVERS=
CONFIG_MANILA_GLUSTERFS_NATIVE_PATH_TO_PRIVATE_KEY=
CONFIG_MANILA_GLUSTERFS_VOLUME_PATTERN=
CONFIG_MANILA_GLUSTERFS_TARGET=
CONFIG_MANILA_GLUSTERFS_MOUNT_POINT_BASE=
CONFIG_MANILA_GLUSTERFS_NFS_SERVER_TYPE=gluster
CONFIG_MANILA_GLUSTERFS_PATH_TO_PRIVATE_KEY=
CONFIG_MANILA_GLUSTERFS_GANESHA_SERVER_IP=
CONFIG_HORIZON_SSL=y
CONFIG_HORIZON_SECRET_KEY=ccd27738725b485aa76bc8aa531b45a9
CONFIG_HORIZON_SSL_CERT=
CONFIG_HORIZON_SSL_KEY=
CONFIG_HORIZON_SSL_CACERT=
CONFIG_SWIFT_KS_PW=f8595dcbf44a4ffa
CONFIG_SWIFT_STORAGES=
CONFIG_SWIFT_STORAGE_ZONES=1
CONFIG_SWIFT_STORAGE_REPLICAS=1
CONFIG_SWIFT_STORAGE_FSTYPE=ext4
CONFIG_SWIFT_HASH=8ee0a4b4687746df
CONFIG_SWIFT_STORAGE_SIZE=2G
CONFIG_HEAT_DB_PW=PW_PLACEHOLDER
CONFIG_HEAT_AUTH_ENC_KEY=44ea37cccabe4814
CONFIG_HEAT_KS_PW=PW_PLACEHOLDER
CONFIG_HEAT_CLOUDWATCH_INSTALL=n
CONFIG_HEAT_CFN_INSTALL=n
CONFIG_HEAT_DOMAIN=heat
CONFIG_HEAT_DOMAIN_ADMIN=heat_admin
CONFIG_HEAT_DOMAIN_PASSWORD=PW_PLACEHOLDER
CONFIG_PROVISION_DEMO=n
CONFIG_PROVISION_TEMPEST=n
CONFIG_PROVISION_DEMO_FLOATRANGE=172.24.4.224/28
CONFIG_PROVISION_IMAGE_NAME=cirros
```

```
CONFIG_PROVISION_IMAGE_URL=http://download.cirros-cloud.net/0.3.4/cirros-
0.3.4-x86_64-disk.img
CONFIG_PROVISION_IMAGE_FORMAT=qcow2
CONFIG_PROVISION_IMAGE_SSH_USER=cirros
CONFIG_TEMPEST_HOST=
CONFIG_PROVISION_TEMPEST_USER=
CONFIG_PROVISION_TEMPEST_USER_PW=PW_PLACEHOLDER
CONFIG_PROVISION_TEMPEST_FLOATRANGE=172.24.4.224/28
CONFIG_PROVISION_TEMPEST_REPO_URI=https://github.com/openstack/tempest.git
CONFIG_PROVISION_TEMPEST_REPO_REVISION=master
CONFIG_RUN_TEMPEST=n
CONFIG_RUN_TEMPEST_TESTS=smoke
CONFIG_PROVISION_OVS_BRIDGE=y
CONFIG_GNOCCHI_DB_PW=0b8428077a2d403a
CONFIG_GNOCCHI_KS_PW=5aee8fd702ab4af1
CONFIG_CEILOMETER_SECRET=bd79e591c06b4b61
CONFIG_CEILOMETER_KS_PW=621893efdab3407a
CONFIG_CEILOMETER_SERVICE_NAME=httpd
CONFIG_CEILOMETER_COORDINATION_BACKEND=redis
CONFIG_CEILOMETER_METERING_BACKEND=database
CONFIG_MONGODB_HOST=85.132.72.10
CONFIG_REDIS_MASTER_HOST=85.132.72.10
CONFIG_REDIS_PORT=6379
CONFIG_REDIS_HA=n
CONFIG_REDIS_SLAVE_HOSTS=
CONFIG_REDIS_SENTINEL_HOSTS=
CONFIG_REDIS_SENTINEL_CONTACT_HOST=
CONFIG_REDIS_SENTINEL_PORT=26379
CONFIG_REDIS_SENTINEL_QUORUM=2
CONFIG_REDIS_MASTER_NAME=mymaster
CONFIG_AODH_KS_PW=53e095eb1da34c78
CONFIG_TROVE_DB_PW=PW_PLACEHOLDER
CONFIG_TROVE_KS_PW=PW_PLACEHOLDER
CONFIG_TROVE_NOVA_USER=trove
CONFIG_TROVE_NOVA_TENANT=services
CONFIG_TROVE_NOVA_PW=PW_PLACEHOLDER
CONFIG_SAHARA_DB_PW=PW_PLACEHOLDER
CONFIG_SAHARA_KS_PW=PW_PLACEHOLDER
CONFIG_NAGIOS_PW=d0089c5be8a941cf
```

To configure ssh token authentication automatically you can use the script from my GitHub repository:

```
[root@controller ~]# git clone https://github.com/jamalshahverdiev/unix-
linux-shell-codes.git
[root@controller ~]# cd unix-linux-shell-codes/ssh-token-creater/
```

Edit the **iplist** file, add IP addresses of the Controller and all Compute nodes (root password for all servers must be the same):

```
[root@controller ~]# cat unix-linux-shell-codes/ssh-token-creater/iplist
controller.openstack.az
```

compute1.openstack.az
compute2.openstack.az
compute3.openstack.az

Execute the script and after that SSH token authentication will be ready:
[root@controller ~]# **./ssh-auth-token.sh**

Start the configuration of OpenStack:

[root@controller ~]# **packstack --answer-file /root/answer.txt**

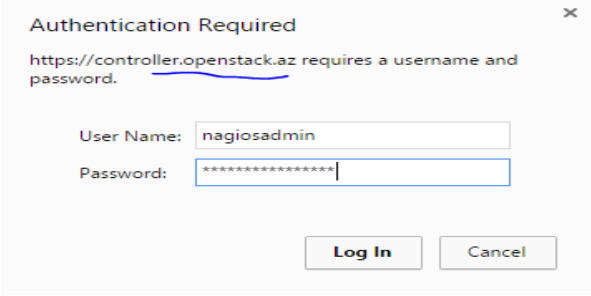
```
**** Installation completed successfully ******

Additional information:
 * File /root/keystonerc_admin has been created on OpenStack client host 85.132.72.10. To use the command line
tools you need to source the file.
 * NOTE : A certificate was generated to be used for ssl, You should change the ssl certificate configured in
/etc/httpd/conf.d/ssl.conf on 85.132.72.10 to use a CA signed cert.
 * To access the OpenStack Dashboard browse to https://85.132.72.10/dashboard .
Please, find your login credentials stored in the keystonerc_admin in your home directory.
 * To use Nagios, browse to http://85.132.72.10/nagios username: nagiosadmin, password: d0089c5be8a941cf
 * The installation log file is available at: /var/tmp/packstack/20161011-224731-eVrMYj/openstack-setup.log
 * The generated manifests are available at: /var/tmp/packstack/20161011-224731-eVrMYj/manifests
```

As we can see we have the dashboard and the monitoring URLs to the Nagios.

WEB UI for control OpenStack:
https://85.132.72.10/dashboard

Nagios administrator WEB UI for servers and resources monitoring:
http://85.132.72.10/nagios
username: **nagiosadmin**
password: **d0089c5be8a941cf**



Host	Service	Status	Last Check	Duration	Attempt	Status Information
85.132.72.10	5 minute load average	OK	10-14-2016 14:15:06	0d 4h 41m 55s	1/3	0.20
	Percent disk space used on /var	OK	10-14-2016 14:09:17	0d 4h 39m 54s	1/3	10
	cinder-list service	OK	10-14-2016 14:16:18	0d 4h 37m 53s	1/3	0
	glance-index service	OK	10-14-2016 14:15:18	0d 4h 28m 53s	1/3	4
	keystone-user-list service	OK	10-14-2016 14:17:07	0d 4h 41m 25s	1/3	12
	nova-list service	OK	10-14-2016 14:14:47	0d 4h 39m 24s	1/3	0
	swift-list service	WARNING	10-14-2016 14:15:48	0d 4h 37m 23s	3/3	Authorization Failure. Authorization Failed: The resource could not be found. (HTTP 404)
85.132.72.11	5 minute load average	OK	10-14-2016 14:18:49	0d 4h 35m 22s	1/3	0.01
	Percent disk space used on /var	OK	10-14-2016 14:18:17	0d 4h 40m 54s	1/3	7
85.132.72.12	5 minute load average	OK	10-14-2016 14:15:17	0d 4h 38m 54s	1/3	0.00
	Percent disk space used on /var	OK	10-14-2016 14:12:18	0d 4h 36m 53s	1/3	9
85.132.72.13	5 minute load average	OK	10-14-2016 14:14:19	0d 4h 34m 52s	1/3	0.00
	Percent disk space used on /var	OK	10-14-2016 14:18:47	0d 4h 40m 24s	1/3	7

After installation, we must change network configuration for all servers as follows

Create the **/etc/sysconfig/network-scripts/ifcfg-eth0** file and add the following lines to it:

```
# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE=eth0
BOOTPROTO="none"
TYPE="OVSPort"
OVS_BRIDGE=br-ex
ONBOOT="yes"
DEVICETYPE=ovs
```

Create the **/etc/sysconfig/network-scripts/ifcfg-eth1** file and add the following lines to it:

```
# cat /etc/sysconfig/network-scripts/ifcfg-eth1
DEVICE=eth1
NAME=eth1
DEVICETYPE=ovs
TYPE=OVSPort
OVS_BRIDGE=br-eth1
ONBOOT=yes
BOOTPROTO=none
```

Create the **/etc/sysconfig/network-scripts/ifcfg-br-ex** file and add the following lines to it (Do not forget to change IP address for all servers):

```
# cat /etc/sysconfig/network-scripts/ifcfg-br-ex
TYPE="OVSBridge"
DEVICE=br-ex
BOOTPROTO="static"
DEVICETYPE=ovs
ONBOOT="yes"
IPADDR0=85.132.72.10
PREFIX0=24
GATEWAY=85.132.72.1
DNS1=85.132.57.58
DNS2=85.132.57.59
PEERDNS="yes"
USERCTL="yes"
```

```
DOMAIN=openstack.az
```

Create **/etc/sysconfig/network-scripts/ifcfg-br-eth1** file and add the following lines to this file(Do not forget change IP address for all servers):

```
# cat /etc/sysconfig/network-scripts/ifcfg-br-eth1
DEFROUTE=yes
ONBOOT=yes
DEVICE=br-eth1
NAME=br-eth1
DEVICETYPE=ovs
OVSBOOTPROTO="static"
TYPE=OVSBridge
IPADDR0=172.16.0.10
PREFIX0=24
```

Restart all servers:

```
[root@controller ~]# reboot
[root@compute1 ~]# reboot
[root@compute2 ~]# reboot
[root@compute3 ~]# reboot
```

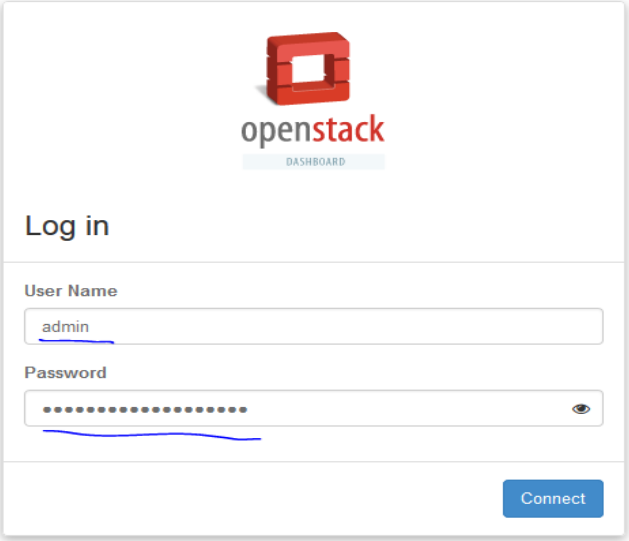
The output of the **ovs-vsctl show** command in the controller node must be as follows:

```
[root@controller ~]# ovs-vsctl show
018b3e81-63c7-48f4-b84c-7040efd5789a
    Bridge br-ex
        Port br-ex
            Interface br-ex
                type: internal
        Port "qg-3f61f7a5-fe"
            Interface "qg-3f61f7a5-fe"
                type: internal
        Port "eth0"
            Interface "eth0"
    Bridge br-tun
        fail_mode: secure
        Port "vxlan-ac10000c"
            Interface "vxlan-ac10000c"
                type: vxlan
                options: {df_default="true", in_key=flow,
local_ip="172.16.0.10", out_key=flow, remote_ip="172.16.0.12"}
        Port br-tun
            Interface br-tun
                type: internal
        Port patch-int
            Interface patch-int
                type: patch
                options: {peer=patch-tun}
        Port "vxlan-ac10000b"
            Interface "vxlan-ac10000b"
                type: vxlan
```

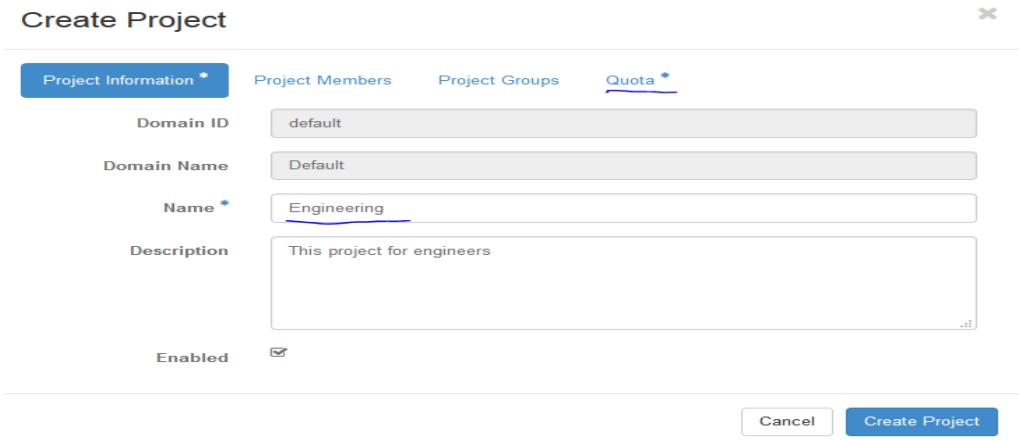
```
                options: {df_default="true", in_key=flow,
local_ip="172.16.0.10", out_key=flow, remote_ip="172.16.0.11"}
        Port "vxlan-ac10000d"
            Interface "vxlan-ac10000d"
                type: vxlan
                options: {df_default="true", in_key=flow,
local_ip="172.16.0.10", out_key=flow, remote_ip="172.16.0.13"}
    Bridge br-int
        fail_mode: secure
        Port "tapa484be32-c7"
            tag: 1
            Interface "tapa484be32-c7"
                type: internal
        Port "int-br-eth1"
            Interface "int-br-eth1"
                type: patch
                options: {peer="phy-br-eth1"}
        Port "qr-f76daf2e-7e"
            tag: 1
            Interface "qr-f76daf2e-7e"
                type: internal
        Port patch-tun
            Interface patch-tun
                type: patch
                options: {peer=patch-int}
        Port br-int
            Interface br-int
                type: internal
    Bridge "br-eth1"
        Port "phy-br-eth1"
            Interface "phy-br-eth1"
                type: patch
                options: {peer="int-br-eth1"}
        Port "br-eth1"
            Interface "br-eth1"
                type: internal
        Port "eth1"
            Interface "eth1"
    ovs_version: "2.5.0"
```

To check the status of the OpenStack services use the following command:
[root@controller ~]# **openstack-status**

Open the **https://controller.openstack.az** link in your browser after reboot. Username will be **admin** and password will be **My0PensT@ckp@44w0rd**.

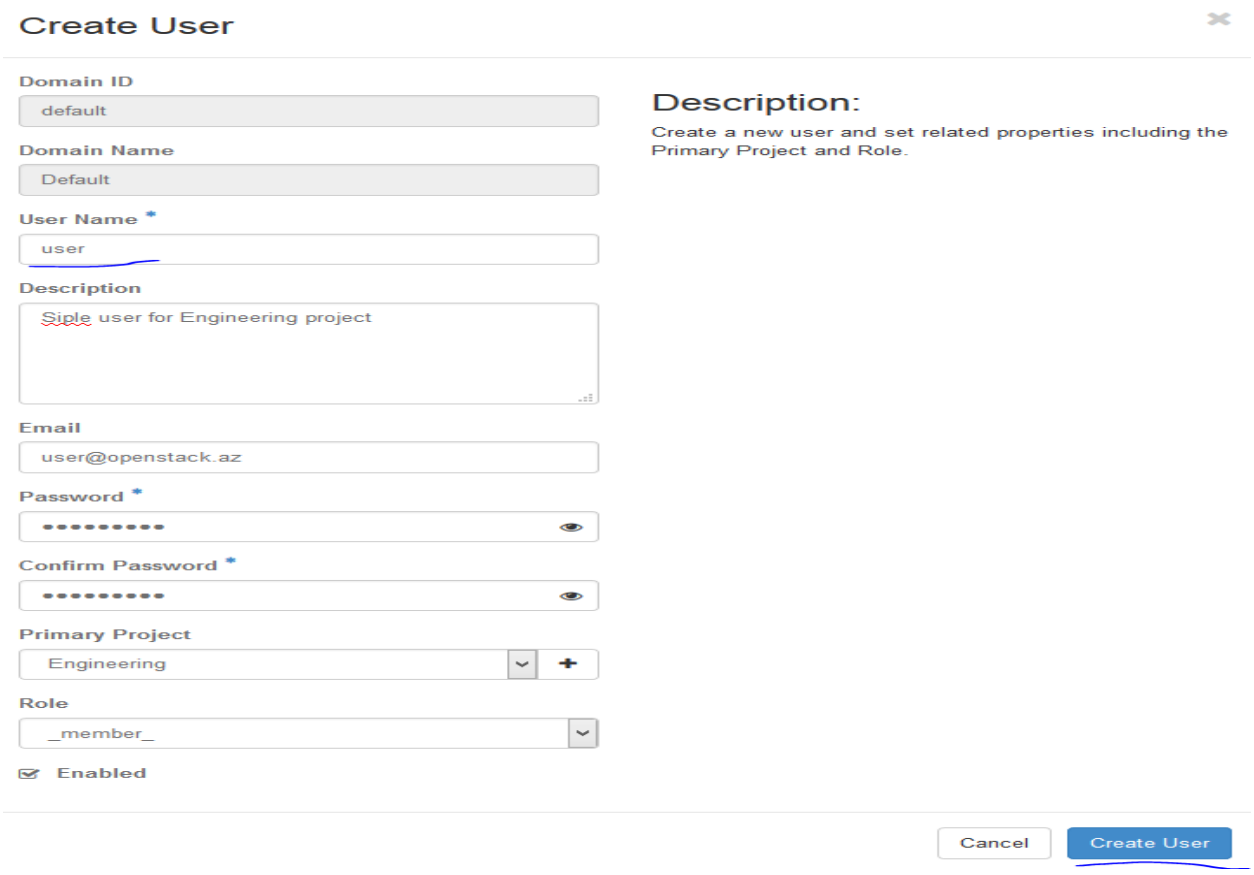


The next step is to configure a new Project for our tenant users. Please go to the **Identity -> Projects -> Create Project**, add the project name **Engineering** and press the **Create Project** button.



We must to add **2** new users. The users will be **user** (simple user with simple privileges) and **adm** (admin user with tenant admin privileges)

Go to the **Identity -> Users -> Create User** page



Create User

Domain ID

default

Domain Name

Default

User Name *

adm

Description

This is tenant admin for Engineering group

Email

adm@openstack.az

Password *

••••••••••

Confirm Password *

••••••••••

Primary Project

Engineering

Role

admin

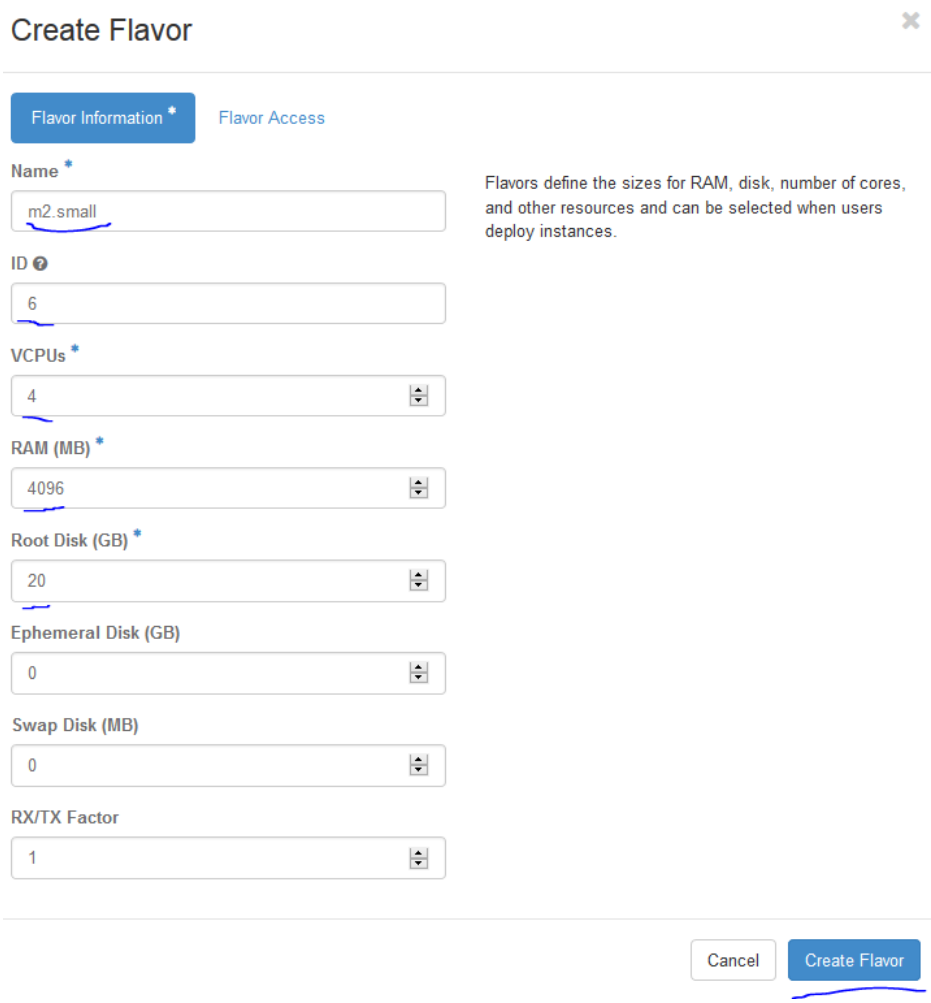
Enabled

Description:

Create a new user and set related properties including the Primary Project and Role.

Cancel | Create User

In the Next step we must create our new Flavor for our Tenant. Go to the **Admin -> Flavors** -> **Create Flavor** page.



Then we must download new image templates from the official OpenStack web page:

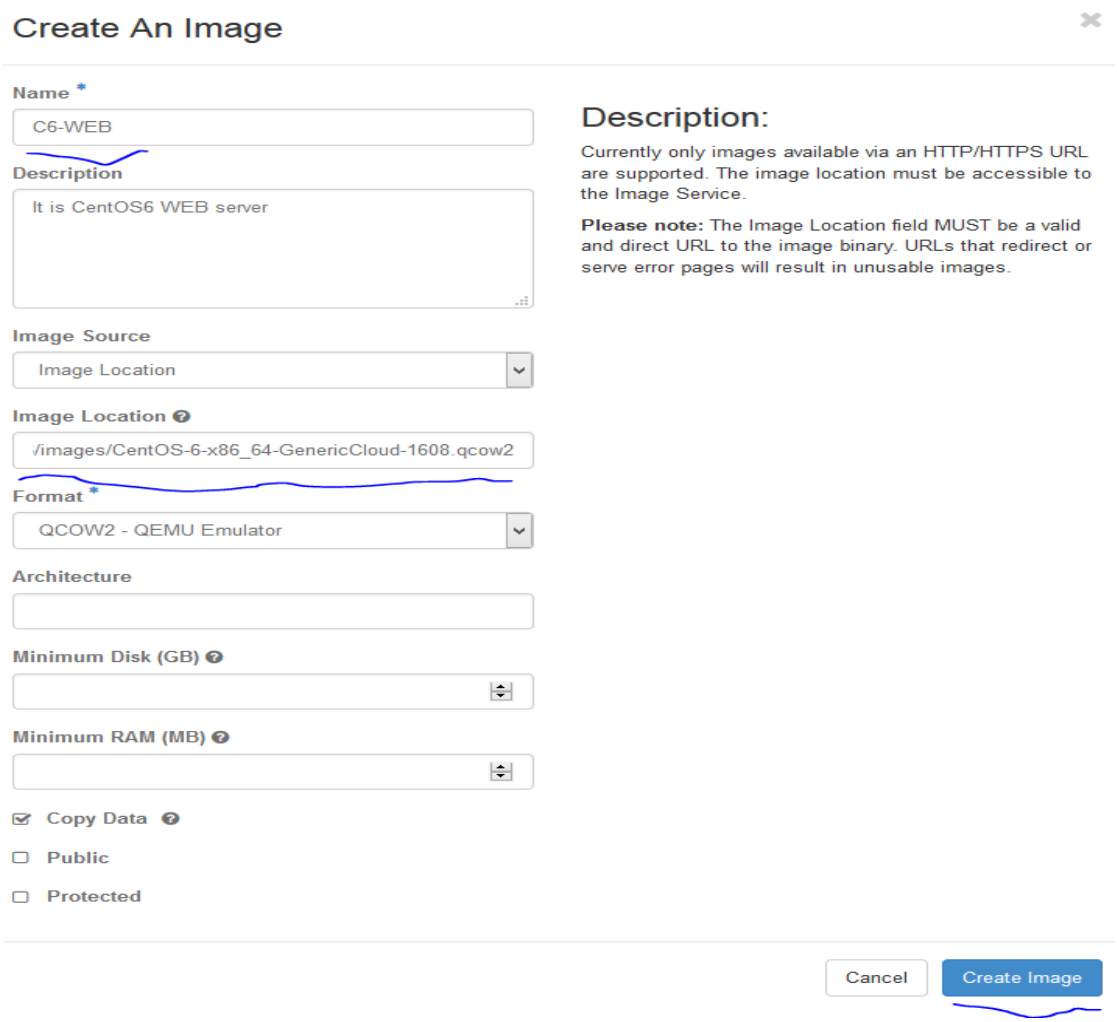
http://docs.openstack.org/image-guide/obtain-images.html

Now we can **Sign Out** and **Login** back with username **user**.

Go to the **Project -> Compute -> Images -> Create Image**

As the first image I selected CentOS6.7 and URL is http://cloud.centos.org/centos/6/images/CentOS-6-x86_64-GenericCloud-1608.qcow2

We must copy and paste this URL in the **Image location** place.



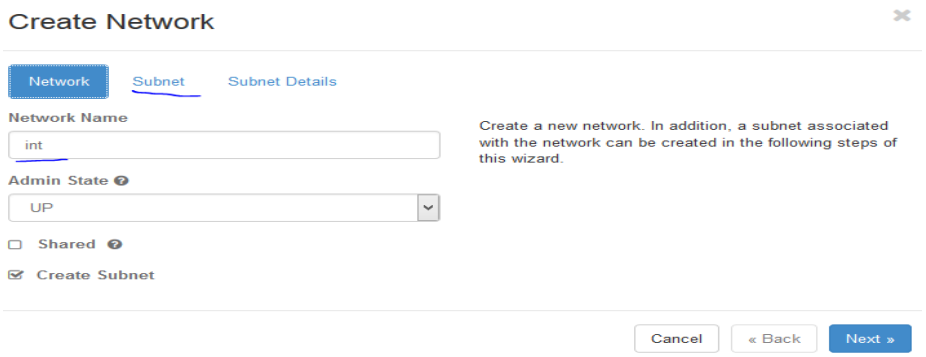
Repeat this step for **Debian** and **Ubuntu**. Used URLS are following:

http://cdimage.debian.org/cdimage/openstack/8.6.0/debian-8.6.0-openstack-amd64.qcow2
http://cloud-images.ubuntu.com/xenial/current/xenial-server-cloudimg-amd64-disk1.img

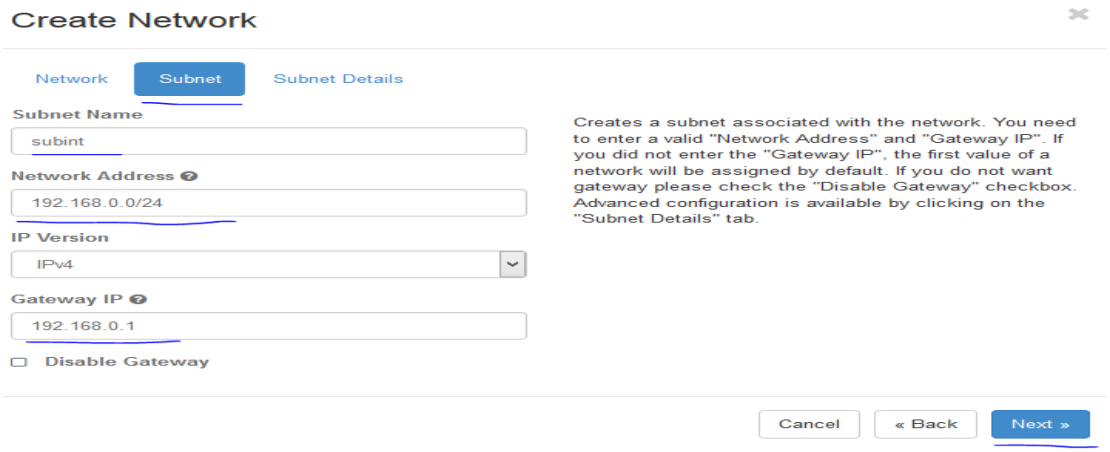
<u>At the next step, we must configure the network for our new tenant environment.</u>

Go to the **Project -> Network -> Networks -> Create Network**

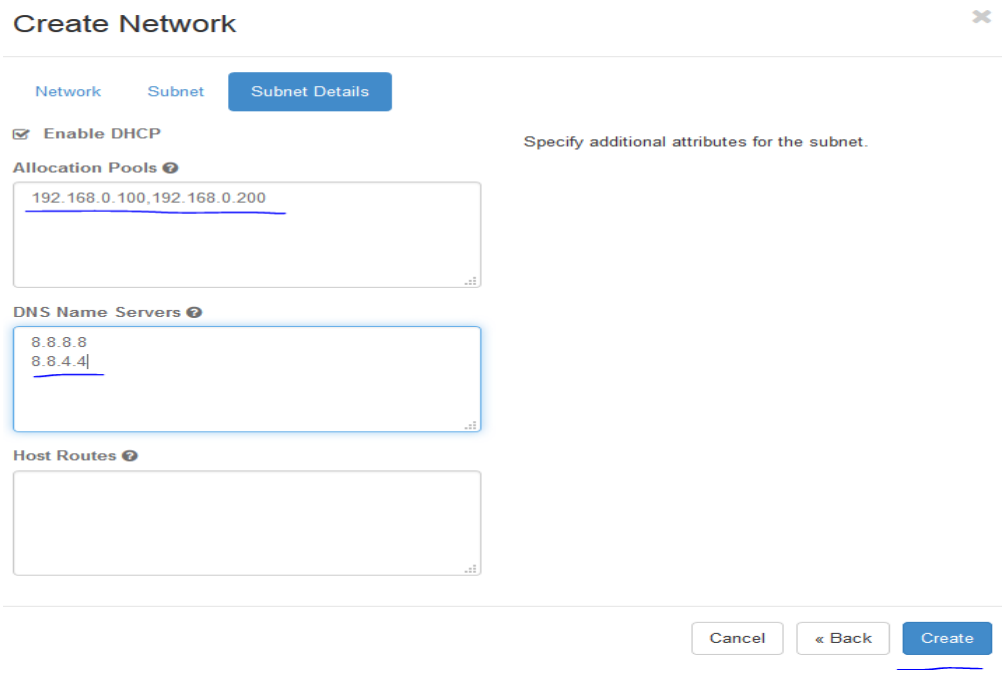
Enter the network name - **int** - and click **Subnet** button:



Enter the Subnet name and Local network address for Virtual Instances and press **Next** button.

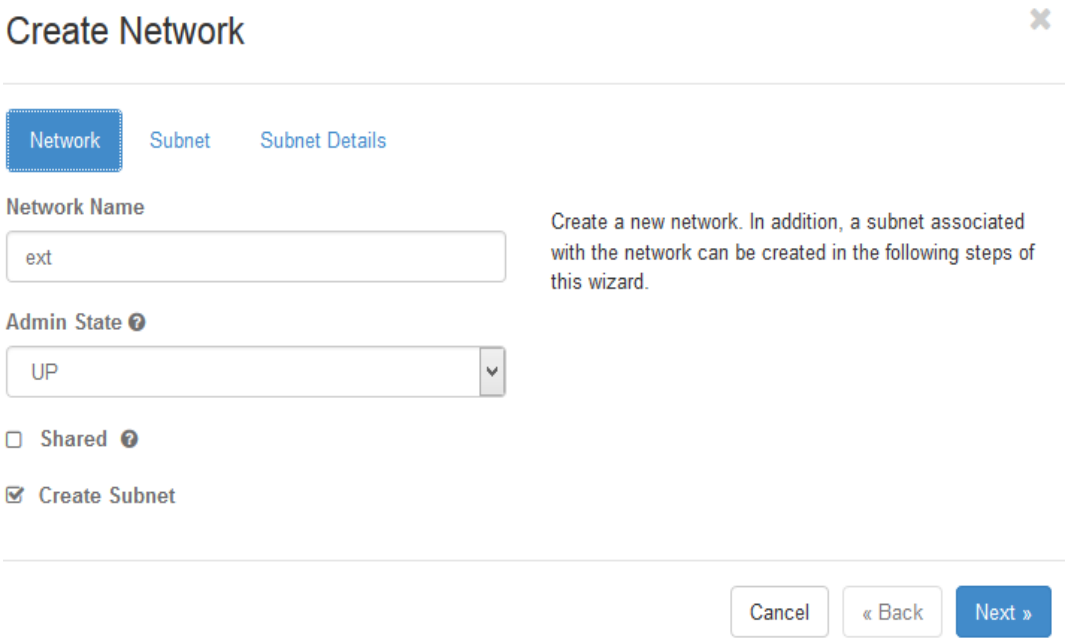


Enter the subnet range and DNS for Virtual Instances and press **Create** button.

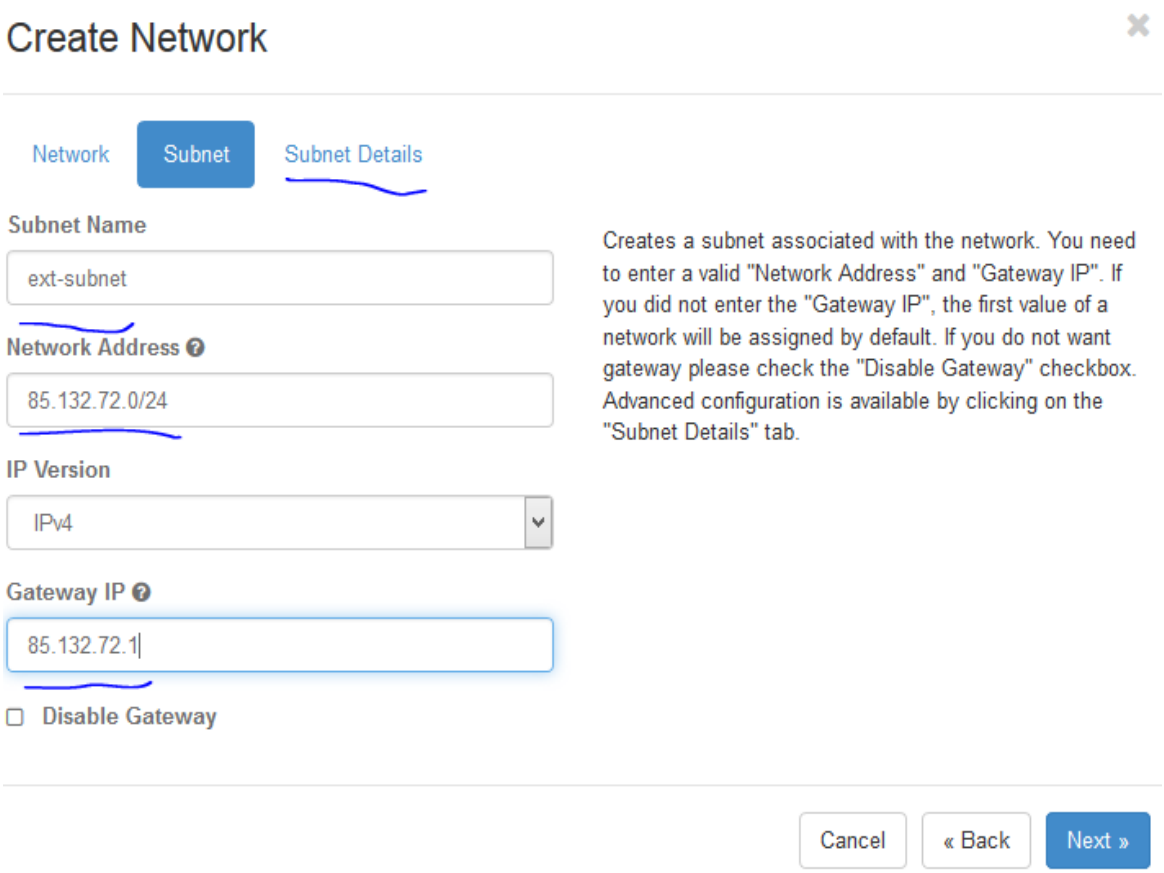


Press **Create Network** button again to create **External** network (repeat above steps).

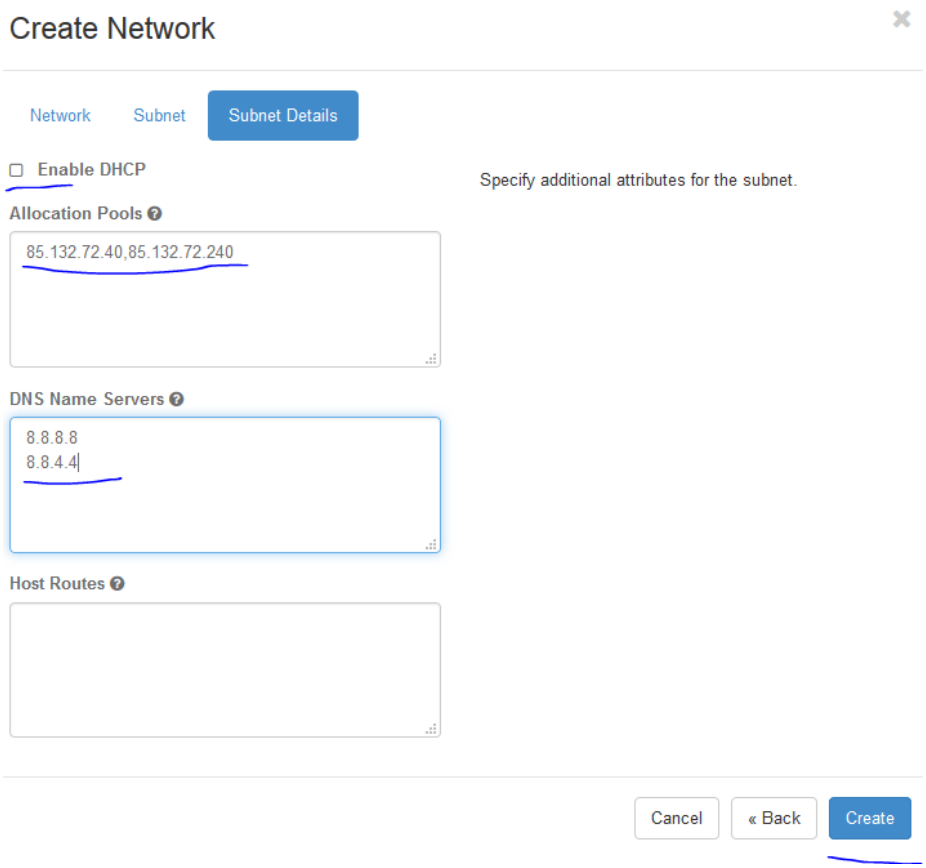
Enter network name - **Ext** - and select **Subnet** tab



Enter **Subnet Name, Network Address, Gateway IP** and select **Subnet Details.**

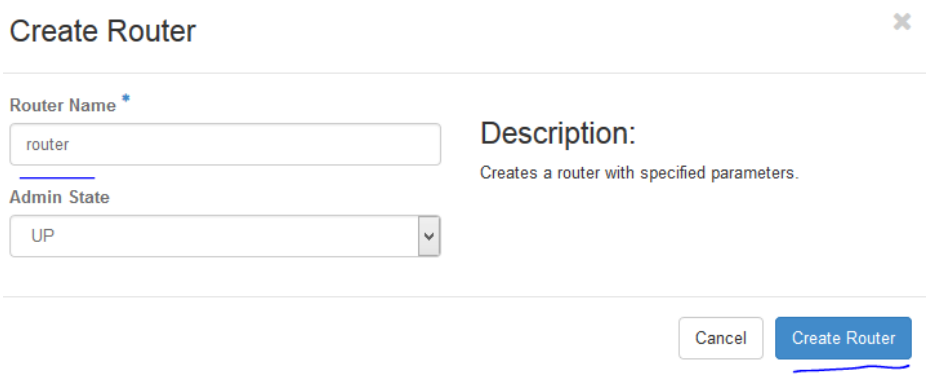


Uncheck "Enable DHCP", enter a range of IP addresses, DNS IP addresses, and press **Create** button.



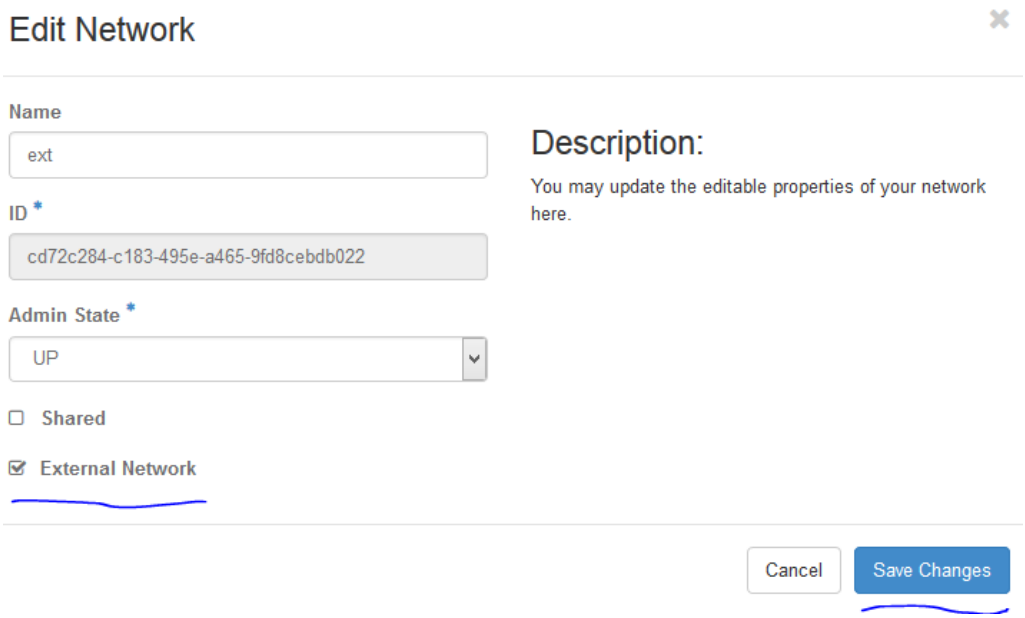
Go to the **Project -> Network -> Routers -> Create Router**

Enter Router Name and press **Create Router** button.



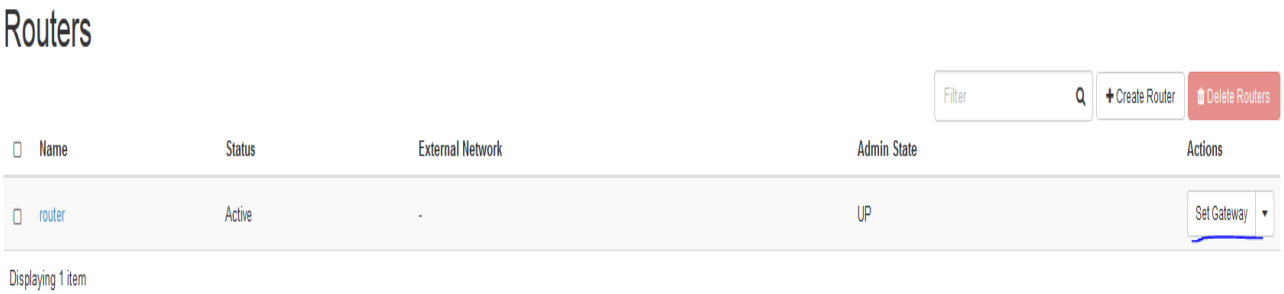
Log out from the system and log back in with the tenant admin (username: **adm**) user. Go to the **Admin -> System -> Networks** and click **Edit Network** for the network **ext**

Select the **External Network** checkbox and press **Save Changes** button:

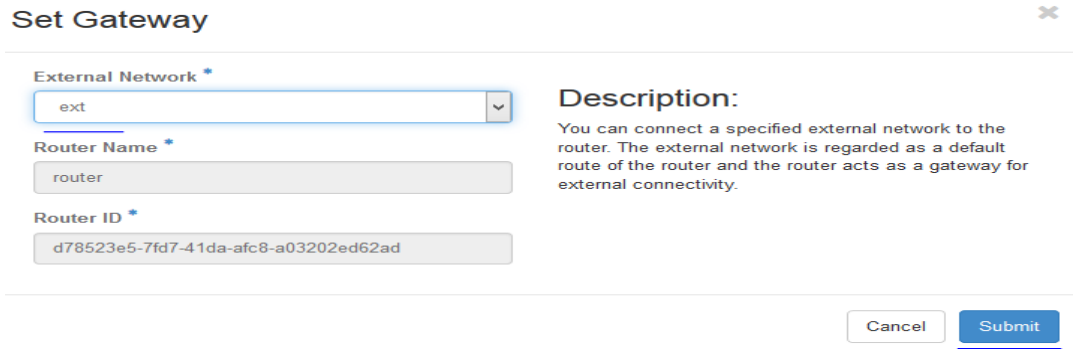


Sign Out from the system as tenant admin (username: **adm**) and **Sign In** back with tenant user (username: **user**)

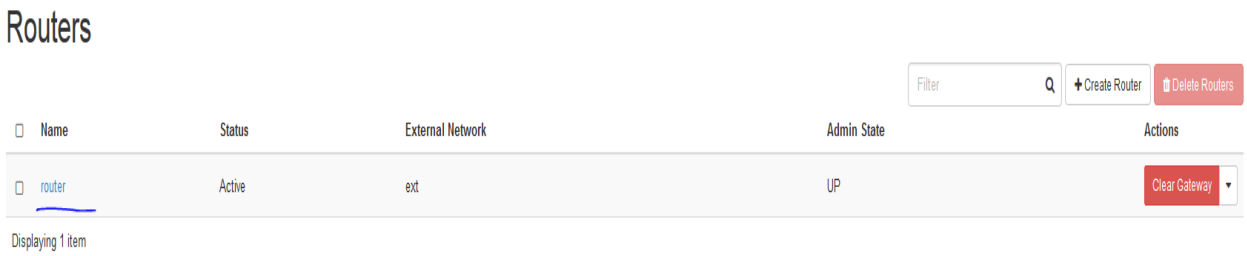
Go to the **Project -> Network -> Routers** and press button **Set Gateway** for our **router**



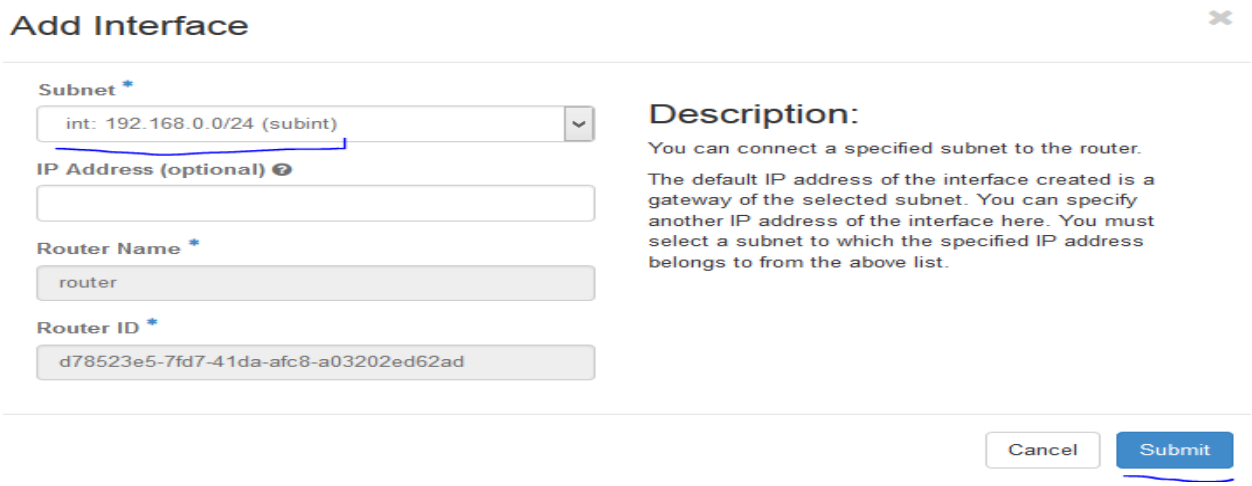
Select External Network (our external subnet: **ext**) and press **Submit** button:



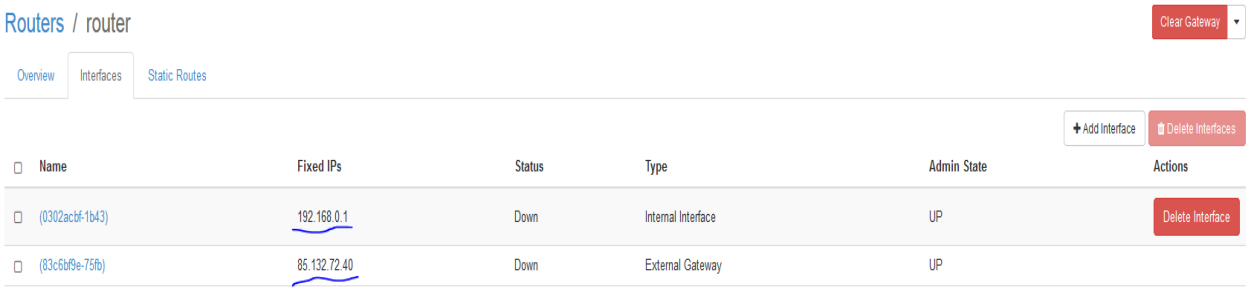
Click to the **router** link:



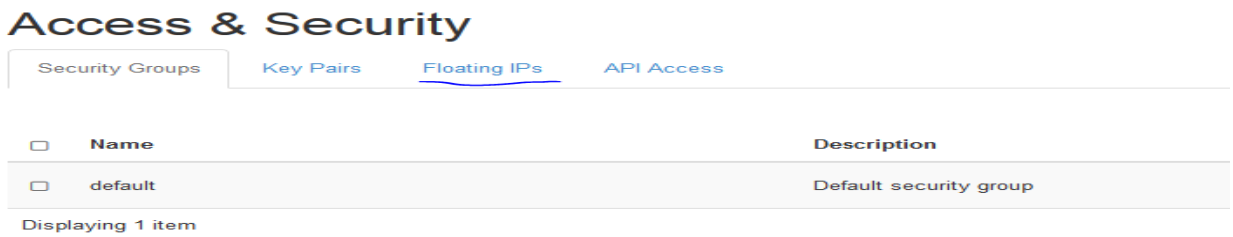
Go to the **Interfaces** -> **Add Interface**, select Subnet as local subnet (local subnet is 192.168.0.0/24 for internal network interface on our software router) **int** and press **Submit** button



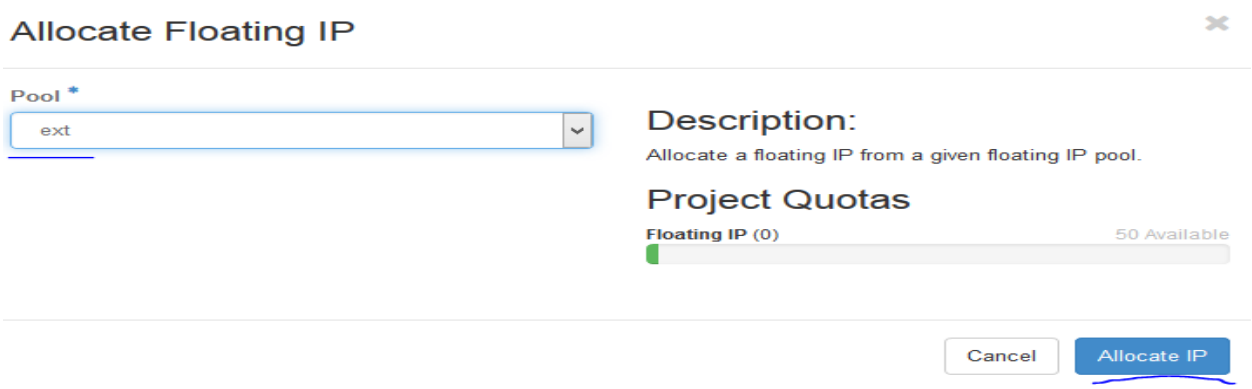
As a result we will see the following configuration of the **router**:



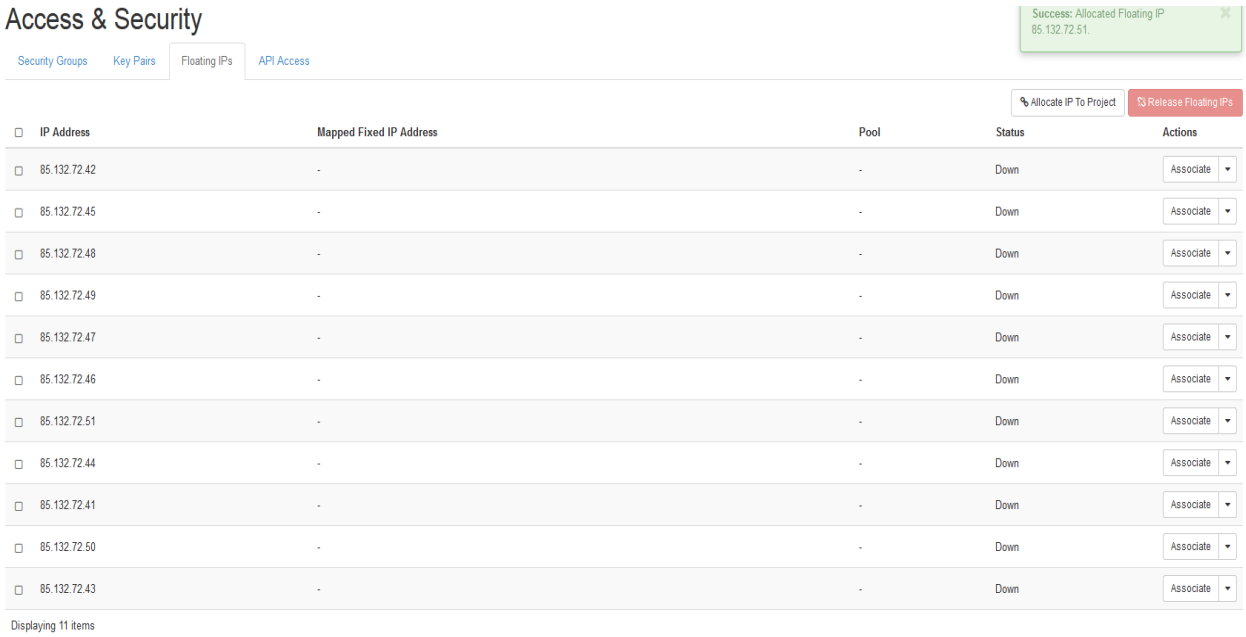
Next, we must configure Floating IP addresses. Go to the **Project -> Compute -> Access & Security** and select tab **Floating IPs**



Then press **Allocate IP To Project** button. Select **ext** pool and press **Allocate IP** button:

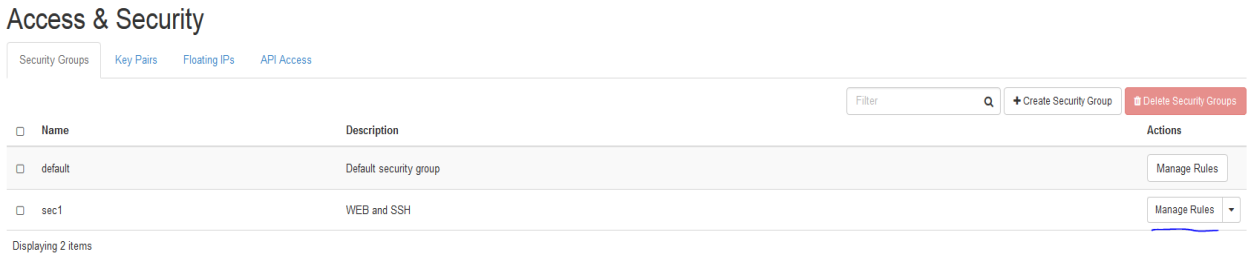


Repeat this step for every PUBLIC IP address (which is already specified in our **ext** pool). In my case result was the following:



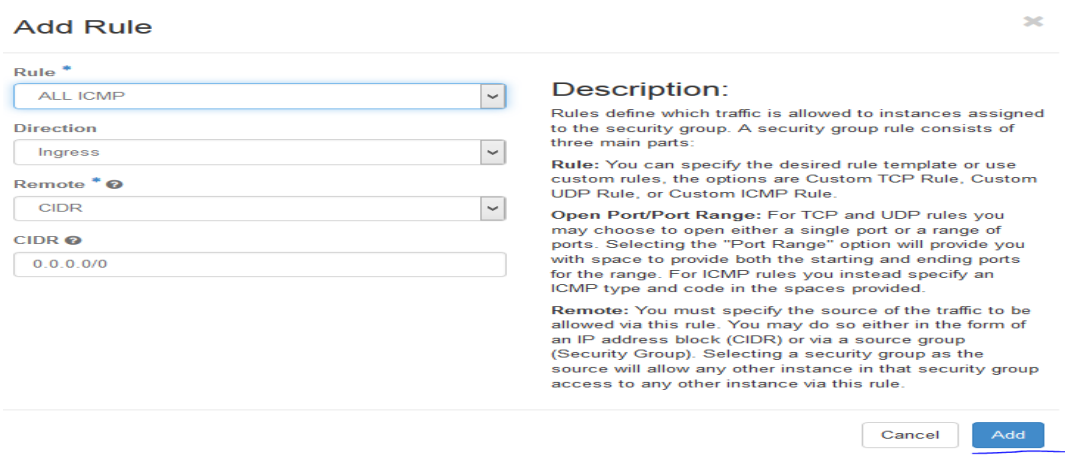
Go to the **Security Groups -> Create Security Group** and press **Create Security Group** button:

Press **Manage Rules**:

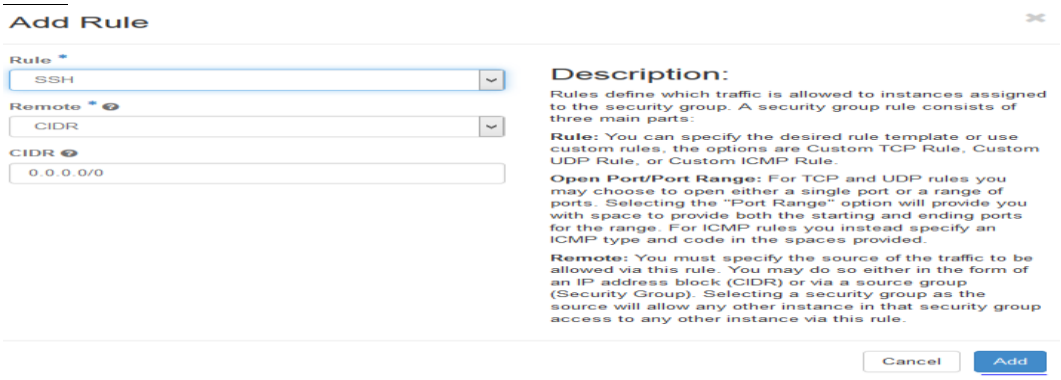


Press **Add Rule** button and add rules for incoming **ICMP, SSH, HTTPS:**

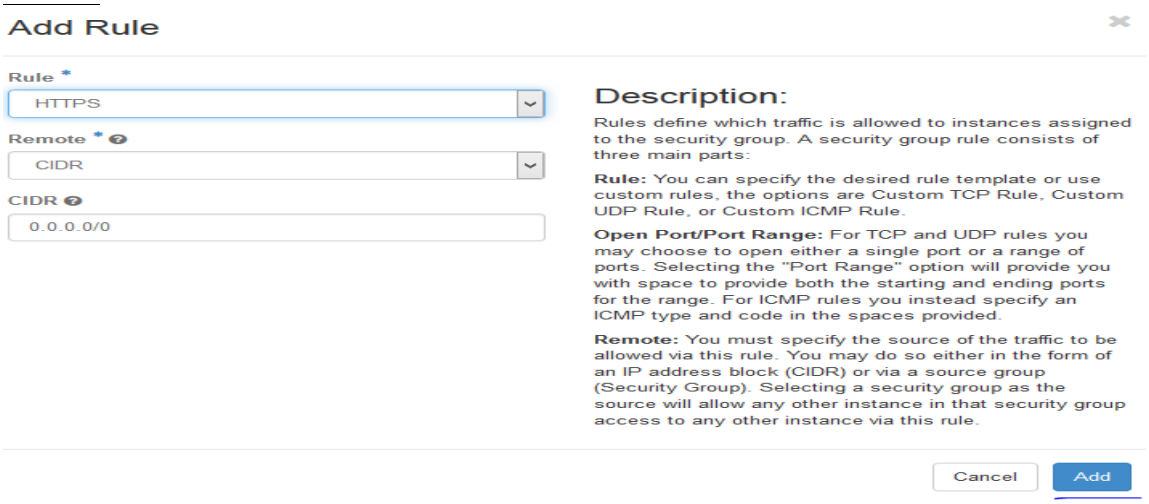
ICMP:



SSH:



HTTPS:



At the end we accept the **HTTP** traffic from other instances:

Add Rule

Rule *

HTTP

Remote *

Security Group

Security Group

sec1 (current)

Ether Type

IPv4

Description:

Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts:

Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.

Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.

Remote: You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.

Cancel Add

End result will be as following:

Access & Security / Manage Security Group Rules: sec1 (414626fc-4b3a-49c3-90b5-750740631553)

+ Add Rule Delete Rules

Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Actions
Egress	IPv6	Any	Any	::/0	-	Delete Rule
Egress	IPv4	Any	Any	0.0.0.0/0	-	Delete Rule
Ingress	IPv4	ICMP	Any	0.0.0.0/0	-	Delete Rule
Ingress	IPv4	TCP	22 (SSH)	0.0.0.0/0	-	Delete Rule
Ingress	IPv4	TCP	80 (HTTP)	-	sec1	Delete Rule
Ingress	IPv4	TCP	443 (HTTPS)	0.0.0.0/0	-	Delete Rule

Displaying 6 items

Go back to the **Project** -> **Access & Security** page and select **Key Pairs** tab and press **Create Key Pair** button

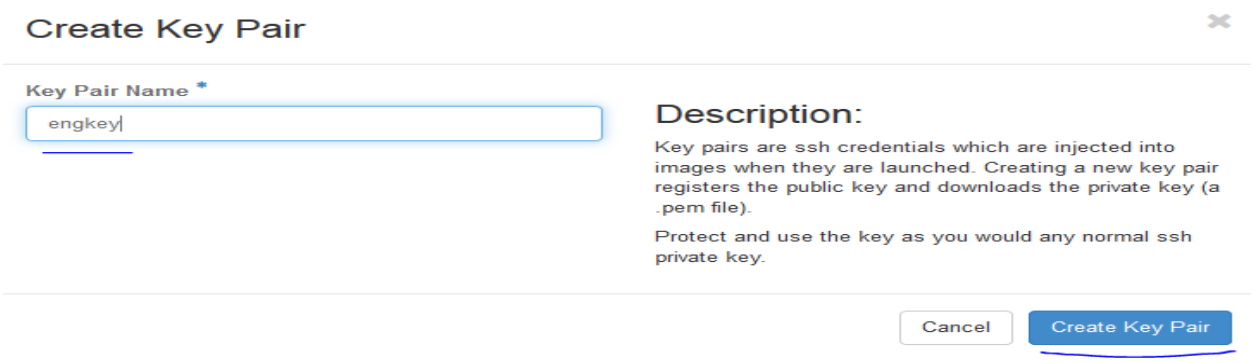
Access & Security

Security Groups Key Pairs Floating IPs API Access

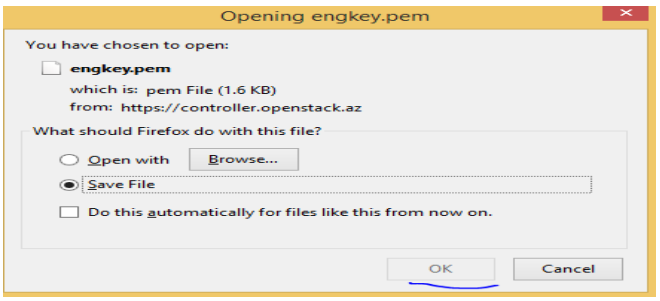
Filter + Create Key Pair

Key Pair Name	Fingerprint	Actions
No items to display.		

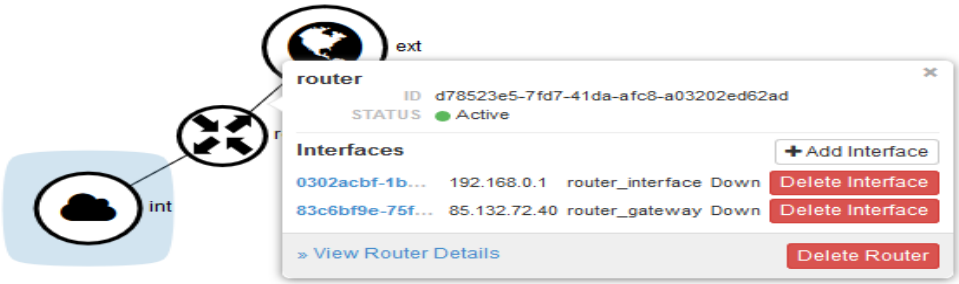
Enter **Key pair Name** and press **Create Key Pair** button:



Save this file in the secure place. You will use this key to connect to your virtual instances over SSH.



Now we have finished the network configuration. Go to the **Project -> Network -> Network Topology** page to perform a check.



At the end of the network configuration we can see network namespaces with the following commands:

```
[root@controller ~]# source keystonerc_admin
[root@controller ~]# ip netns list
qrouter-5d866ee6-2317-4391-ba7f-f7d69d9463bf
qdhcp-c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76

[root@controller ~]# ip netns exec qrouter-5d866ee6-2317-4391-ba7f-f7d69d9463bf ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
```

```
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
10: qg-3f61f7a5-fe: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc noqueue
state UNKNOWN
    link/ether fa:16:3e:2c:da:75 brd ff:ff:ff:ff:ff:ff
    inet 85.132.72.40/24 brd 85.132.72.255 scope global qg-3f61f7a5-fe
       valid_lft forever preferred_lft forever
    inet 85.132.72.41/32 brd 85.132.72.41 scope global qg-3f61f7a5-fe
       valid_lft forever preferred_lft forever
    inet 85.132.72.44/32 brd 85.132.72.44 scope global qg-3f61f7a5-fe
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe2c:da75/64 scope link
       valid_lft forever preferred_lft forever
11: qr-f76daf2e-7e: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc noqueue
state UNKNOWN
    link/ether fa:16:3e:e9:61:7f brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.1/24 brd 192.168.0.255 scope global qr-f76daf2e-7e
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fee9:617f/64 scope link
       valid_lft forever preferred_lft forever

[root@controller ~]# ip netns exec qdhcp-c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76
ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
9: tapa484be32-c7: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc noqueue
state UNKNOWN
    link/ether fa:16:3e:1e:39:8b brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.100/24 brd 192.168.0.255 scope global tapa484be32-c7
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe1e:398b/64 scope link
       valid_lft forever preferred_lft forever

[root@controller ~]# ip netns exec qdhcp-c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76
netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
0.0.0.0         192.168.0.1     0.0.0.0         UG        0 0          0 tapa484be32-c7
192.168.0.0     0.0.0.0         255.255.255.0   U         0 0          0 tapa484be32-c7


[root@controller ~]# ip netns exec qdhcp-c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76
ifconfig
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 2  bytes 1152 (1.1 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2  bytes 1152 (1.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

tapa484be32-c7: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1450
        inet 192.168.0.100  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::f816:3eff:fe1e:398b  prefixlen 64  scopeid 0x20<link>
        ether fa:16:3e:1e:39:8b  txqueuelen 0  (Ethernet)
        RX packets 2311  bytes 101612 (99.2 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 20  bytes 3888 (3.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

You can get the overall configuration using the following commands:

```
[root@controller ~(admin)]# neutron net-list
+--------------------------------------+------+-----------------------------------------------------+
| id                                   | name | subnets                                             |
+--------------------------------------+------+-----------------------------------------------------+
| c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76 | int  | 41773c84-0b12-44cd-aca3-5f968fa9c5b3 192.168.0.0/24 |
| ded7faf6-986b-40fc-ac6a-554cc4003003 | ext  | 9a61a1e3-03cb-4b28-ac76-76e04c8f2ac8 85.132.72.0/24 |
+--------------------------------------+------+-----------------------------------------------------+

[root@controller ~(admin)]# neutron net-show c3976dc5-d61c-40b7-8d7b-
a5c1e7ed9c76
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| availability_zone_hints   |                                      |
| availability_zones        | nova                                 |
| created_at                | 2016-10-14T06:12:45                  |
| description               |                                      |
| id                        | c3976dc5-d61c-40b7-8d7b-a5c1e7ed9c76 |
| ipv4_address_scope        |                                      |
| ipv6_address_scope        |                                      |
| mtu                       | 1450                                 |
| name                      | int                                  |
| provider:network_type     | vxlan                                |
| provider:physical_network |                                      |
| provider:segmentation_id  | 64                                   |
| router:external           | False                                |
| shared                    | False                                |
| status                    | ACTIVE                               |
| subnets                   | 41773c84-0b12-44cd-aca3-5f968fa9c5b3 |
| tags                      |                                      |
| tenant_id                 | 9b304efca082491da73a84b0c9875d53     |
| updated_at                | 2016-10-14T06:12:45                  |
+---------------------------+--------------------------------------+


[root@controller ~(admin)]# neutron router-list
+--------------------------------------+--------+-------------------------------------------------------------------+-------------+-------+
| id                                   | name   | external_gateway_info                                             | distributed | ha    |
+--------------------------------------+--------+-------------------------------------------------------------------+-------------+-------+
| 5d866ee6-2317-4391-ba7f-f7d69d9463bf | router | {"network_id": "ded7faf6-986b-40fc-ac6a-554cc4003003",            | False       | False |
|                                      |        | "enable_snat": true, "external_fixed_ips": [{"subnet_id": "9a61a1e3 |             |       |
|                                      |        | -03cb-4b28-ac76-76e04c8f2ac8", "ip_address": "85.132.72.40"}]}     |             |       |
```

```
+--------------------------------------+--------+--------------------------------------------------------------------+------------+-------+
```

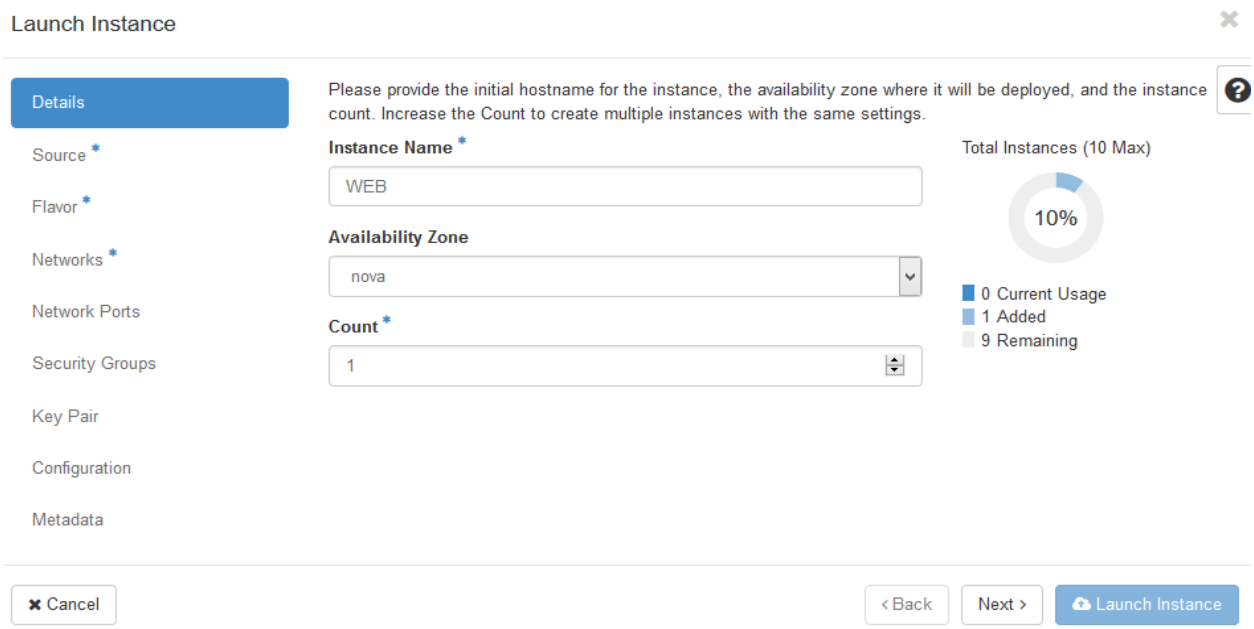
```
[root@controller ~(admin)]# neutron router-show 5d866ee6-2317-4391-ba7f-f7d69d9463bf
+-------------------------+-----------------------------------------------------------------------------------------------------------------------+
| Field                   | Value                                                                                                                 |
+-------------------------+-----------------------------------------------------------------------------------------------------------------------+
| admin_state_up          | True                                                                                                                  |
| availability_zone_hints |                                                                                                                       |
| availability_zones      | nova                                                                                                                  |
| description             |                                                                                                                       |
| distributed             | False                                                                                                                 |
| external_gateway_info   | {"network_id": "ded7faf6-986b-40fc-ac6a-554cc4003003", "enable_snat": true, "external_fixed_ips": [{"subnet_id": "9a61a1e3-03cb- |
|                         | 4b28-ac76-76e04c8f2ac8", "ip_address": "85.132.72.40"}]}                                                             |
| ha                      | False                                                                                                                 |
| id                      | 5d866ee6-2317-4391-ba7f-f7d69d9463bf                                                                                  |
| name                    | router                                                                                                                |
| routes                  |                                                                                                                       |
| status                  | ACTIVE                                                                                                                |
| tenant_id               | 9b304efca082491da73a84b0c9875d53                                                                                      |
+-------------------------+-----------------------------------------------------------------------------------------------------------------------+
```

```
[root@controller ~(admin)]# neutron subnet-list
+--------------------------------------+------------+----------------+----------------------------------------------------+
| id                                   | name       | cidr           | allocation_pools                                   |
+--------------------------------------+------------+----------------+----------------------------------------------------+
| 41773c84-0b12-44cd-aca3-5f968fa9c5b3 | subint     | 192.168.0.0/24 | {"start": "192.168.0.100", "end": "192.168.0.200"} |
| 9a61a1e3-03cb-4b28-ac76-76e04c8f2ac8 | ext-subnet | 85.132.72.0/24 | {"start": "85.132.72.40", "end": "85.132.72.240"}  |
+--------------------------------------+------------+----------------+----------------------------------------------------+
```

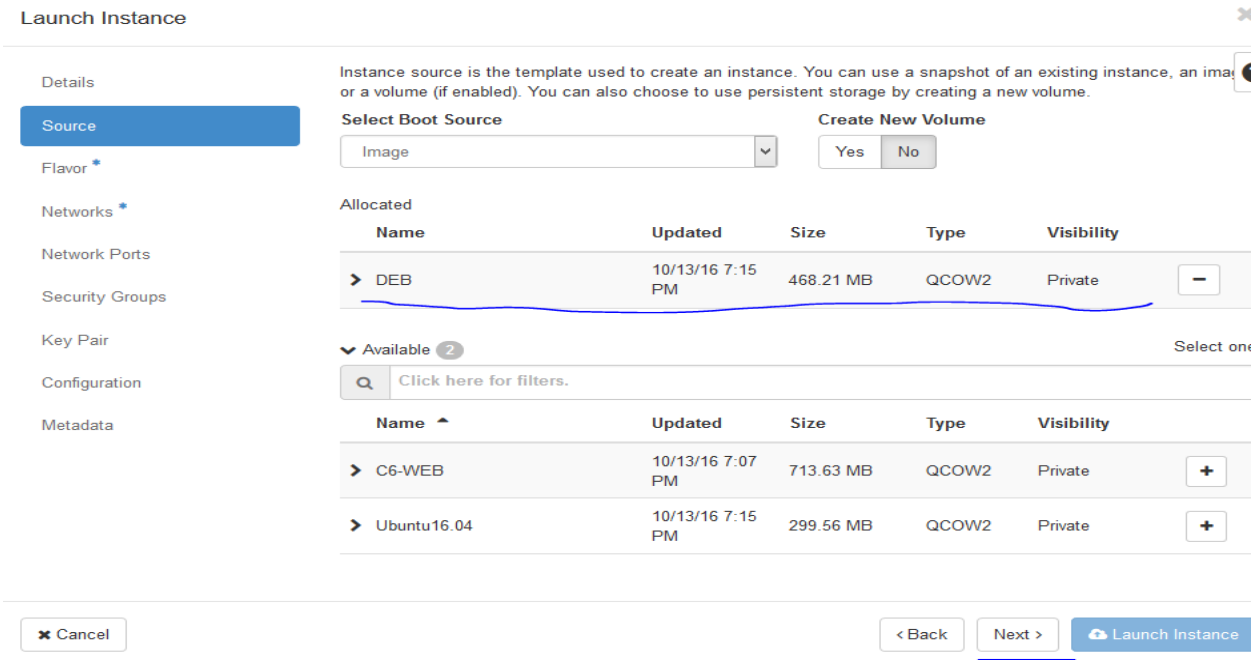
```
[root@controller ~(admin)]# neutron subnet-show 9a61a1e3-03cb-4b28-ac76-76e04c8f2ac8
+-------------------+---------------------------------------------------+
| Field             | Value                                             |
+-------------------+---------------------------------------------------+
| allocation_pools  | {"start": "85.132.72.40", "end": "85.132.72.240"} |
| cidr              | 85.132.72.0/24                                    |
| created_at        | 2016-10-14T06:14:51                               |
| description       |                                                   |
| dns_nameservers   | 8.8.8.8                                           |
|                   | 8.8.4.4                                           |
| enable_dhcp       | False                                             |
| gateway_ip        | 85.132.72.1                                       |
| host_routes       |                                                   |
| id                | 9a61a1e3-03cb-4b28-ac76-76e04c8f2ac8              |
| ip_version        | 4                                                 |
| ipv6_address_mode |                                                   |
| ipv6_ra_mode      |                                                   |
| name              | ext-subnet                                        |
| network_id        | ded7faf6-986b-40fc-ac6a-554cc4003003              |
| subnetpool_id     |                                                   |
| tenant_id         | 9b304efca082491da73a84b0c9875d53                  |
| updated_at        | 2016-10-14T06:14:51                               |
+-------------------+---------------------------------------------------+
```

Create new Instance

Sign in as the tenant user (username: **user**). Go to the **Project** -> **Compute** -> **Instances** and press **Launch Instance** button. Enter the name of the instance and press **Next** button:



Select the Debian Image and press **Next** button:



Select **m2.small** flavor which we created before and press **Next** button:

Launch Instance

Details
Source
Flavor
Networks *
Network Ports
Security Groups
Key Pair
Configuration
Metadata

Flavors manage the sizing for the compute, memory and storage capacity of the instance.

Allocated

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
m2.small	4	4 GB	20 GB	20 GB	0 GB	Yes

Available 5 — Select one

Click here for filters.

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes
m1.small	1	2 GB	20 GB	20 GB	0 GB	Yes
m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes
m1.large	4	8 GB	80 GB	80 GB	0 GB	Yes
m1.xlarge	8	16 GB	160 GB	160 GB	0 GB	Yes

Cancel | Back | Next | Launch Instance

Select **int** interface to use IP address from the **192.168.0.0/24** subnet for the new instance and press **Next** button:

Launch Instance

Details
Source
Flavor
Networks
Network Ports
Security Groups
Key Pair
Configuration
Metadata

Networks provide the communication channels for instances in the cloud.

Allocated 1 — Select networks from those listed below.

	Network	Subnets Associated	Shared	Admin State	Status
1	int	subint	No	Up	Active

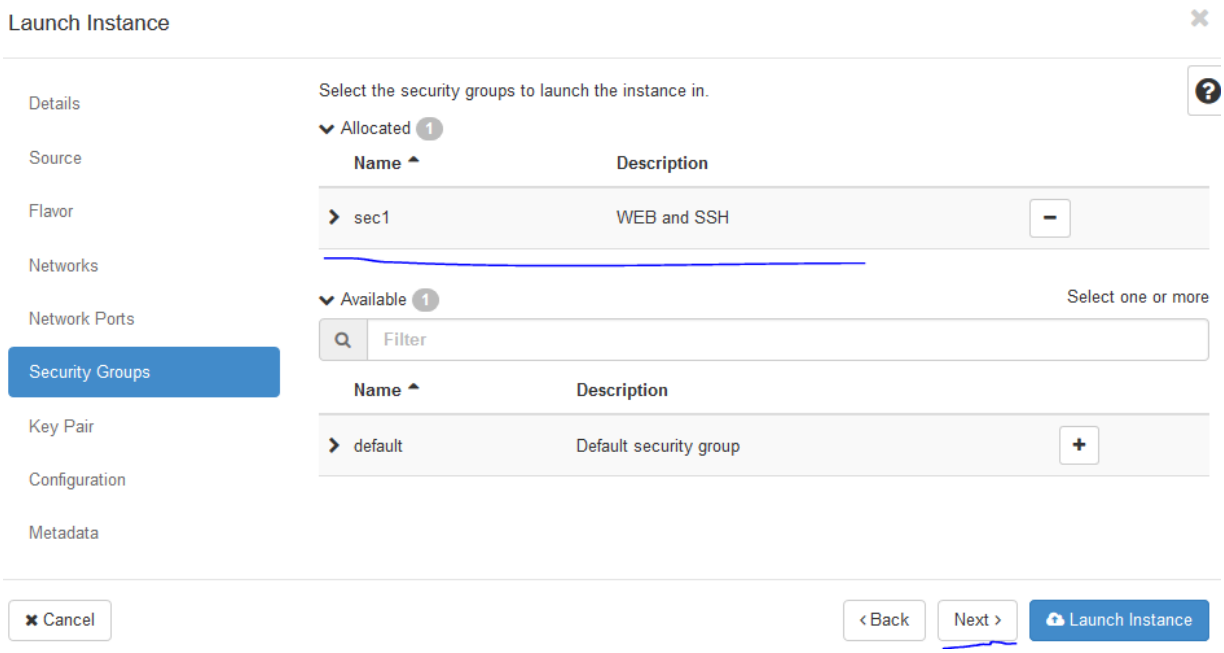
Available 1 — Select at least one network

Click here for filters.

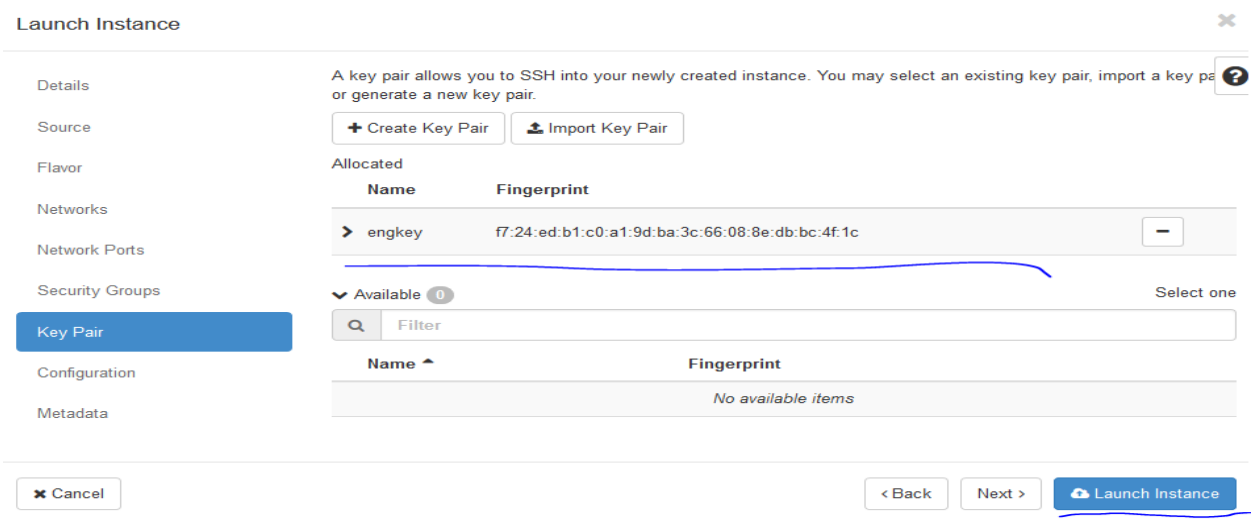
Network	Subnets Associated	Shared	Admin State	Status
ext	ext-subnet	No	Up	Active

Cancel | Back | Next | Launch Instance

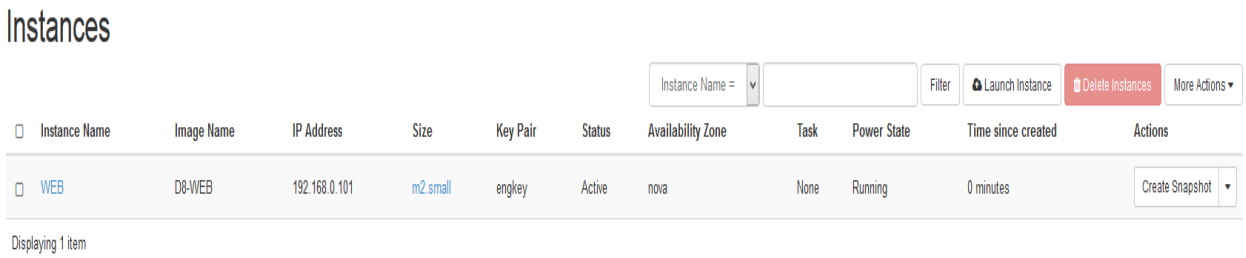
Go to the **Security Groups**, select **sec1** and press **Next** button:



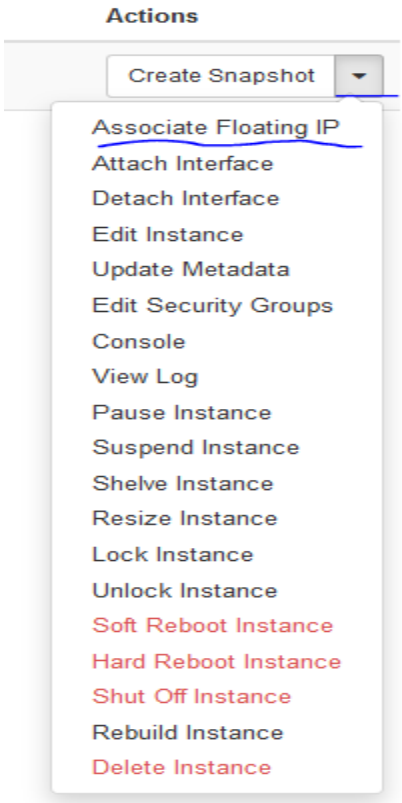
Press **Key Pair** button, select **engkey** Key Pair which we created before and press **Launch Instance** button:



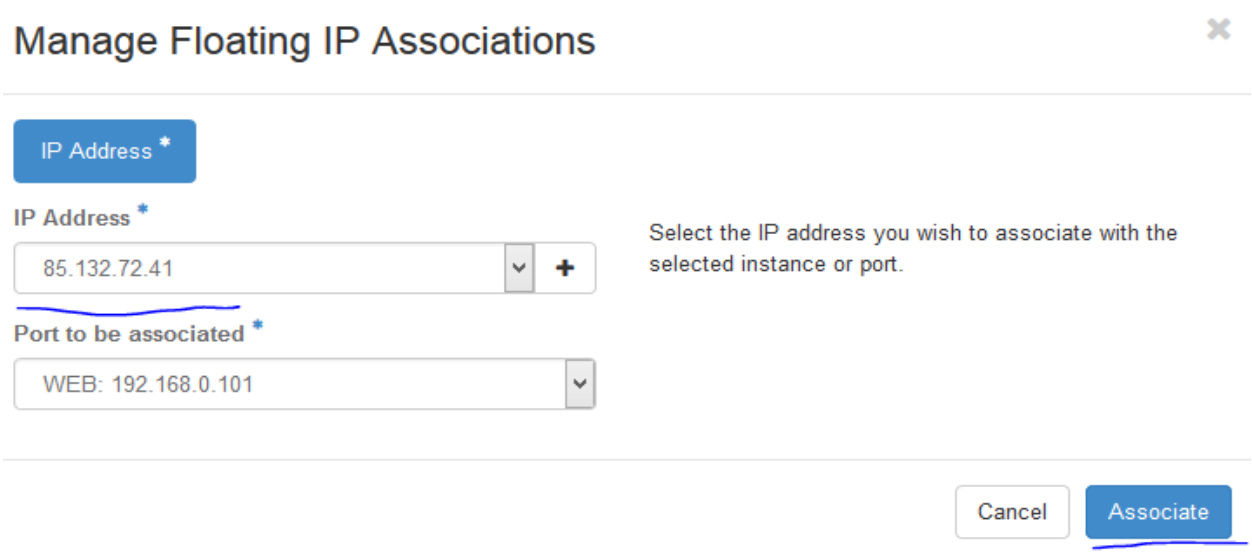
The result must be as following:



In the right side of our Virtual Instance in the drop down list select **Associate Floating IP**

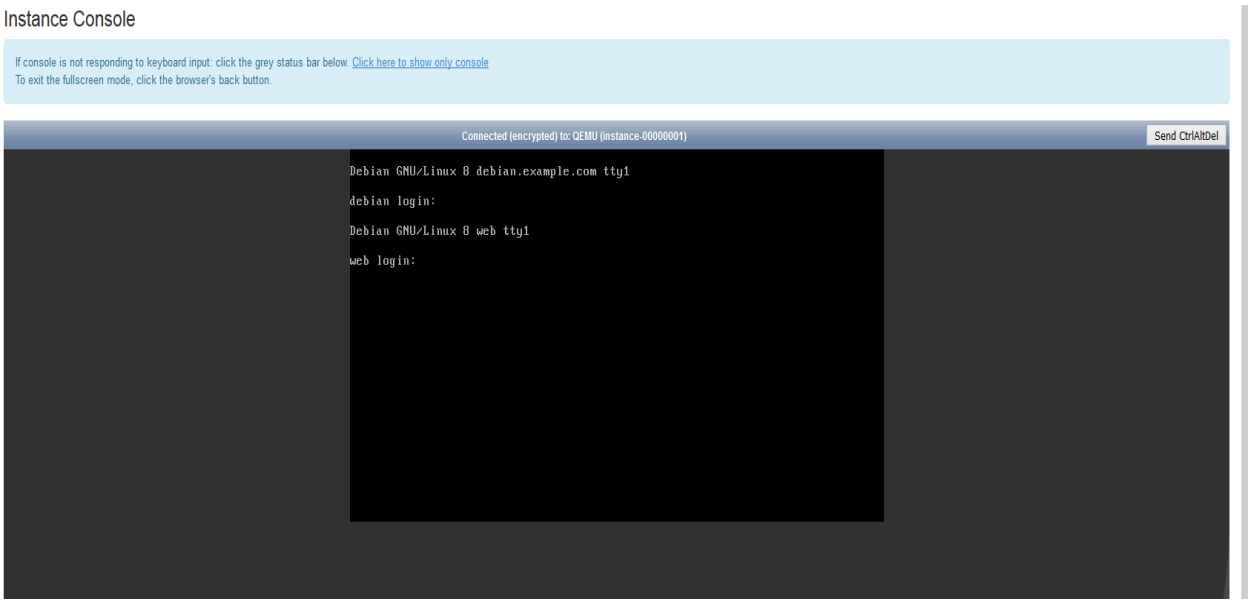


Select one of IP addresses which we created before and press **Associate** button:



Then press to the instance name (in our case the name was **WEB** which we created before) and go to the **Console** tab.

The Debian server console looks like this:



By default, Debian image has the **debian** user. We must connect to this server via SSH from another Linux or Windows machine with the **engkey.pem** file which we generated before:

Note: Do not forget to upload the **engkey.pem** file to you client (Linux or Windows) machine, which will be use to connect to the Debian server.

```
root@wifinat:/home/jamal # ssh -i /home/jamal/engkey.pem debian@85.132.72.41
The authenticity of host '85.132.72.41 (85.132.72.41)' can't be established.
ECDSA key fingerprint is 9e:64:48:46:f4:b5:6c:cf:2b:ab:b1:57:4a:cf:0c:ba.
Are you sure you want to continue connecting (yes/no)? yes

debian@web:~$ sudo -s
root@web:/home/debian# ifconfig
eth0      Link encap:Ethernet  HWaddr fa:16:3e:e3:88:e6
          inet addr:192.168.0.101  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::f816:3eff:fee3:88e6/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1400  Metric:1
          RX packets:175 errors:0 dropped:0 overruns:0 frame:0
          TX packets:217 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:21462 (20.9 KiB)  TX bytes:22120 (21.6 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Congratulations your OpenStack environment is ready ☺