

Openstack Manual Installation Guide

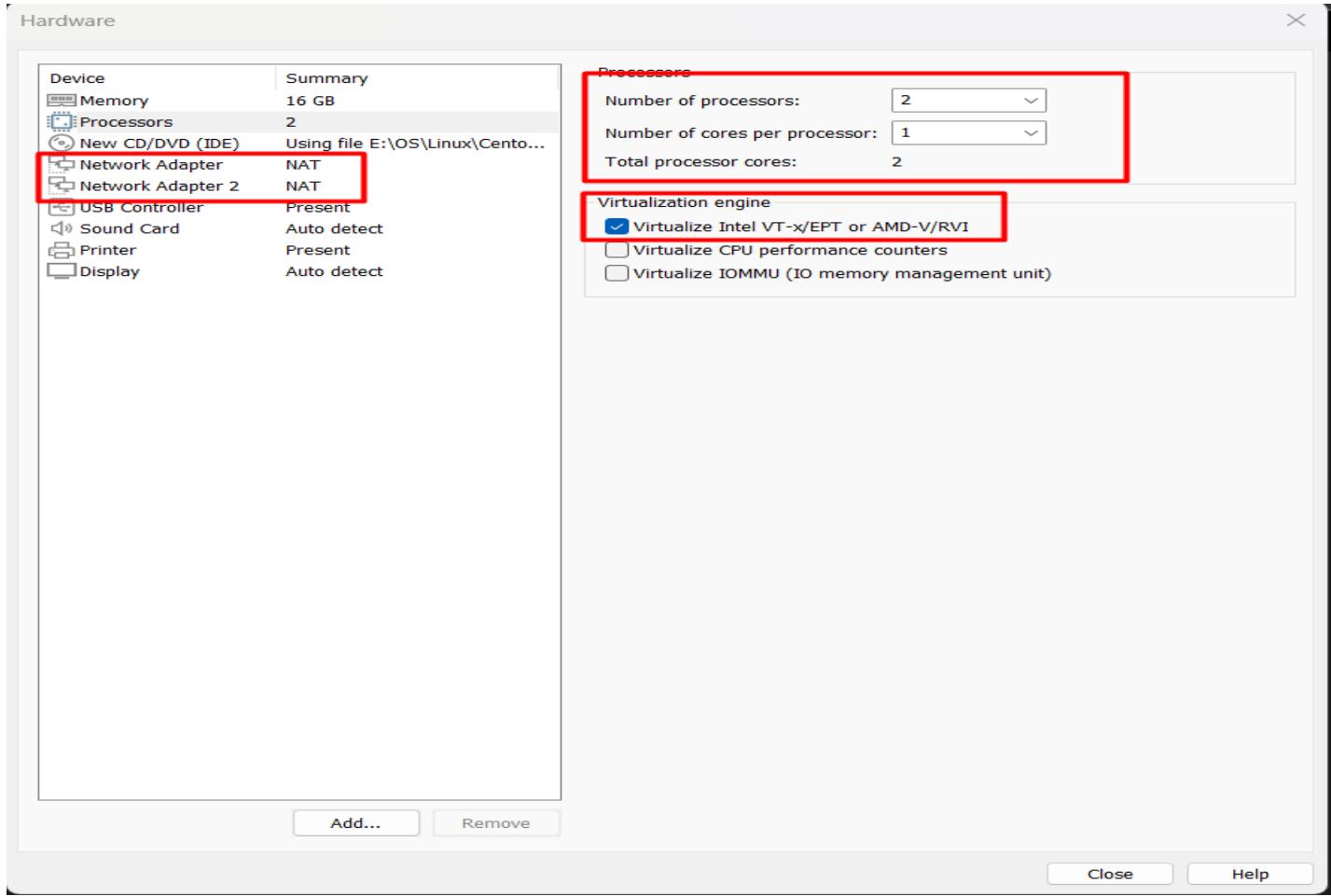
Environment:

Use CentOS Stream 8-stream.

A single VM of MINIMUM 12 GB RAM, 2 CPUs and 2 NICs

This lab uses FQDN of openstack.lab.local, you should edit /etc/hosts file

1- Machine preparation



Q1. Why we need to CPUs?

Because we will create instance on this VM so we need more than 1 CPU.

Q2. Why Two NICs?

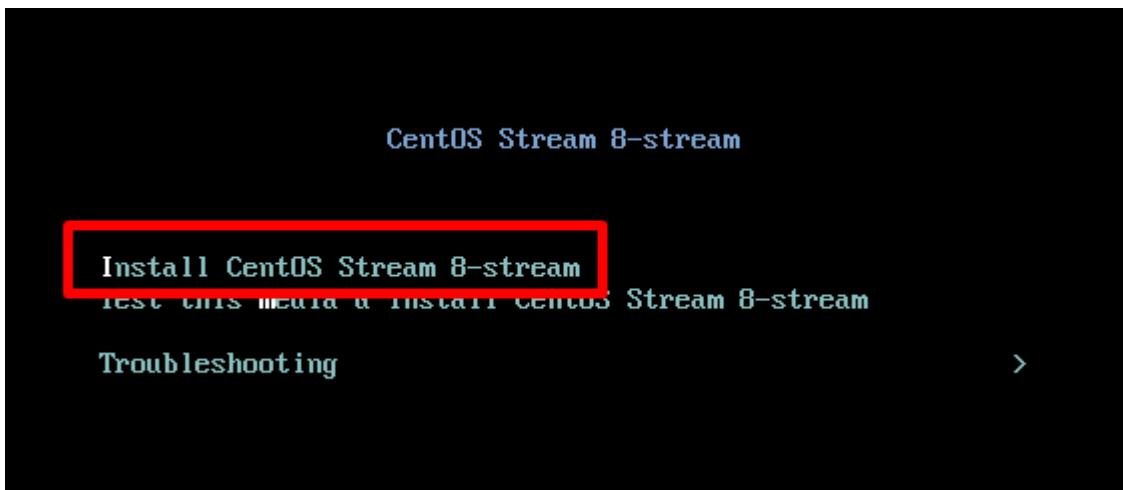
On this guide we will use just one of them but we want to imagine this is a real platform so we will have two types of traffic (Management, Business).

Q3. What is Virtualize Intel VT-X/EPT or AMD-V/RVI?

This feature to enable the nested virtualization.

2- Operating System Installation

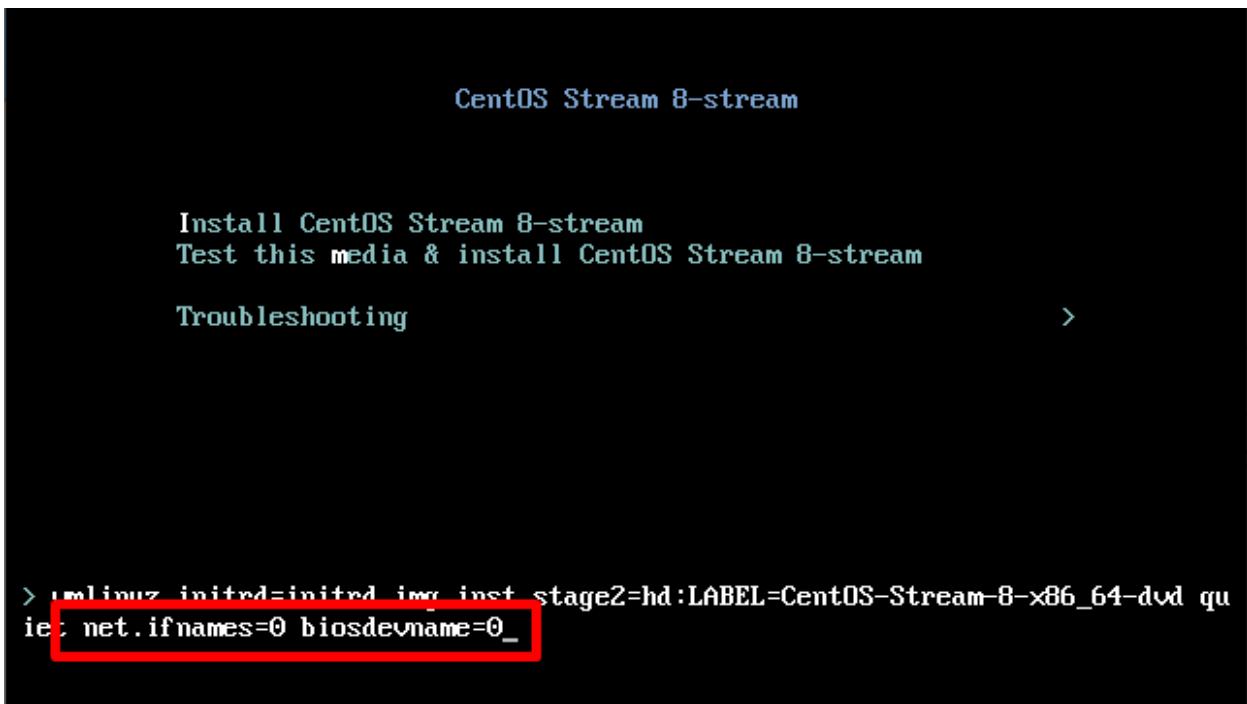
During the installation of the CentOS OS. Move to Install CentOS Stream 8-stream and click tab on your keyboard.



Type a space to separate than the last kernel option, type

```
net.ifnames=0 biosdevname=0
```

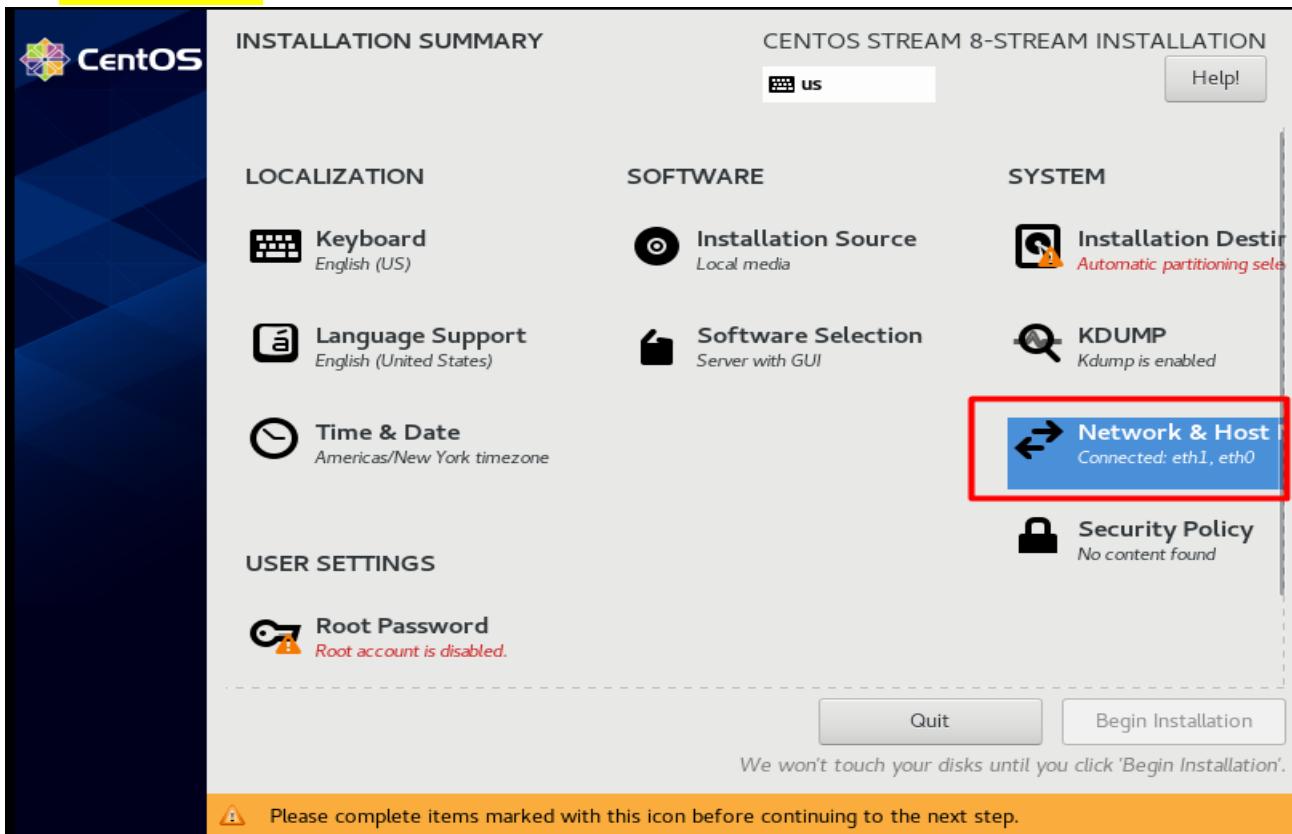
Then hit Enter.



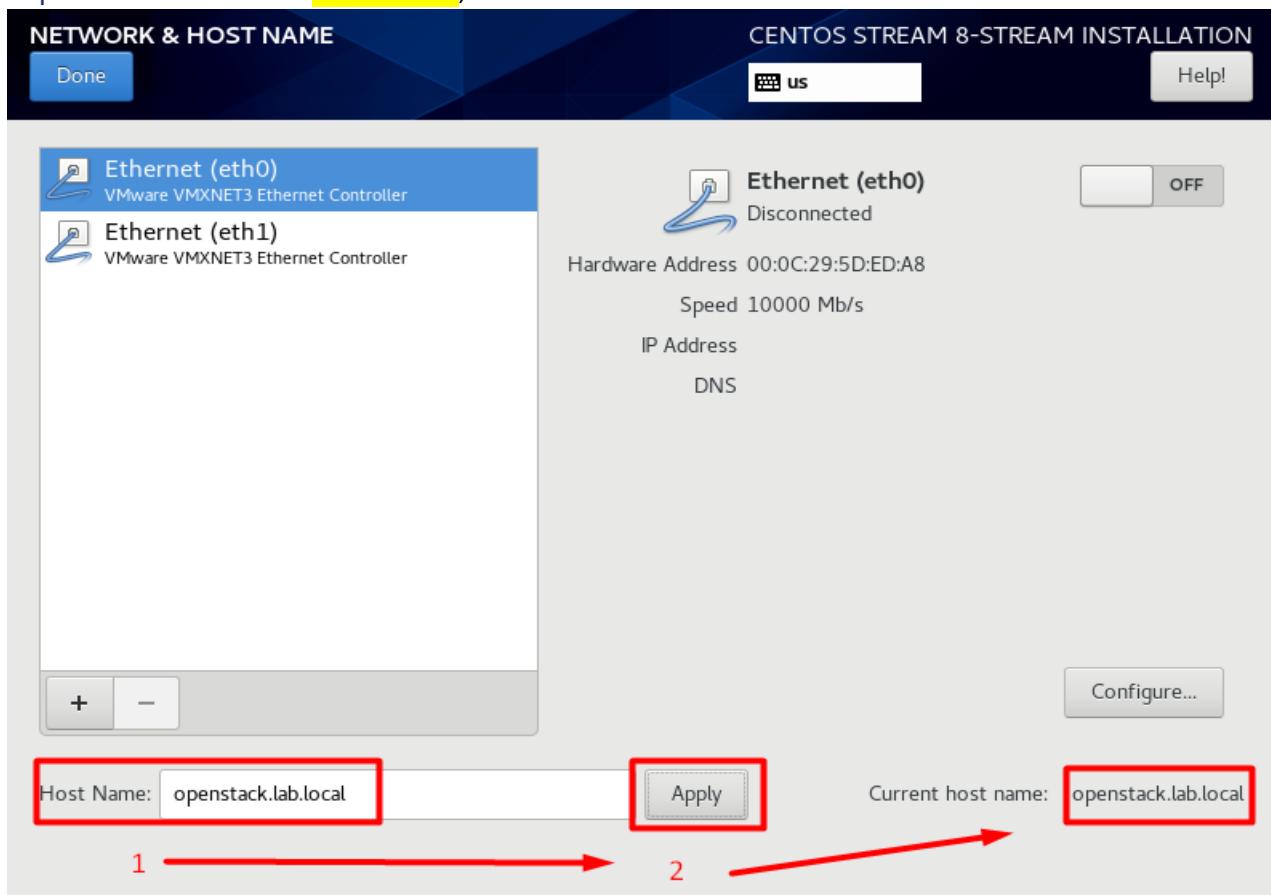
This will enable old Linux NIC card naming (eth0, eth1, ...etc).

Now you see the installation screen,

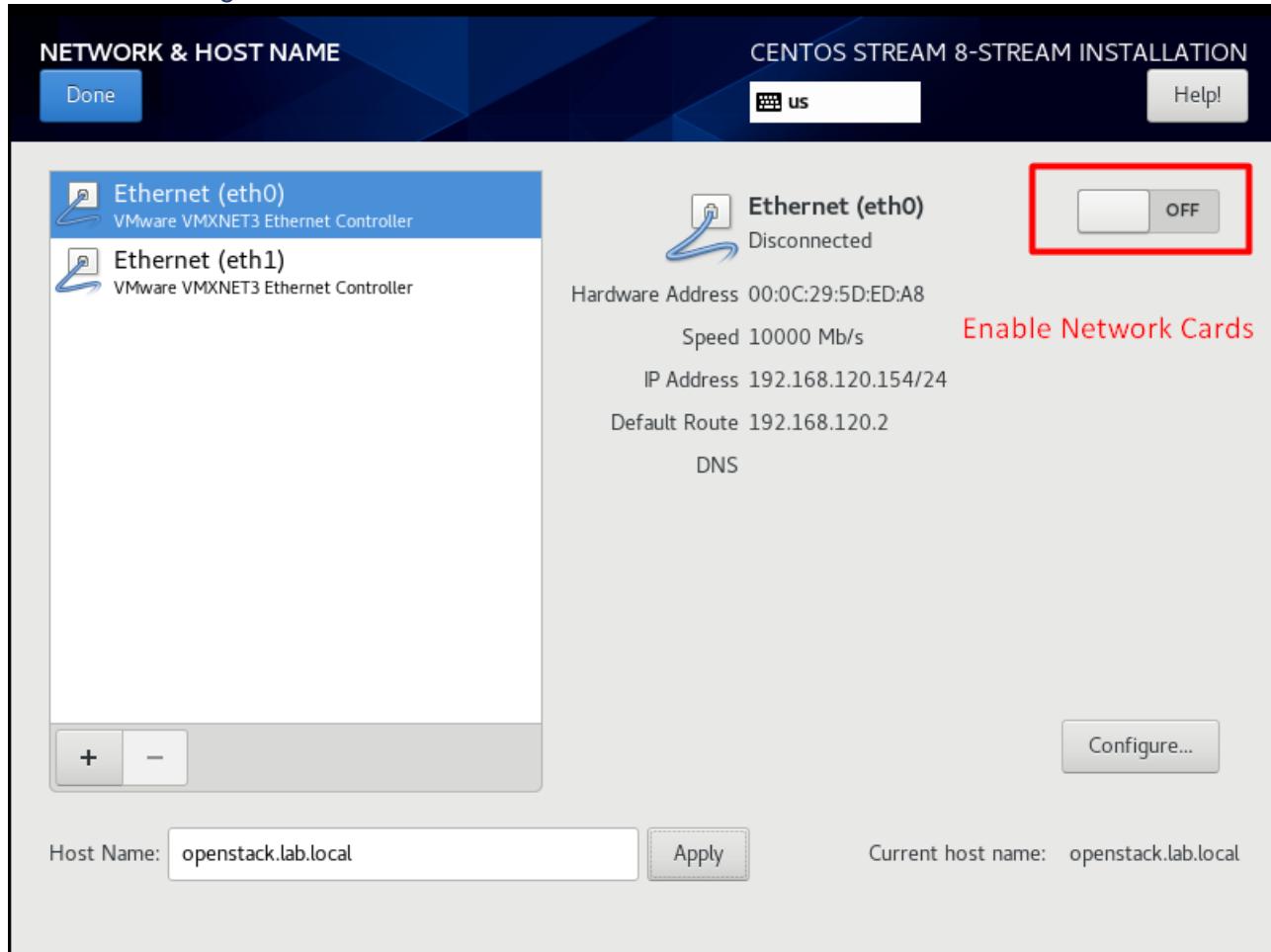
Click on Network & Host.



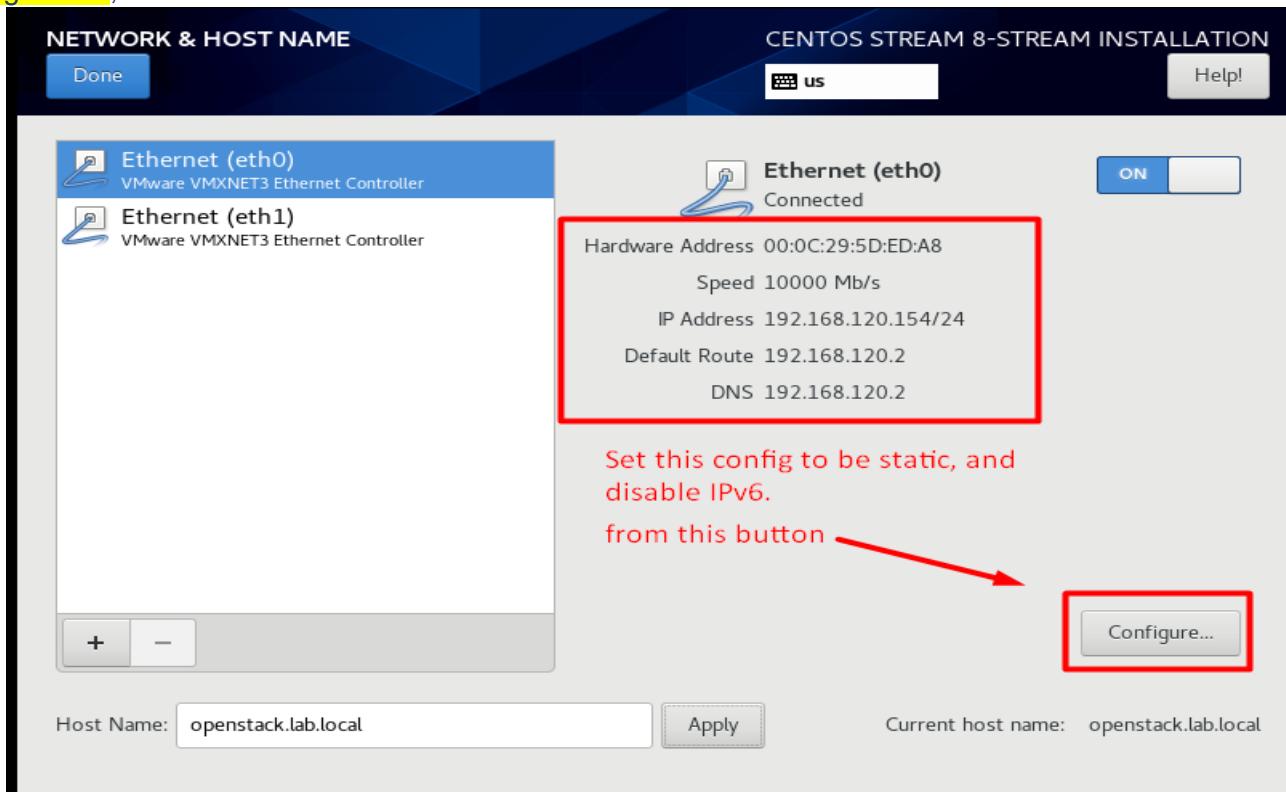
First step we need to set the Host Name,



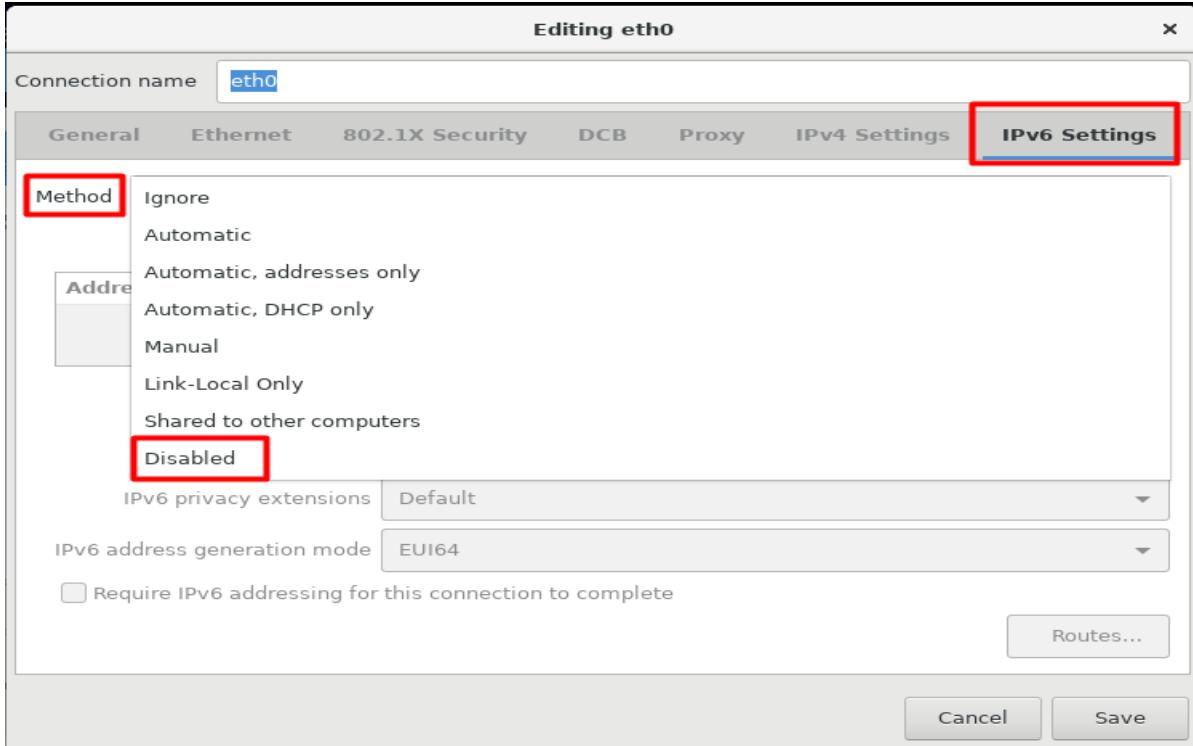
Now, the network card got an IP from the DHCP. configure the IP manually by clicking configure. Give the card the same fetched configuration from DHCP.



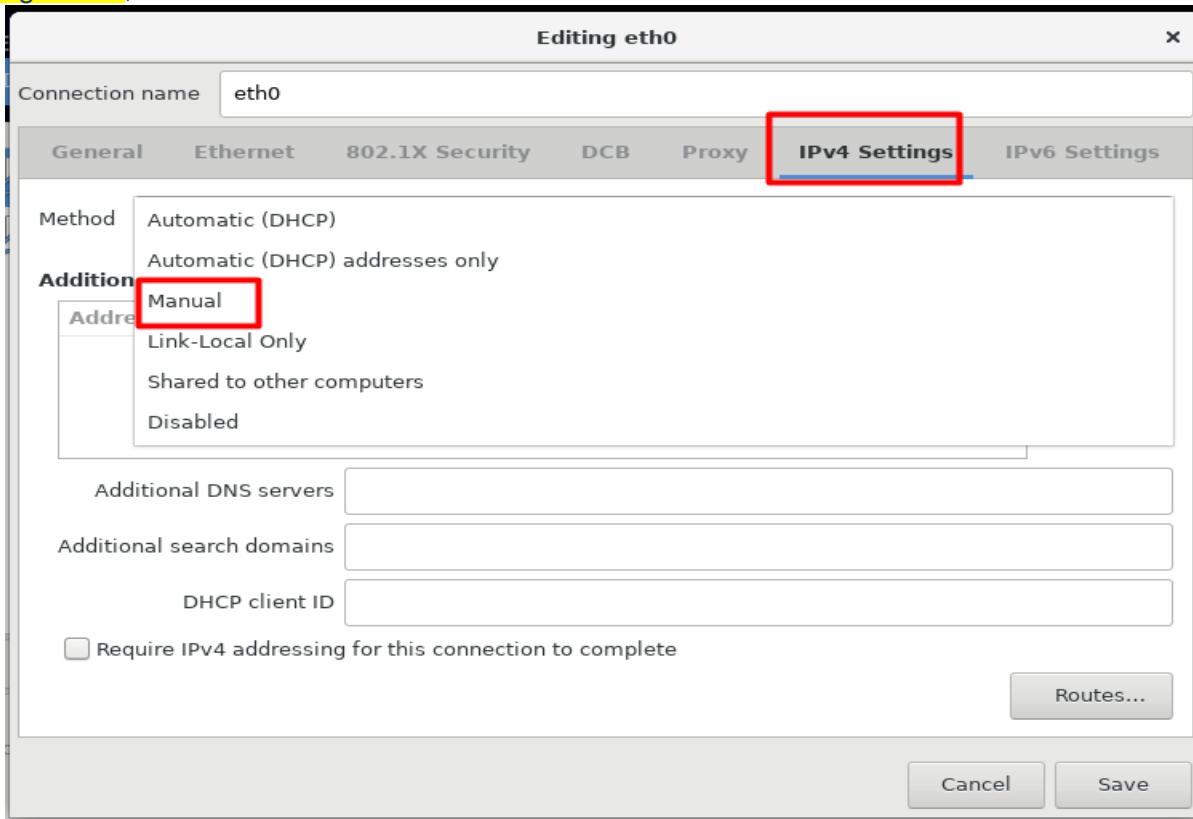
Configuration,



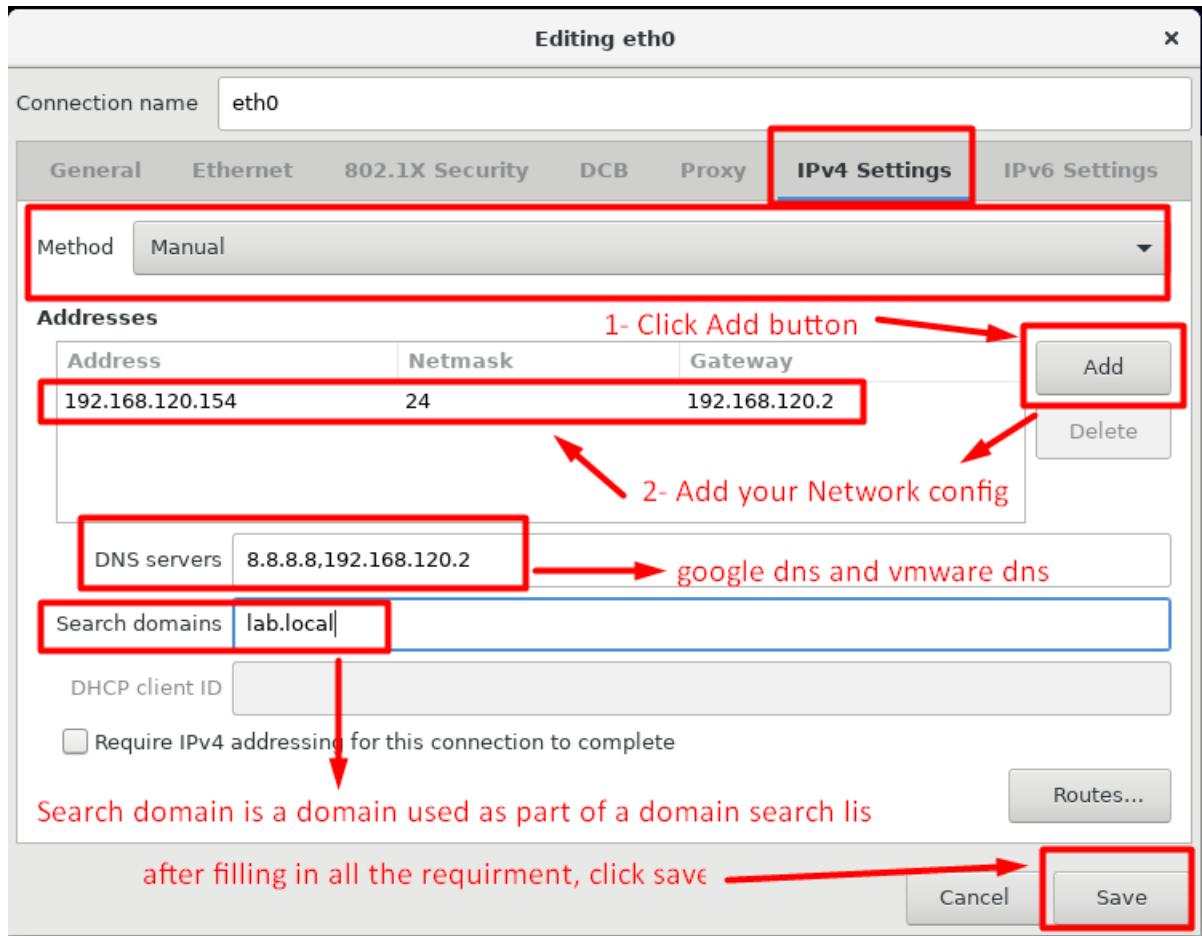
Disable IPv6,



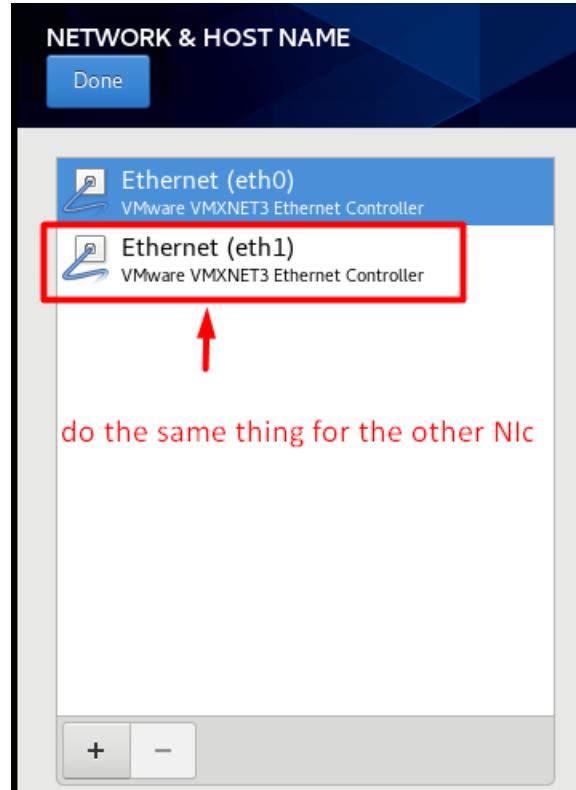
IPv4 Configuration,



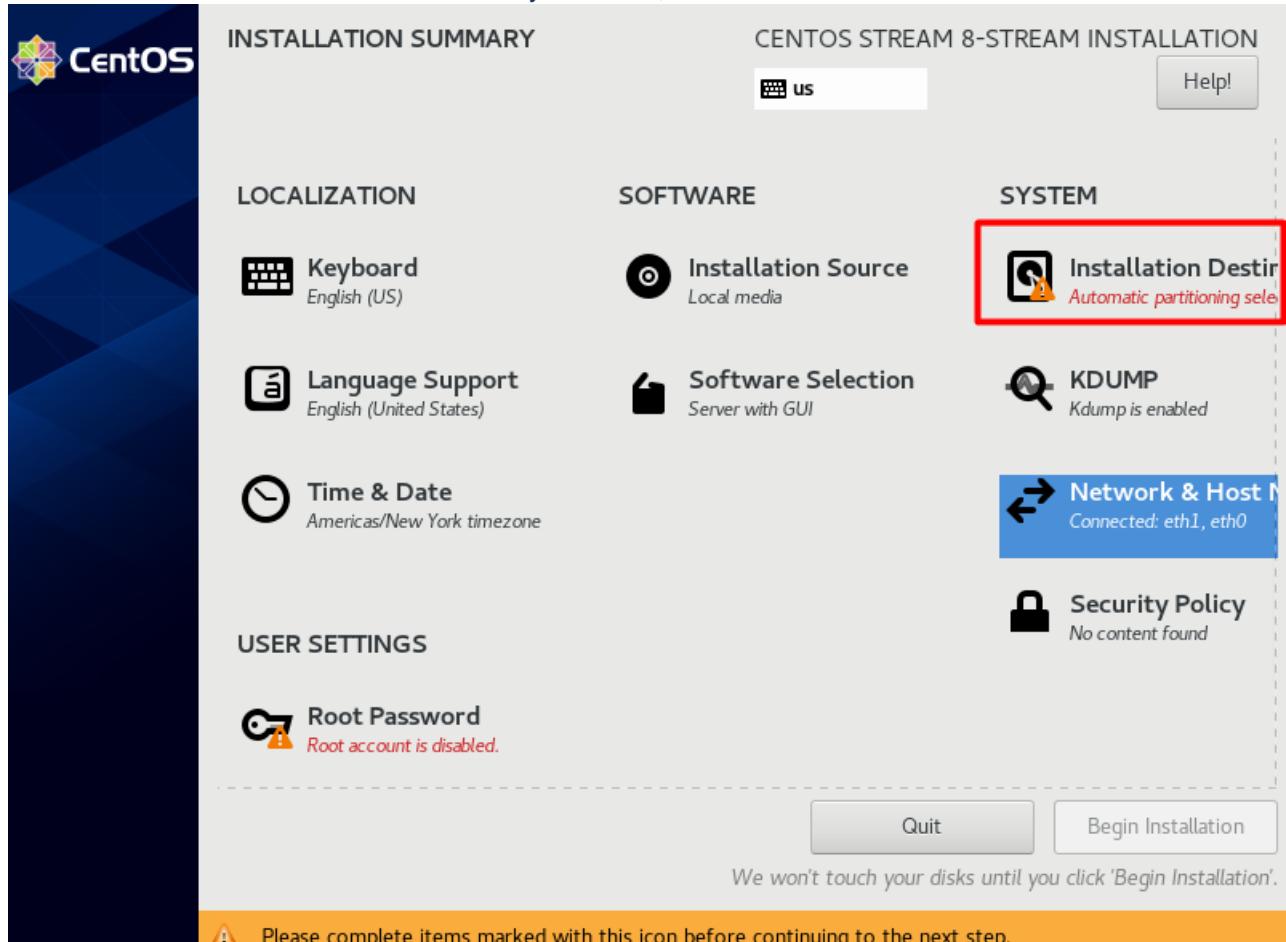
Then,



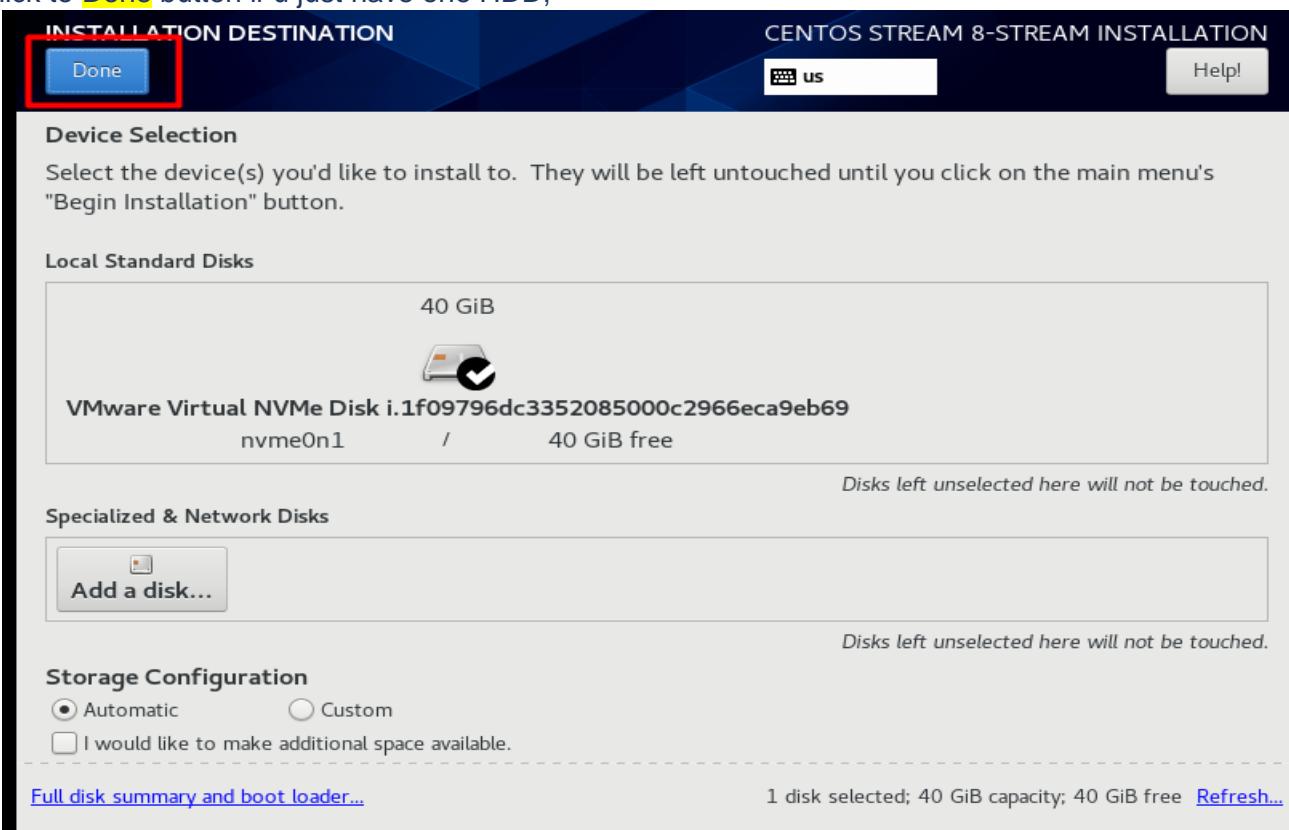
And do the same for the other NICs,



Select the Installation Destination and choose your HDD,



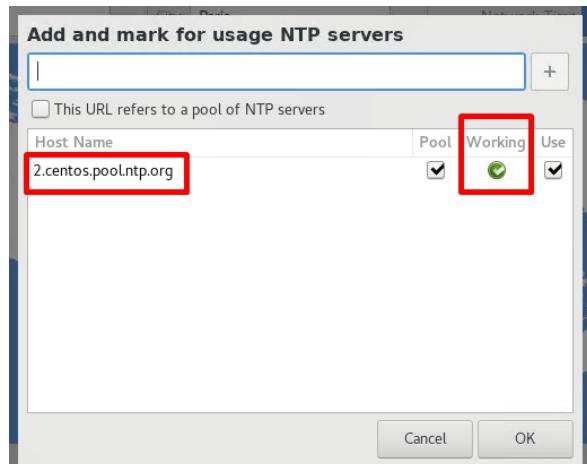
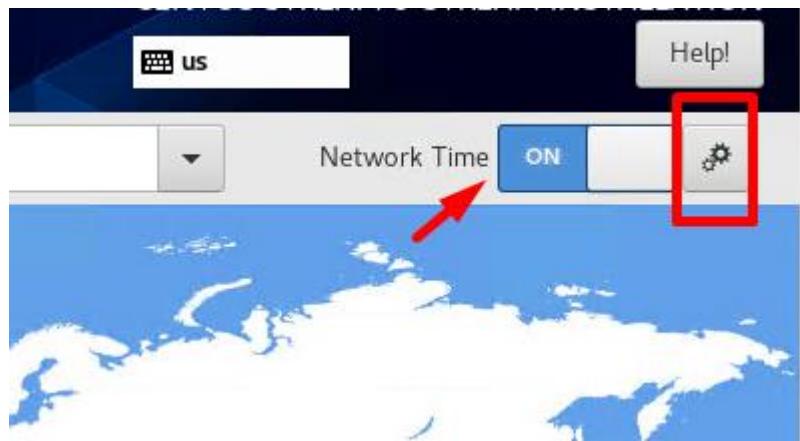
just click to **Done** button if u just have one HDD,



Click the Time and Date button and select **Cairo** as your local time zone.



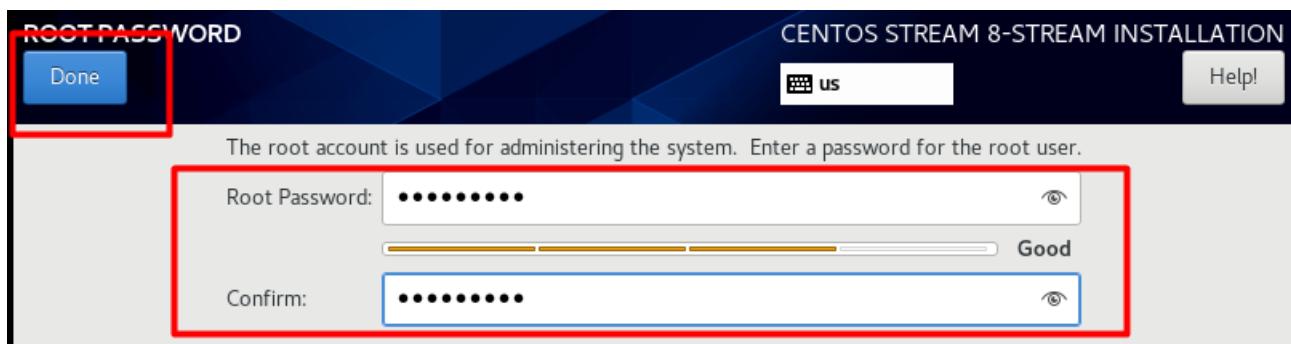
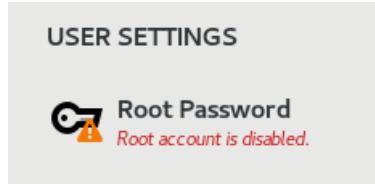
Make sure that **NTP** on the top right is enabled, click on the gear icon and wait for a moment to make sure it is **syncing** with centos public NTP servers.



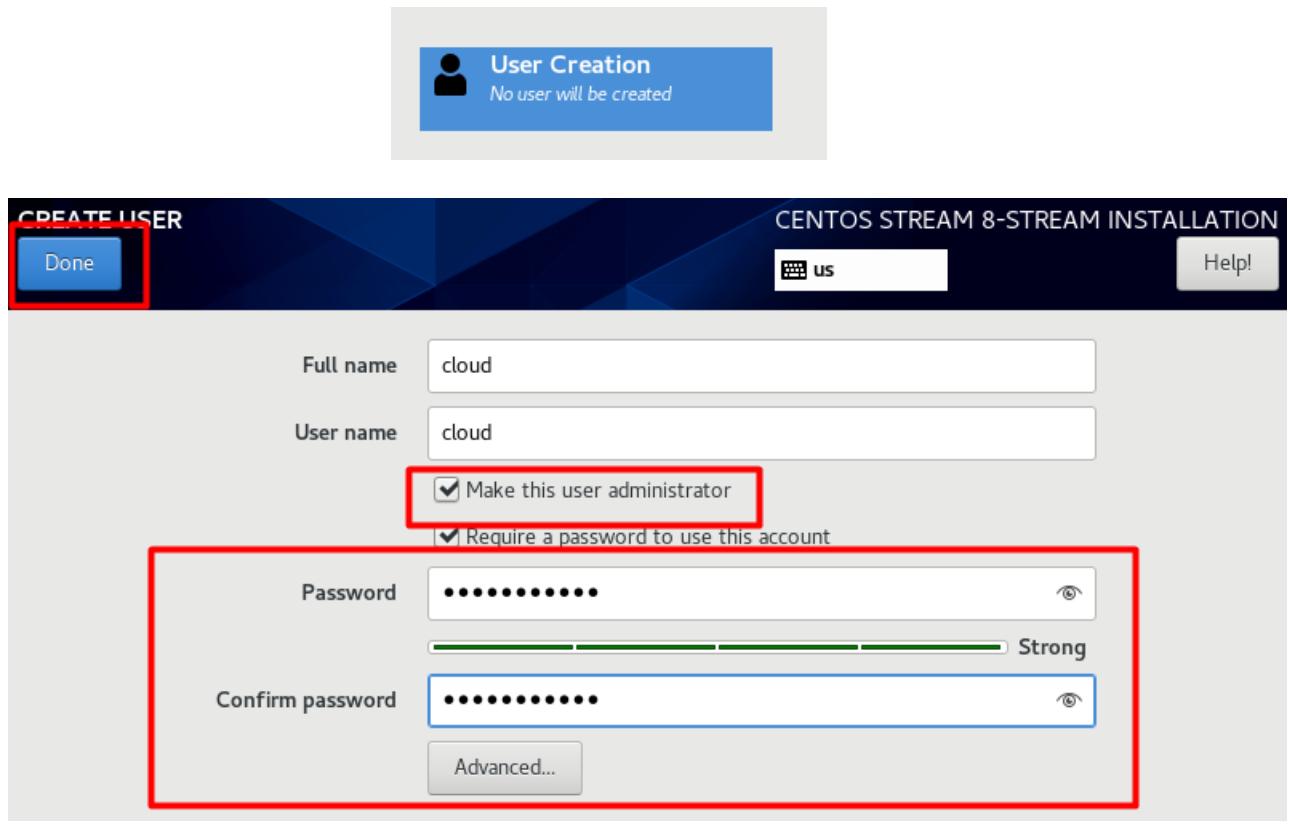
For Software Selection, please, select Server with GUI



Then create root password,



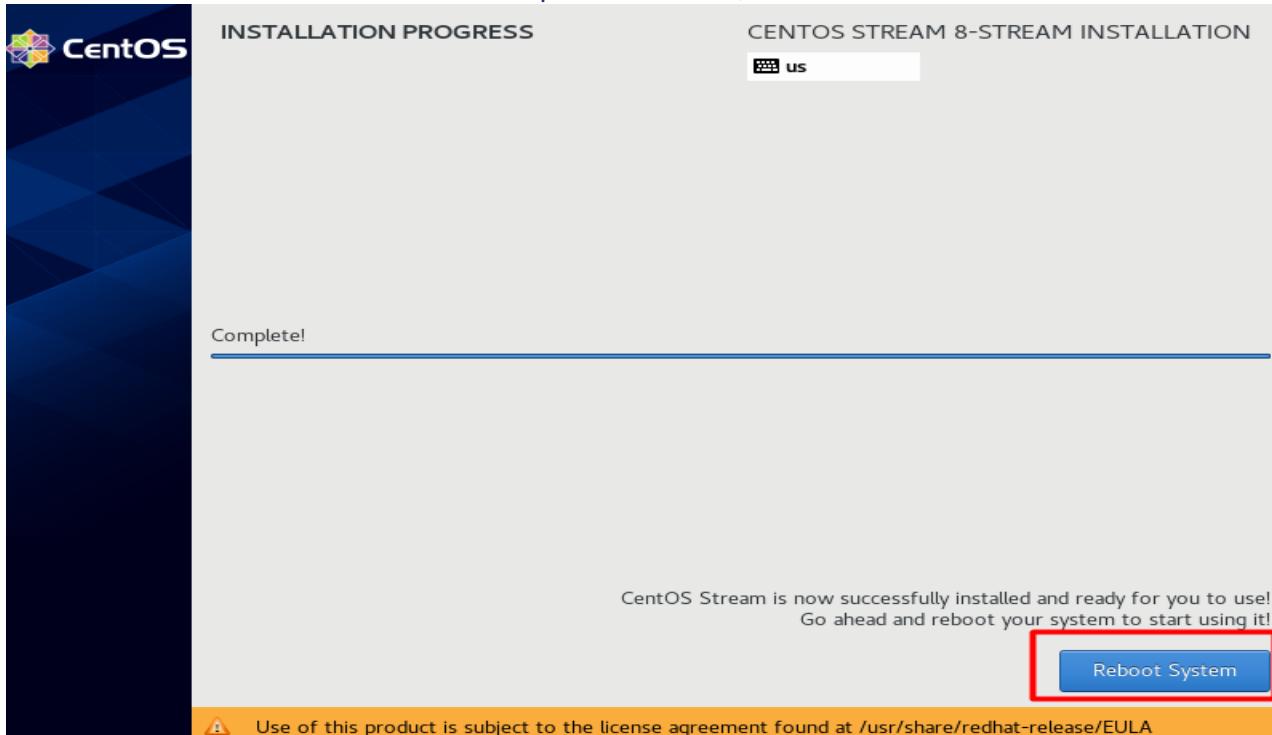
Then create user and make him Admin,



Once all are set. Begin the OS installation.



When the installation is over Reboot and Accept the Licenses,



Then,

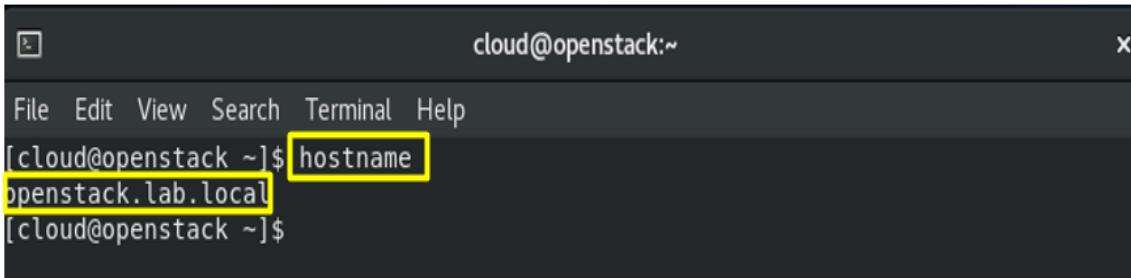


3- Prerequisites Deployment:

As a prerequisite, you have to install the needed repos and Adding to that, you must disable some services and enable the legacy network service.

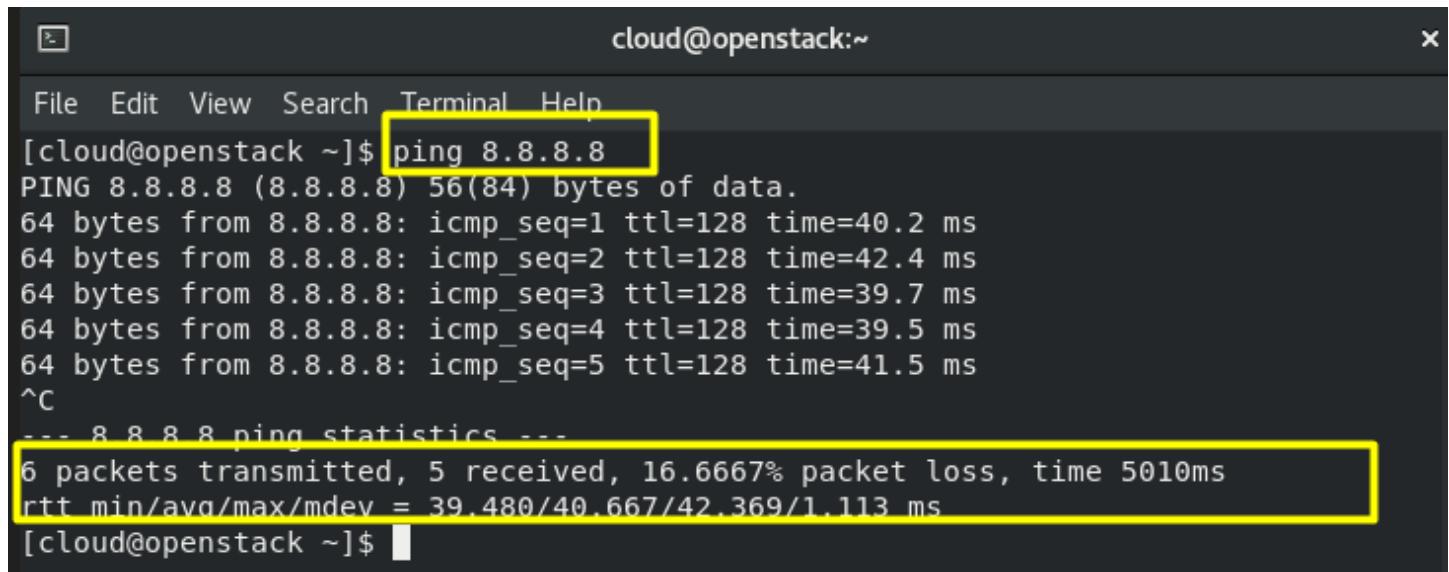
The below section illustrates the actions we have to follow:

Firstly, we need to check the hostname, and check if we can reach the internet or not, and switch to be root.



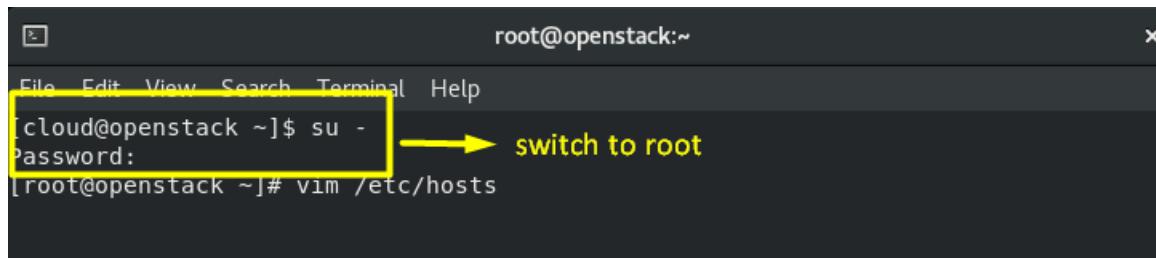
```
cloud@openstack:~$ hostname
openstack.lab.local
cloud@openstack:~$
```

Ping check,



```
cloud@openstack:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=128 time=40.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=128 time=42.4 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=128 time=39.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=128 time=39.5 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=128 time=41.5 ms
^C
--- 8.8.8.8 ping statistics ---
6 packets transmitted, 5 received, 16.6667% packet loss, time 5010ms
rtt min/avg/max/mdev = 39.480/40.667/42.369/1.113 ms
[cloud@openstack:~]$
```

Switch to root,



```
root@openstack:~$ su -
Password: → switch to root
[root@openstack ~]# vim /etc/hosts
```

Environment Setup:

- 1- Add the hostname to `/etc/hosts` and make an alias for it,

```
root@openstack:~  
File Edit View Search Terminal Help  
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4  
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6  
192.168.120.155 openstack.lab.local openstack  
alias to your domain  
your ip           your FQDN
```

- 2- Disable and stop firewalld

```
systemctl disable firewalld  
systemctl stop firewalld  
systemctl status firewalld
```

```
root@openstack:~# systemctl disable firewalld.service  
Removed /etc/systemd/system/multi-user.target.wants/firewalld.service.  
Removed /etc/systemd/system/dbus-org_fedoraproject_FirewallD1.service.  
[root@openstack ~]# systemctl stop firewalld.service  
[root@openstack ~]# systemctl status firewalld.service  
● firewalld.service - firewalld - dynamic firewall daemon  
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; disabled; vendor preset: enabled)  
  Active: inactive (dead) since Thu 2023-03-09 11:35:11 EET; 13s ago  
    Docs: man:firewalld(1)  
  Process: 8188 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARGS (code=exited, status=0/SUCCESS)  
 Main PID: 8188 (code=exited, status=0/SUCCESS)  
  
Mar 09 11:34:29 openstack.lab.local systemd[1]: Starting firewalld - dynamic firewall daemon...  
Mar 09 11:34:29 openstack.lab.local systemd[1]: Started firewalld - dynamic firewall daemon.  
Mar 09 11:34:29 openstack.lab.local firewalld[8188]: WARNING: AllowZoneDrifting is enabled. This is considered a security risk.  
Mar 09 11:35:10 openstack.lab.local systemd[1]: Stopping firewalld - dynamic firewall daemon...  
Mar 09 11:35:11 openstack.lab.local systemd[1]: firewalld.service: Succeeded.  
Mar 09 11:35:11 openstack.lab.local systemd[1]: Stopped firewalld - dynamic firewall daemon.  
lines 1-13/13 (END)
```

3- Disable Selinux

```
setenforce 0
```

```
sed -i 's/SELINUX=.*/SELINUX=disabled/' /etc/selinux/config
```

Cat the selinux config file, make sure it is disabled now.

```
[root@openstack ~]# sed -i 's/SELINUX=.*/SELINUX=disabled/' /etc/selinux/config
[root@openstack ~]# cat /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX=disabled
#       enforcing - SELinux security policy is enforced.
#       permissive - SELinux prints warnings instead of enforcing.
#       disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE can take one of these three values:
#       targeted - Targeted processes are protected,
#       minimum - Modification of targeted policy. Only selected processes are protected.
#       mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

The screenshot shows a terminal window titled 'root@openstack:~'. It displays the output of several commands:

- [root@openstack ~]# getenforce: Shows 'Enforcing' (highlighted by a yellow box).
- [root@openstack ~]# setenforce 0: Changes SELinux to 'permissive' (highlighted by a yellow box). An annotation 'change SELinux to be permissive' points to this command.
- [root@openstack ~]# getenforce: Shows 'Permissive' (highlighted by a yellow box).

4- Disable and stop Networkmanager

```
systemctl disable NetworkManager
systemctl stop NetworkManager
systemctl status NetworkManager
```

The screenshot shows a terminal window titled 'root@openstack:~'. It displays the output of several commands:

- [root@openstack ~]# systemctl disable NetworkManager: Disables the NetworkManager service (highlighted by a yellow box).
- [root@openstack ~]# systemctl stop NetworkManager: Stops the NetworkManager service (highlighted by a yellow box).
- [root@openstack ~]# systemctl status NetworkManager: Shows the status of the NetworkManager service, indicating it is inactive (dead) (highlighted by a yellow box).

Below the status command, the terminal shows log entries from the NetworkManager service, including messages about stopping and exiting successfully.

5- Download network-scripts

```
dnf install network-scripts -y
```

```
[root@openstack ~]# dnf install network-scripts -y
CentOS Stream 8 - AppStream
CentOS Stream 8 - BaseOS
CentOS Stream 8 - Extras
CentOS Stream 8 - Extras common packages
Dependencies resolved.

=====
Package           Architecture   Version      Repository  Size
=====
Installing:
network-scripts   x86_64        10.00.18-1.el8  baseos     197 k
Installing dependencies:
ipcalc            x86_64        0.2.4-4.el8    baseos     38 k
Installing weak dependencies:
network-scripts-team x86_64        1.31-4.el8    baseos     28 k

Transaction Summary
=====
Install 3 Packages

Total download size: 263 k
Installed size: 245 k
Downloading Packages:
(1/3): network-scripts-team-1.31-4.el8.x86_64.rpm          56 kB/s |  28 kB   00:00
(2/3): ipcalc-0.2.4-4.el8.x86_64.rpm                      73 kB/s |  38 kB   00:00
(3/3): network-scripts-10.00.18-1.el8.x86_64.rpm          189 kB/s | 197 kB  00:01
-----
Total                                         176 kB/s | 263 kB   00:01
CentOS Stream 8 - BaseOS
Importing GPG key 0x8483C65D:
```

6- Enable and Start network-scripts

```
systemctl enable network
systemctl start network
systemctl status network
```

```
[root@openstack ~]# systemctl enable network
network.service is not a native service, redirecting to systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable network
[root@openstack ~]# systemctl start network
[root@openstack ~]# systemctl status network
● network.service - LSB: Bring up/down networking
  Loaded: loaded (/etc/rc.d/init.d/network; generated)
  Active: active (exited) since Thu 2023-03-09 11:41:23 EET; 6s ago
    Docs: man:systemd-sysv-generator(8)
  Process: 38334 ExecStart=/etc/rc.d/init.d/network start (code=exited, status=0/SUCCESS)

Mar 09 11:41:23 openstack.lab.local systemd[1]: Starting LSB: Bring up/down networking...
Mar 09 11:41:23 openstack.lab.local network[38334]: WARN      : [network] You are using 'network' service pro>
Mar 09 11:41:23 openstack.lab.local network[38334]: WARN      : [network] 'network-scripts' will be removed i>
Mar 09 11:41:23 openstack.lab.local network[38334]: WARN      : [network] It is advised to switch to 'Network>
Mar 09 11:41:23 openstack.lab.local network[38334]: Bringing up loopback interface: [  OK  ]
Mar 09 11:41:23 openstack.lab.local network[38334]: Bringing up interface eth0: [  OK  ]
Mar 09 11:41:23 openstack.lab.local systemd[1]: Started LSB: Bring up/down networking.
lines 1-13/13 (END)
```

7- Enable power tools and install yoga,

```
dnf config-manager --enable powertools  
dnf install -y centos-release-openstack-yoga
```

The screenshot shows a terminal window titled "root@openstack:~". The terminal displays the following command sequence:

```
root@openstack ~]# dnf config-manager --set-enabled powertools  
root@openstack ~]# dnf install centos-release-openstack-yoga -y
```

Annotations with arrows point to the first command: "enable power tools" and to the second command: "install yoga".

Below the commands, the terminal shows the package installation details:

Package	Architecture	Version	Repository	Size
centos-release-openstack-yoga	noarch	1-1.el8s	extras-common	8.9 k
centos-release-advanced-virtualization	noarch	1.0-4.el8	extras	16 k
centos-release-ceph-pacific	noarch	1.0-2.el8	extras	8.9 k
centos-release-messaging	noarch	1-3.el8	extras	9.5 k
centos-release-nfv-common	noarch	1-3.el8	extras	9.3 k
centos-release-nfv-openvswitch	noarch	1-3.el8	extras	8.6 k
centos-release-rabbitmq-38	noarch	1-3.el8	extras	8.4 k
centos-release-storage-common	noarch	2-2.el8	extras	9.4 k
centos-release-virt-common	noarch	1-2.el8	extras	8.9 k

Transaction Summary:

```
Total download size: 88 k  
Installed size: 32 k  
Downloading Packages:  
1/9): centos-release-ceph-pacific-1.0-2.el8.noarch.rpm  
2/9): centos-release-messaging-1-3.el8.noarch.rpm  
3/9): centos-release-advanced-virtualization-1.0-4.el8.noarch.rpm
```

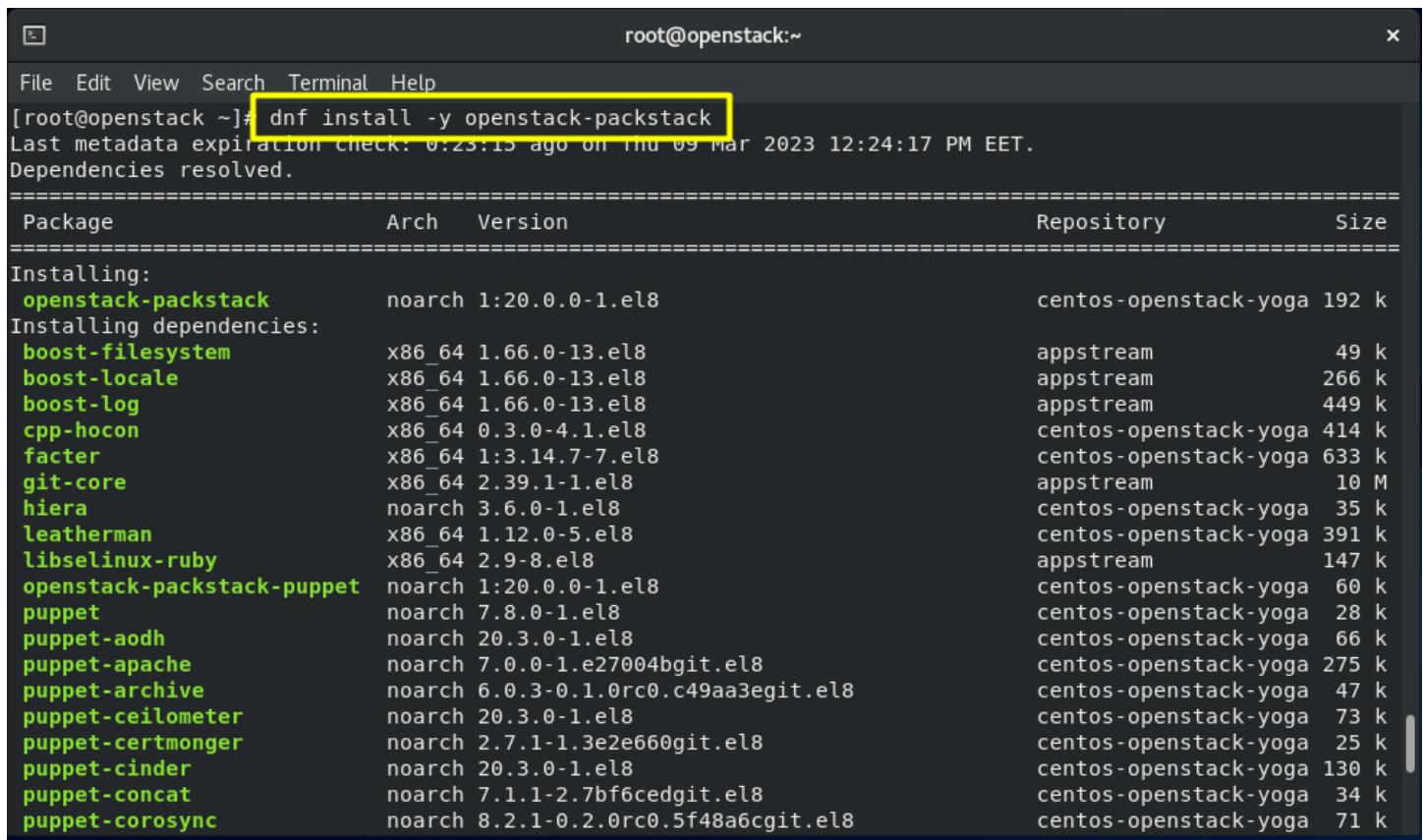
Download progress bars are shown for each package, indicating speeds of 20 kB/s, 21 kB/s, and 28 kB/s respectively, with download times of 00:00 for all.

8- Update the system,

```
dnf -y update
```

9- Install Packstack,

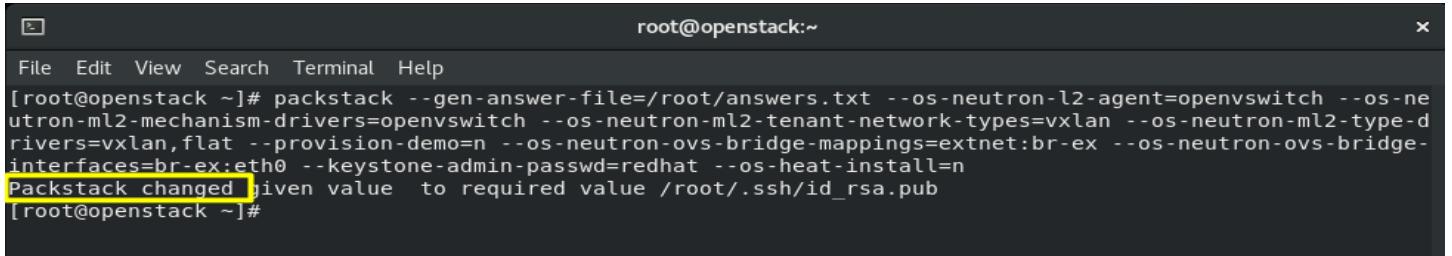
```
dnf install -y openstack-packstack
```



```
[root@openstack ~]# dnf install -y openstack-packstack
Last metadata expiration check: 0:23:15 ago on Thu 09 Mar 2023 12:24:17 PM EET.
Dependencies resolved.
=====
Package           Arch   Version            Repository      Size
=====
Installing:
openstack-packstack    noarch 1:20.0.0-1.el8    centos-openstack-yoga 192 k
Installing dependencies:
boost-filesystem        x86_64 1.66.0-13.el8    appstream      49 k
boost-locale            x86_64 1.66.0-13.el8    appstream      266 k
boost-log               x86_64 1.66.0-13.el8    appstream     449 k
cpp-hocon              x86_64 0.3.0-4.1.el8    centos-openstack-yoga 414 k
facter                  x86_64 1:3.14.7-7.el8    centos-openstack-yoga 633 k
git-core                x86_64 2.39.1-1.el8    appstream      10 M
hiera                  noarch 3.6.0-1.el8    centos-openstack-yoga 35 k
leatherman              x86_64 1.12.0-5.el8    centos-openstack-yoga 391 k
libselinux-ruby         x86_64 2.9-8.el8    appstream      147 k
openstack-packstack-puppet noarch 1:20.0.0-1.el8    centos-openstack-yoga 60 k
puppet                  noarch 7.8.0-1.el8    centos-openstack-yoga 28 k
puppet-aodh              noarch 20.3.0-1.el8    centos-openstack-yoga 66 k
puppet-apache             noarch 7.0.0-1.e27004bgit.el8    centos-openstack-yoga 275 k
puppet-archive            noarch 6.0.3-0.1.0rc0.c49aa3egit.el8    centos-openstack-yoga 47 k
puppet-ceilometer          noarch 20.3.0-1.el8    centos-openstack-yoga 73 k
puppet-certmonger          noarch 2.7.1-1.3e2e660git.el8    centos-openstack-yoga 25 k
puppet-cinder              noarch 20.3.0-1.el8    centos-openstack-yoga 130 k
puppet-concat              noarch 7.1.1-2.7bf6cedgit.el8    centos-openstack-yoga 34 k
puppet-corosync             noarch 8.2.1-0.2.0rc0.5f48a6cgit.el8    centos-openstack-yoga 71 k
```

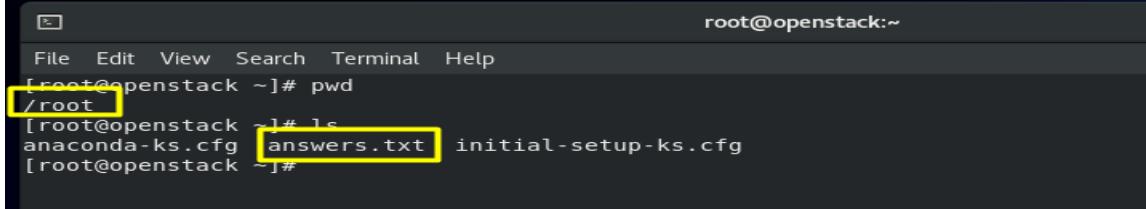
10- Generate answer file,

```
packstack --gen-answer-file=/root/answers.txt --os-neutron-l2-agent=openvswitch --os-neutron-ml2-mechanism-drivers=openvswitch --os-neutron-ml2-tenant-network-types=vxlan --os-neutron-ml2-type-drivers=vxlan,flat --provision-demo=n --os-neutron-ovs-bridge-mappings=extnet:br-ex --os-neutron-ovs-bridge-interfaces=br-ex:eth0 --keystone-admin-passwd=redhat --os-heat-install=n
```



```
root@openstack:~# packstack --gen-answer-file=/root/answers.txt --os-neutron-l2-agent=openvswitch --os-neutron-ml2-mechanism-drivers=openvswitch --os-neutron-ml2-tenant-network-types=vxlan --os-neutron-ml2-type-drivers=vxlan,flat --provision-demo=n --os-neutron-ovs-bridge-mappings=extnet:br-ex --os-neutron-ovs-bridge-interfaces=br-ex:eth0 --keystone-admin-passwd=redhat --os-heat-install=n
Packstack changed given value to required value /root/.ssh/id_rsa.pub
[root@openstack ~]#
```

You can check the answer file if you want,



```
root@openstack:~# pwd
/root
[root@openstack ~]# ls
anaconda-ks.cfg [answers.txt] initial-setup-ks.cfg
[root@openstack ~]#
```

Here is a breakdown of the different options and arguments used in the command,

packstack: This is the name of the utility that is being invoked.

--gen-answer-file=/root/answers.txt: This option specifies the name and location of the answer file that will be generated.

--os-neutron-l2-agent=openvswitch: This option specifies that Open vSwitch will be used as the L2 agent for Neutron.

--os-neutron-ml2-mechanism-drivers=openvswitch: This option specifies that Open vSwitch will be used as the ML2 mechanism driver for Neutron.

--os-neutron-ml2-tenant-network-types=vxlan: This option specifies that VXLAN will be used as the tenant network type for Neutron ML2.

--os-neutron-ml2-type-drivers=vxlan,flat: This option specifies the type drivers that will be used for Neutron ML2, which are VXLAN and flat.

--provision-demo=n: This option specifies that the demo project will not be provisioned during the installation process.

--os-neutron-ovs-bridge-mappings=extnet:br-ex: This option specifies the mapping between the external network (extnet) and the OVS bridge (br-ex).

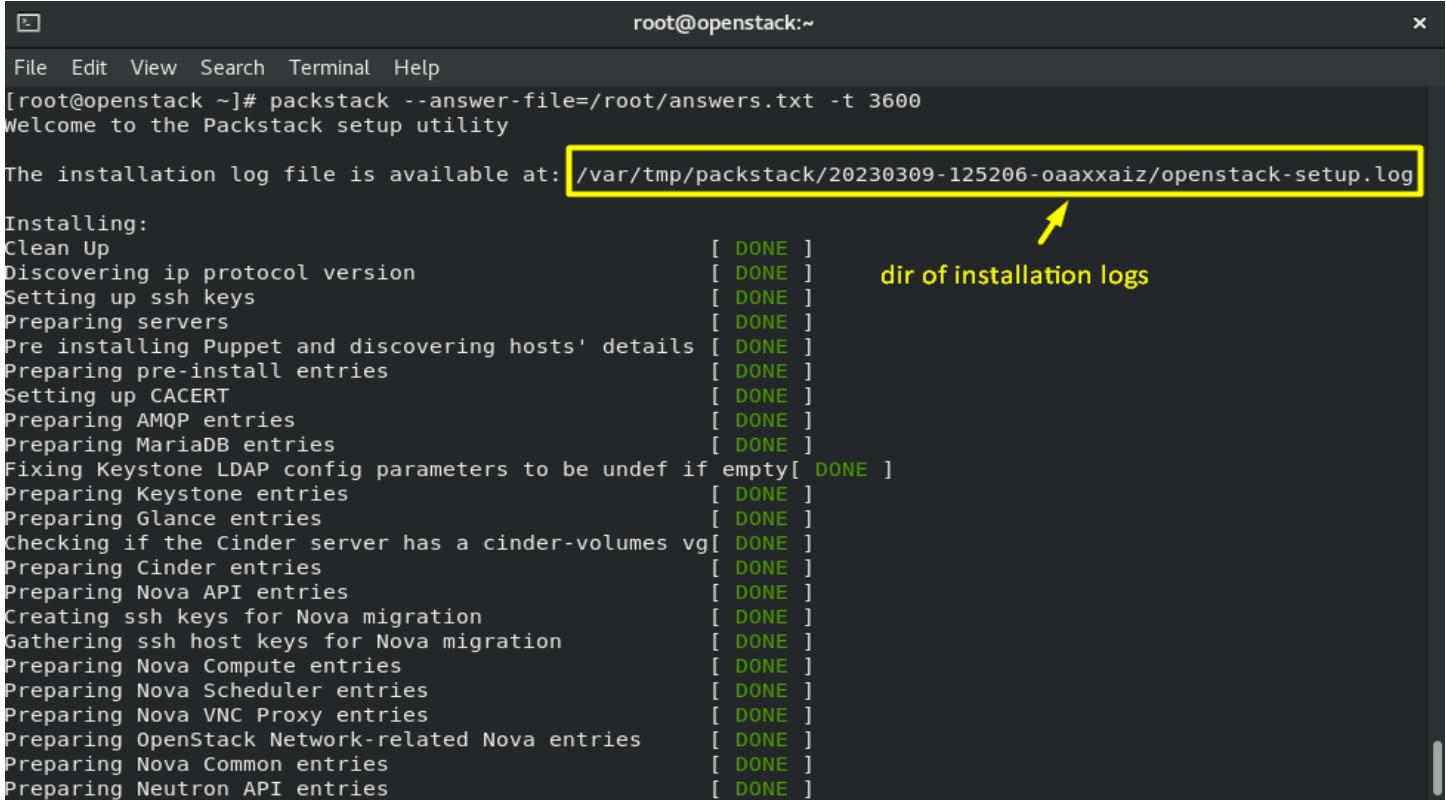
--os-neutron-ovs-bridge-interfaces=br-ex:ens192: This option specifies the mapping between the OVS bridge (br-ex) and the network interface (ens192).

--keystone-admin-passwd=redhat: This option specifies the password for the Keystone admin user.

--os-heat-install=n: This option specifies that the Heat service will not be installed during the installation process.

11- Start the installation,

```
packstack --answer-file=/root/answers.txt -t 3600
```

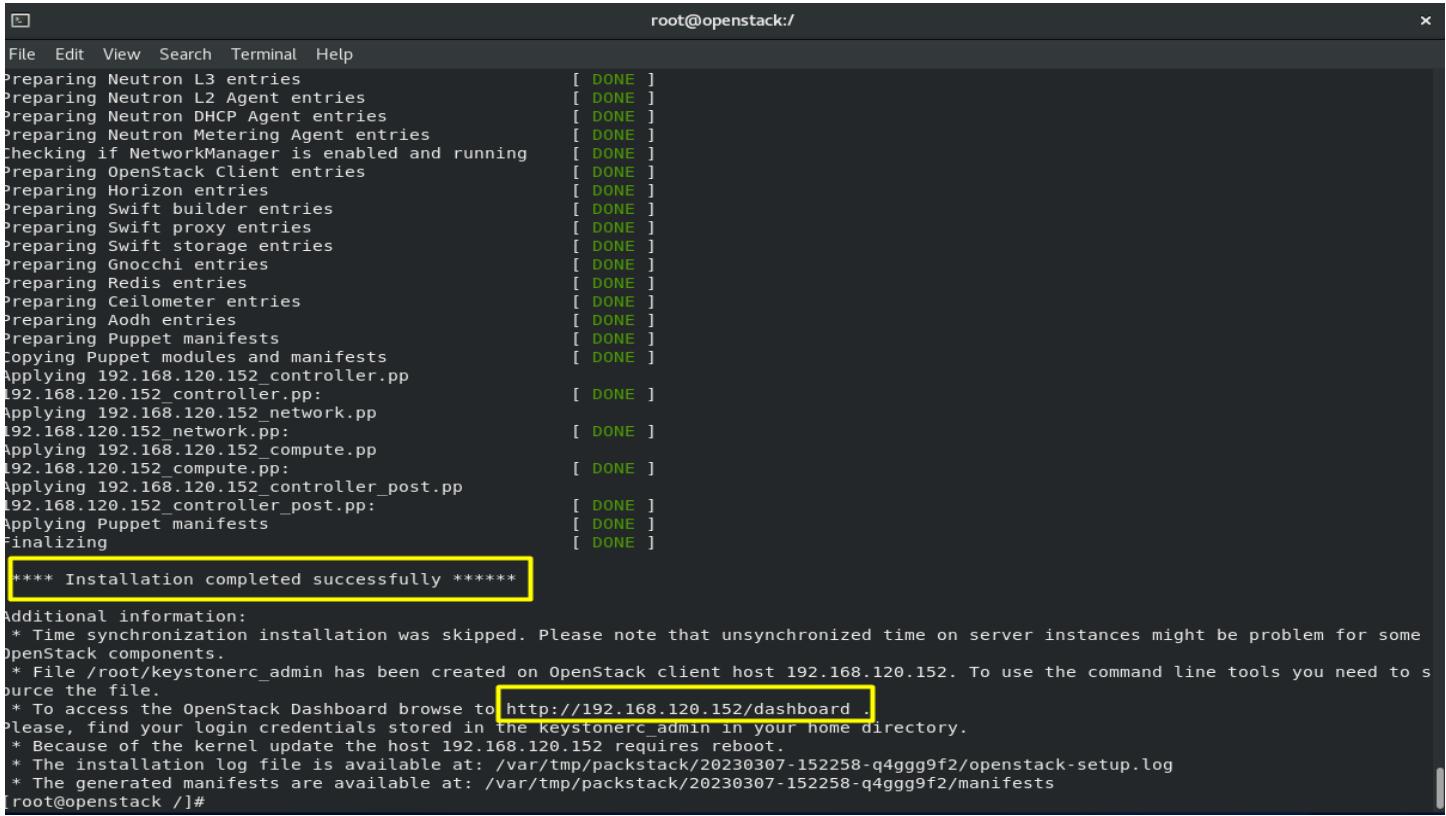


```
[root@openstack ~]# packstack --answer-file=/root/answers.txt -t 3600
Welcome to the Packstack setup utility

The installation log file is available at: /var/tmp/packstack/20230309-125206-oaaxxaiz/openstack-setup.log

Installing:
Clean Up [ DONE ]
Discovering ip protocol version [ DONE ] dir of installation logs
Setting up ssh keys [ DONE ]
Preparing servers [ DONE ]
Pre installing Puppet and discovering hosts' details [ DONE ]
Preparing pre-install entries [ DONE ]
Setting up CACERT [ DONE ]
Preparing AMQP entries [ DONE ]
Preparing MariaDB entries [ DONE ]
Fixing Keystone LDAP config parameters to be undef if empty[ DONE ]
Preparing Keystone entries [ DONE ]
Preparing Glance entries [ DONE ]
Checking if the Cinder server has a cinder-volumes vg[ DONE ]
Preparing Cinder entries [ DONE ]
Preparing Nova API entries [ DONE ]
Creating ssh keys for Nova migration [ DONE ]
Gathering ssh host keys for Nova migration [ DONE ]
Preparing Nova Compute entries [ DONE ]
Preparing Nova Scheduler entries [ DONE ]
Preparing Nova VNC Proxy entries [ DONE ]
Preparing OpenStack Network-related Nova entries [ DONE ]
Preparing Nova Common entries [ DONE ]
Preparing Neutron API entries [ DONE ]
```

Wait for the installation to finish,



```
File Edit View Search Terminal Help
Preparing Neutron L3 entries [ DONE ]
Preparing Neutron L2 Agent entries [ DONE ]
Preparing Neutron DHCP Agent entries [ DONE ]
Preparing Neutron Metering Agent entries [ DONE ]
Checking if NetworkManager is enabled and running [ DONE ]
Preparing OpenStack Client entries [ DONE ]
Preparing Horizon entries [ DONE ]
Preparing Swift builder entries [ DONE ]
Preparing Swift proxy entries [ DONE ]
Preparing Swift storage entries [ DONE ]
Preparing Gnocchi entries [ DONE ]
Preparing Redis entries [ DONE ]
Preparing Ceilometer entries [ DONE ]
Preparing Aodh entries [ DONE ]
Preparing Puppet manifests [ DONE ]
Copying Puppet modules and manifests [ DONE ]
Applying 192.168.120.152_controller.pp: [ DONE ]
Applying 192.168.120.152_network.pp: [ DONE ]
Applying 192.168.120.152_compute.pp: [ DONE ]
Applying 192.168.120.152_controller_post.pp: [ DONE ]
Applying Puppet manifests [ DONE ]
Finalizing [ DONE ]

**** Installation completed successfully ****

Additional information:
* Time synchronization installation was skipped. Please note that unsynchronized time on server instances might be problem for some OpenStack components.
* File /root/keystonerc_admin has been created on OpenStack client host 192.168.120.152. To use the command line tools you need to source the file.
* To access the OpenStack Dashboard browse to http://192.168.120.152/dashboard
Please, find your login credentials stored in the keystonerc_admin in your home directory.
* Because of the kernel update the host 192.168.120.152 requires reboot.
* The installation log file is available at: /var/tmp/packstack/20230307-152258-q4ggg9f2/openstack-setup.log
* The generated manifests are available at: /var/tmp/packstack/20230307-152258-q4ggg9f2/manifests
```

After the deployment is done successfully, make sure that br-ex and eth0 interfaces are configured correct as the below >> you should configure them manually then restart network if they aren't the same as below.

eth0,

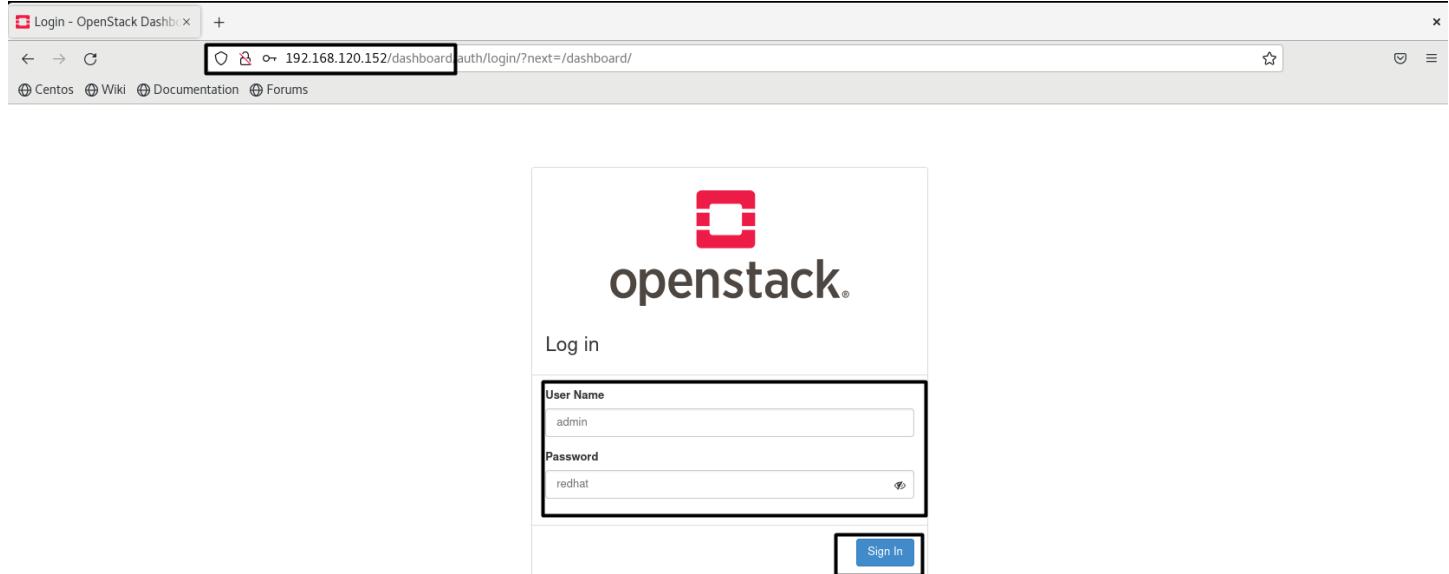
```
root@openstack:~#
File Edit View Search Terminal Help
[root@openstack ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE=eth0
NAME=eth0
DEVICETYPE=ovs
TYPE=OVSPort
OVS_BRIDGE=br-ex
ONBOOT=yes
BOOTPROTO=none
[root@openstack ~]#
```

br-ex,

```
root@openstack:~#
File Edit View Search Terminal Help
[root@openstack ~]# cat /etc/sysconfig/network-scripts/ifcfg-br-ex
PROXY_METHOD=none
BROWSER_ONLY=no
DEFROUTE=yes
UUID=2591430a-e979-4b9f-bdcd-f4f2f6509cb2
ONBOOT=yes
IPADDR=192.168.120.152
PREFIX=24
GATEWAY=192.168.120.2
DNS1=8.8.8.8
DNS2=192.168.120.2
DOMAIN=lab.local
DEVICE=br-ex
NAME=br-ex
DEVICETYPE=ovs
OVSBOOTPROTO=none
TYPE=OVSBridge
OVS_EXTRA="set bridge br-ex fail_mode=standalone"
[root@openstack ~]#
```

4- Validation:

open the dashboard in your browser, and enter the User Name and the password to Sign In.



Login - OpenStack Dashboard

192.168.120.152/dashboard/auth/login/?next=/dashboard/

Centos Wiki Documentation Forums

openstack.

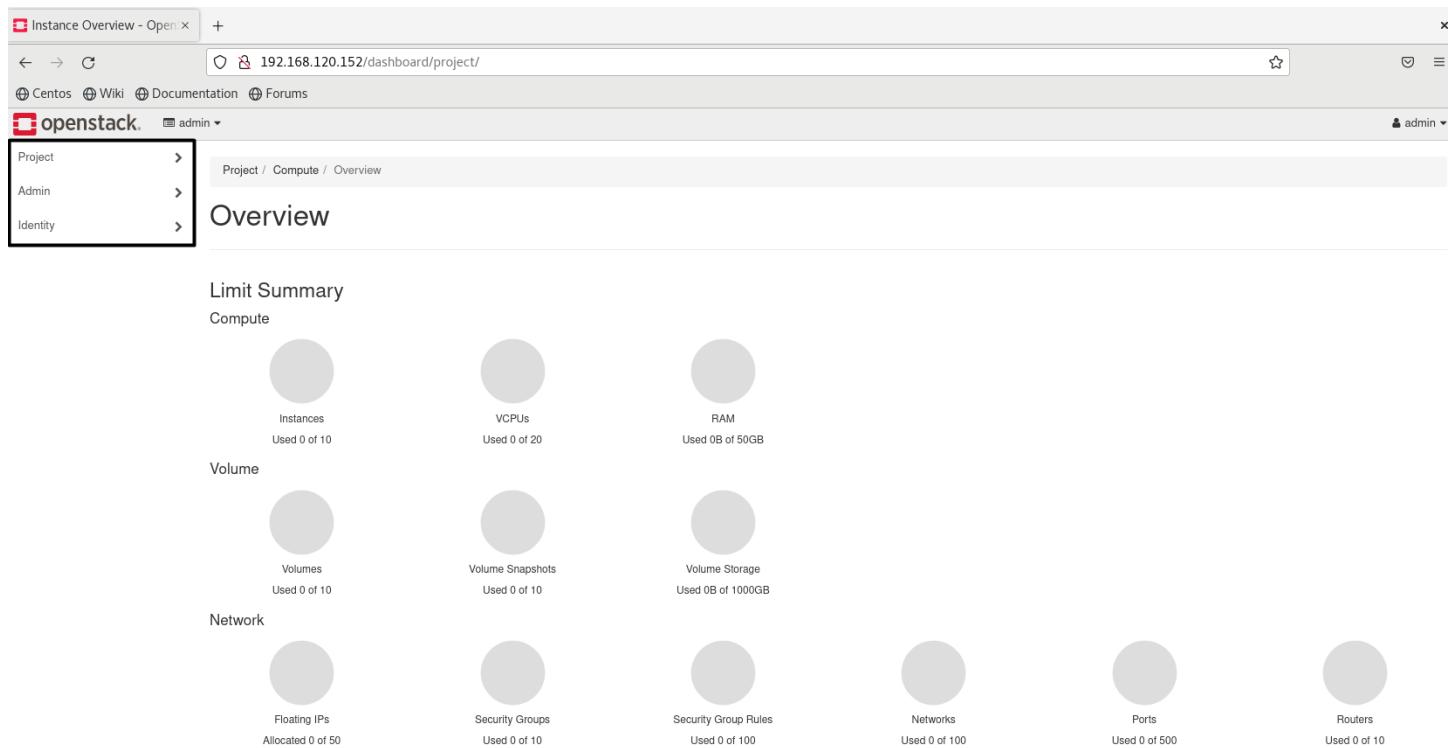
Log in

User Name
admin

Password
redhat

Sign In

Congratulations 😊,



Then go to, Admin → System → System Information,
Each service has 3 Endpoints, "Admin, Internal, Public".

The screenshot shows the OpenStack System Information interface. On the left, a navigation sidebar lists 'Compute', 'Volume', 'Network', 'System' (which is selected and highlighted in blue), and 'Identity'. Under 'System', there are 'Metadata Definitions' and 'System Information' (also highlighted in blue). The main content area is titled 'System Information' and displays a table of services and their endpoints. The table has columns for 'Name', 'Service', and 'Region'. The first row shows 'aodh' as the service, 'alarming' as the name, and 'RegionOne' as the region. For each service, there are three endpoint entries: 'Admin' (http://192.168.120.152:8042), 'Internal' (http://192.168.120.152:8042), and 'Public' (http://192.168.120.152:8042). Other services listed include 'gnocchi', 'cinderv3', 'nova', and 'placement'. Each service row also includes 'Admin', 'Internal', and 'Public' endpoint details.

Name	Service	Region	Admin	Internal	Public
aodh	alarming	RegionOne	http://192.168.120.152:8042	http://192.168.120.152:8042	http://192.168.120.152:8042
gnocchi	metric	RegionOne	http://192.168.120.152:8041	http://192.168.120.152:8041	http://192.168.120.152:8041
cinderv3	volumev3	RegionOne	http://192.168.120.152:8776/v3	http://192.168.120.152:8776/v3	http://192.168.120.152:8776/v3
nova	compute	RegionOne	http://192.168.120.152:8774/v2.1	http://192.168.120.152:8774/v2.1	http://192.168.120.152:8774/v2.1
placement	placement	RegionOne	http://192.168.120.152:8778	http://192.168.120.152:8778	http://192.168.120.152:8778

Compute Component,

The screenshot shows the OpenStack Admin interface. The left sidebar has a tree structure: Project (Admin), Overview, Compute, Volume, Network, System (selected), Defaults, Metadata Definitions, System Information (highlighted in blue). The main content area is titled 'System Information' under 'Services'. It shows a table with three items:

Name	Host	Zone	Status	State	Last Updated
nova-conductor	openstack.lab.local	internal	Enabled	Up	0 minutes
nova-scheduler	openstack.lab.local	internal	Enabled	Up	0 minutes
nova-compute	openstack.lab.local	nova	Enabled	Up	0 minutes

A callout points to the 'Compute Services' tab in the navigation bar.

Here is a breakdown of the Compute Components,

These three components are part of the OpenStack Nova project, which is the compute module in the OpenStack cloud computing platform.

nova-conductor: It is a control plane service that runs on the Nova API server and is responsible for coordinating and validating operations that modify the state of Nova objects, such as instances and flavors. It ensures that the database is updated correctly and that the requested operation is valid based on policy rules.

nova-scheduler: It is also a control plane service that runs on the Nova API server and is responsible for selecting the best compute node to run a new instance. It receives requests for new instances from the API server and uses filters and weighting algorithms to choose the most suitable compute node based on factors such as resource availability and workload balancing.

nova-compute: It is a compute plane service that runs on each compute node and is responsible for managing the virtualization of instances on that node. It interacts with the hypervisor, such as KVM or Xen, to create, start, stop, pause, and delete instances. It also manages the network connectivity of the instances by attaching them to the appropriate virtual networks.

Block Storage Services,

The screenshot shows the OpenStack Dashboard interface. The URL is 192.168.120.152/dashboard/admin/info/. The top navigation bar includes links for Centos, Wiki, Documentation, and Forums. The Openstack logo is on the left, and a user account for 'admin' is on the right. The main menu on the left is under the 'Admin' dropdown, showing options like Compute, Volume, Network, System, and Identity. 'System' is currently selected. The main content area is titled 'System Information' and has tabs for Services, Compute Services, and Block Storage Services. The 'Block Storage Services' tab is highlighted with a red box and an arrow. Below it, a table lists three services: cinder-scheduler, cinder-volume, and cinder-backup. The table columns are Host, Zone, Status, State, and Last Updated. The table shows the following data:

Name	Host	Zone	Status	State	Last Updated
cinder-scheduler	openstack.lab.local	nova	Enabled	Up	0 minutes
cinder-volume	openstack.lab.local@lvm	nova	Enabled	Up	0 minutes
cinder-backup	openstack.lab.local	nova	Enabled	Down	2 days, 22 hours

Version: 22.1.0

Here is a breakdown of the Block Storage Services,

These three components are part of the OpenStack Cinder project, which provides block storage to the OpenStack cloud computing platform.

cinder-scheduler: It is a control plane service that runs on the Cinder API server and is responsible for selecting the best backend storage device to create a new volume. It receives requests for new volumes from the API server and uses filters and weighting algorithms to choose the most suitable backend based on factors such as capacity, performance, and availability.

cinder-volume: It is a compute plane service that runs on each storage node and is responsible for managing the physical storage devices, such as disks or storage arrays, that provide the backend storage for Cinder volumes. It interacts with the storage drivers to create, attach, detach, and delete volumes on the backend.

cinder-backup: It is a control plane service that runs on the Cinder API server and is responsible for performing backups of Cinder volumes. It receives backup requests from the API server and coordinates the backup process with the cinder-volume service on the storage node where the volume is located. It uses the configured backup driver to perform the actual backup and stores the backup data in the specified backup storage location.

Network Agents,

The screenshot shows the OpenStack Admin interface. The left sidebar is titled 'Admin' and includes 'Compute', 'Volume', 'Network', 'System', 'Metadata Definitions', and 'Identity'. 'System' is highlighted with a blue box. The main content area is titled 'System Information' and has tabs for 'Services', 'Compute Services', 'Block Storage Services', and 'Network Agents', with 'Network Agents' highlighted with a blue box. A table lists five network agents: 'DHCP agent', 'Metering agent', 'Metadata agent', 'L3 agent', and 'Open vSwitch agent'. Arrows point from the 'System' and 'Network Agents' labels to their respective boxes in the sidebar and table.

Type	Name	Host	Zone	Status	State	Last Updated	Actions
DHCP agent	neutron-dhcp-agent	openstack.lab.local	nova	Enabled	Up	0 minutes	
Metering agent	neutron-metering-agent	openstack.lab.local	-	Enabled	Up	0 minutes	
Metadata agent	neutron-metadata-agent	openstack.lab.local	-	Enabled	Up	0 minutes	
L3 agent	neutron-l3-agent	openstack.lab.local	nova	Enabled	Up	0 minutes	View Routers
Open vSwitch agent	neutron-openvswitch-agent	openstack.lab.local	-	Enabled	Up	0 minutes	

Here is a breakdown of the Network Agents,

These are various agents that are part of the Neutron networking service in OpenStack.

neutron-dhcp-agent: This agent is responsible for managing DHCP (Dynamic Host Configuration Protocol) for Neutron networks. It runs on each compute node and provides DHCP services to instances connected to the network.

neutron-metering-agent: This agent is responsible for collecting network usage data for billing and monitoring purposes. It runs on each compute node and collects network usage information from the Open vSwitch (OVS) kernel module.

neutron-metadata-agent: This agent is responsible for providing metadata services to instances running on the Neutron network. It runs on each compute node and provides instances with metadata information about the instance itself and the network it is running on.

neutron-l3-agent: This agent is responsible for providing Layer 3 (routing) services for Neutron networks. It runs on each network node and provides routing services between different Neutron networks.

neutron-openvswitch-agent: This agent is responsible for managing the Open vSwitch (OVS) virtual switch on each compute node. It provides virtual networking connectivity to instances and manages the OVS configuration for Neutron networks.

5- Build Our Platform:

Firstly, we need you to be root and source the kestonerc_admin file to run the openstack commands,

A terminal window titled "root@openstack:~". The window shows the following command sequence:

```
[cloud@openstack ~]$ su - → switch to root  
Password: [REDACTED]  
[root@openstack ~]# [source kestonerc_admin] → source keystone  
[root@openstack ~ (keystone_admin)]#
```

The first command, "su -", is highlighted with a yellow box and an arrow pointing to the text "switch to root". The second command, "[source kestonerc_admin]", is also highlighted with a yellow box and an arrow pointing to the text "source keystone".

5.1- Create a Private Network:

```
neutron net-create Internal
```

```
root@openstack:~  
File Edit View Search Terminal Help  
[root@openstack ~ (keystone_admin)]# neutron net-create Internal  
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.  
Created a new network:  
+-----+  
| Field | Value |  
+-----+  
| admin_state_up | True |  
| availability_zone_hints | |  
| availability_zones | |  
| created_at | 2023-03-10T13:52:45Z |  
| description | |  
| id | 16aaaf56-9b71-44cd-b499-9dc2290448d3 |  
| ipv4_address_scope | |  
| ipv6_address_scope | |  
| is_default | False |  
| mtu | 1450 |  
| name | Internal |  
| port_security_enabled | True |  
| project_id | b9b772e1d11f401a8f488ee9eff93302 |  
| provider:network_type | vxlan |  
| provider:physical_network | |  
| provider:segmentation_id | 75 |  
| qos_policy_id | |  
| revision_number | 1 |  
| router:external | False |  
| shared | False |  
| status | ACTIVE |  
| subnets | |  
| tags | |  
| tenant_id | b9b772e1d11f401a8f488ee9eff93302 |  
| updated_at | 2023-03-10T13:52:45Z |  
+-----+[root@openstack ~ (keystone admin)]#
```

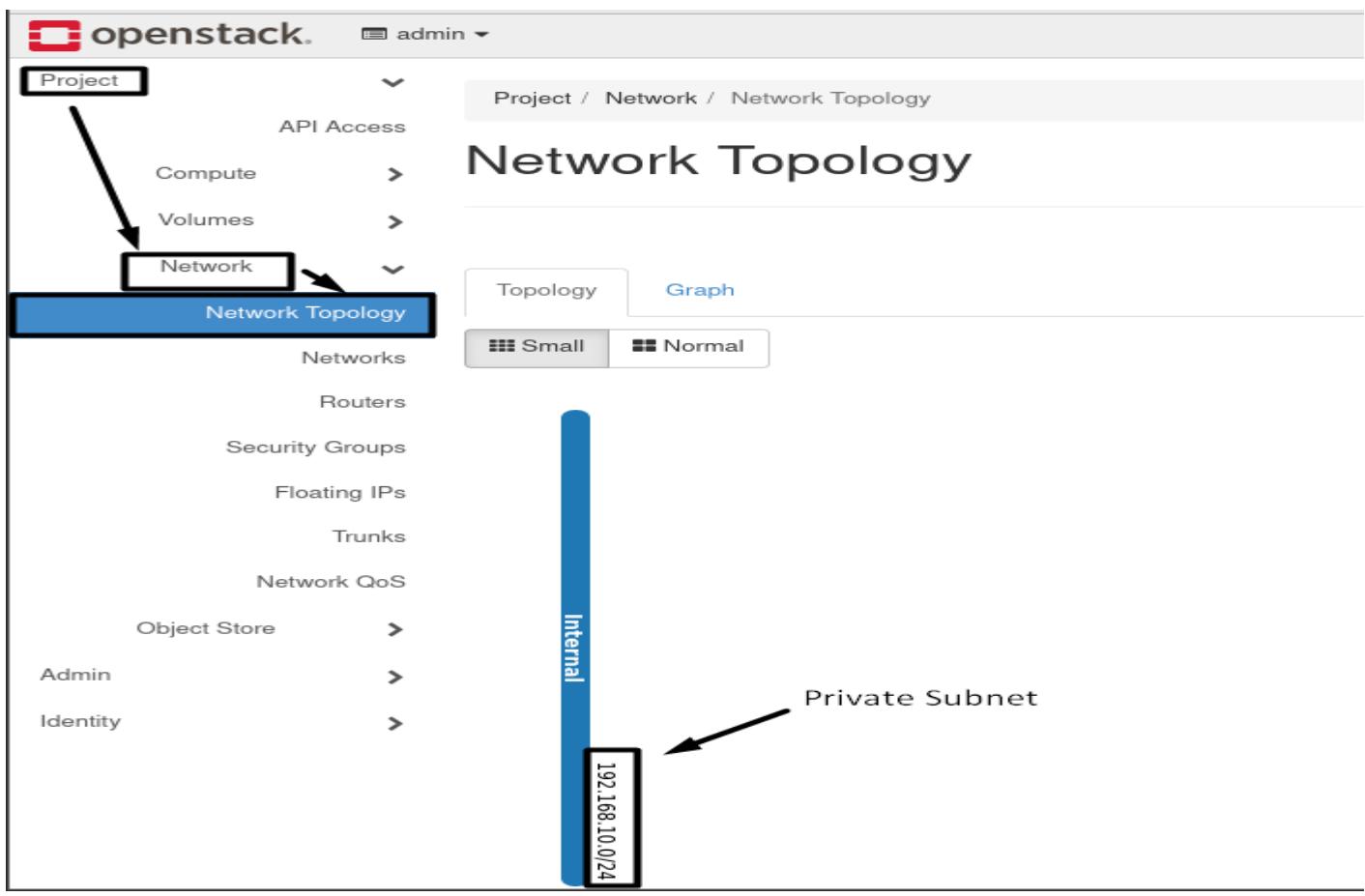
You can check the result from the GUI from Project → Network → Network Topology,

The screenshot shows the OpenStack Network Topology interface. On the left, there is a navigation sidebar with a tree view of network resources. The 'Network' node is expanded, and its child 'Network Topology' node is selected and highlighted in blue. A large arrow points from this 'Network Topology' node towards the main content area. The main content area displays a network topology graph. A vertical bar on the left of the graph is labeled 'Internal'. An arrow points from the text 'Internal Network Created' towards this 'Internal' label. The top navigation bar shows 'Project / Network / Network Topology'.

5.2- Create a Private Subnet:

```
openstack subnet create --network Internal --subnet-range 192.168.10.0/24 --dhcp Internal_subnet
```

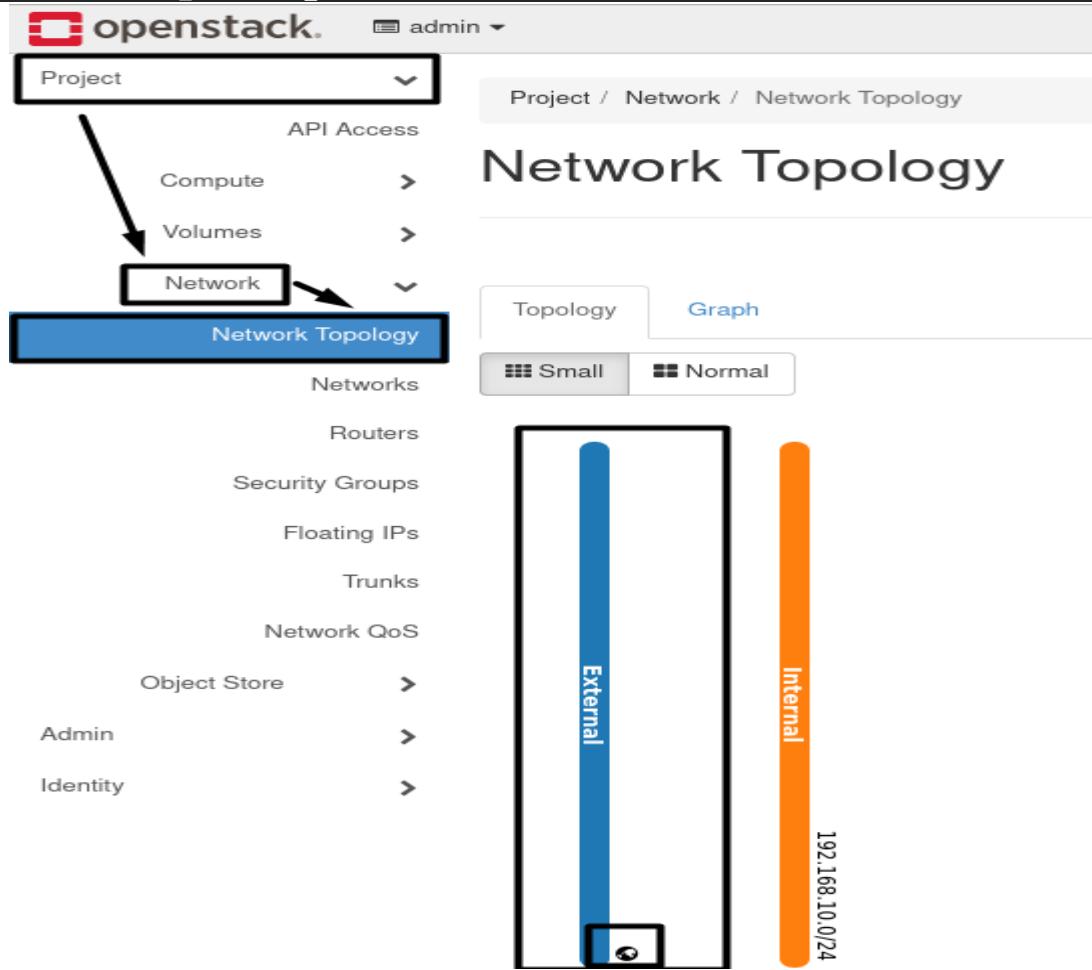
```
root@openstack:~  
File Edit View Search Terminal Help  
[root@openstack ~]# openstack subnet create --network Internal --subnet-range 192.168.10.0/24 --dh  
cp Internal_subnet  
+-----+  
| Field | Value |  
+-----+  
| allocation_pools | 192.168.10.2-192.168.10.254 |  
| cidr | 192.168.10.0/24 |  
| created_at | 2023-03-10T13:57:04Z |  
| description | |  
| dns_nameservers | |  
| dns_publish_fixed_ip | None |  
| enable_dhcp | True |  
| gateway_ip | 192.168.10.1 |  
| host_routes | |  
| id | acc308e4-62c4-4271-b55a-f6938020b485 |  
| ip_version | 4 |  
| ipv6_address_mode | None |  
| ipv6_ra_mode | None |  
| name | Internal_subnet |  
| network_id | 16aaaf56-9b71-44cd-b499-9dc2290448d3 |  
| project_id | b9b772e1d11f401a8f488ee9eff93302 |  
| revision_number | 0 |  
| segment_id | None |  
| service_types | |  
| subnetpool_id | None |  
| tags | |  
| updated_at | 2023-03-10T13:57:04Z |  
+-----+  
[root@openstack ~]#
```



5.3- Create an External Network:

```
openstack network create External --provider-network-type flat --provider-physical-network extnet --external
```

```
root@openstack:~#
File Edit View Search Terminal Help
[root@openstack ~]# openstack network create External --provider-network-type flat --provider-physical-network extnet --external
+-----+-----+
| Field | Value |
+-----+-----+
| admin_state_up | UP |
| availability_zone_hints | None |
| availability_zones | 2023-03-10T14:01:51Z |
| created_at | 2023-03-10T14:01:51Z |
| description | None |
| dns_domain | ec3609b0-cf2e-459b-b8e8-7db4fc79003d |
| id | None |
| ipv4_address_scope | None |
| ipv6_address_scope | None |
| is_default | False |
| is_vlan_transparent | None |
| mtu | 1500 |
| name | External |
| port_security_enabled | True |
| project_id | b9b772e1d11f401a8f488ee9eff93302 |
| provider:network_type | flat |
| provider:physical_network | extnet |
| provider:segmentation_id | None |
| qos_policy_id | None |
| revision_number | 1 |
| router:external | External |
| segments | None |
| shared | False |
| status | ACTIVE |
| subnets | None |
| tags | None |
| updated_at | 2023-03-10T14:01:51Z |
+-----+-----+
[root@openstack ~]#
```



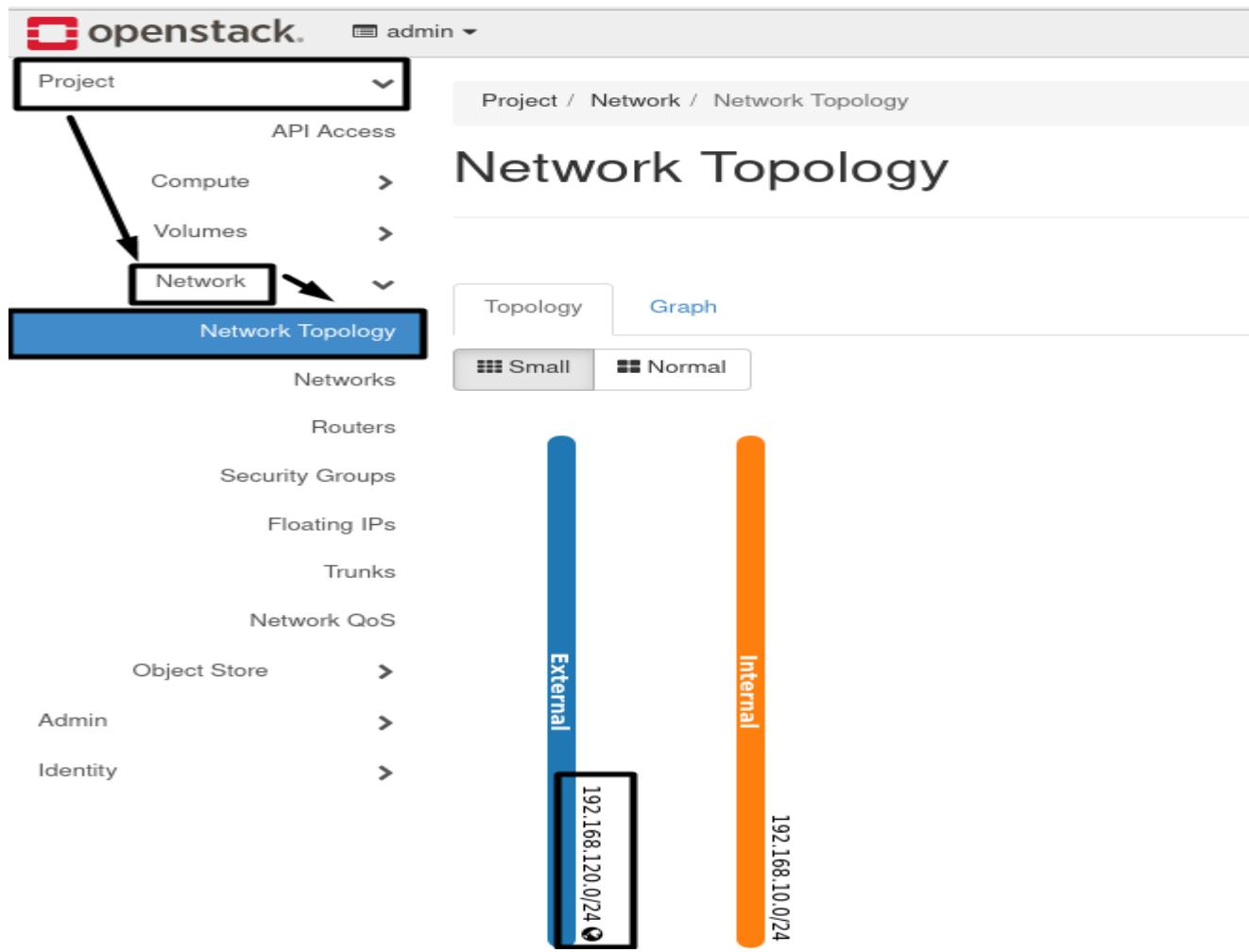
5.4- Create an External Subnet:

```
openstack subnet create External_subnet --no-dhcp --allocation-pool start=192.168.120.160,end=192.168.120.170 --gateway 192.168.120.2 --network External --subnet-range 192.168.120.0/24
```

```
root@openstack:~
```

Field	Value
allocation_pools	192.168.120.160-192.168.120.170
cidr	192.168.120.0/24
created_at	2023-03-10T14:05:00Z
description	
dns_nameservers	
dns_publish_fixed_ip	None
enable_dhcp	False
gateway_ip	192.168.120.2
host_routes	
id	22be7b77-b18e-454e-b971-b5ddc2d5ad31
ip_version	4
ipv6_address_mode	None
ipv6_ra_mode	None
name	External_subnet
network_id	ec3609b0-cf2e-459b-b8e8-7db4fc79003d
project_id	b9b772e1d11f401a8f488ee9eff93302
revision_number	0
segment_id	None
service_types	
subnetpool_id	
tags	
updated_at	2023-03-10T14:05:00Z

```
[root@openstack:~(keystone_admin)]#
```

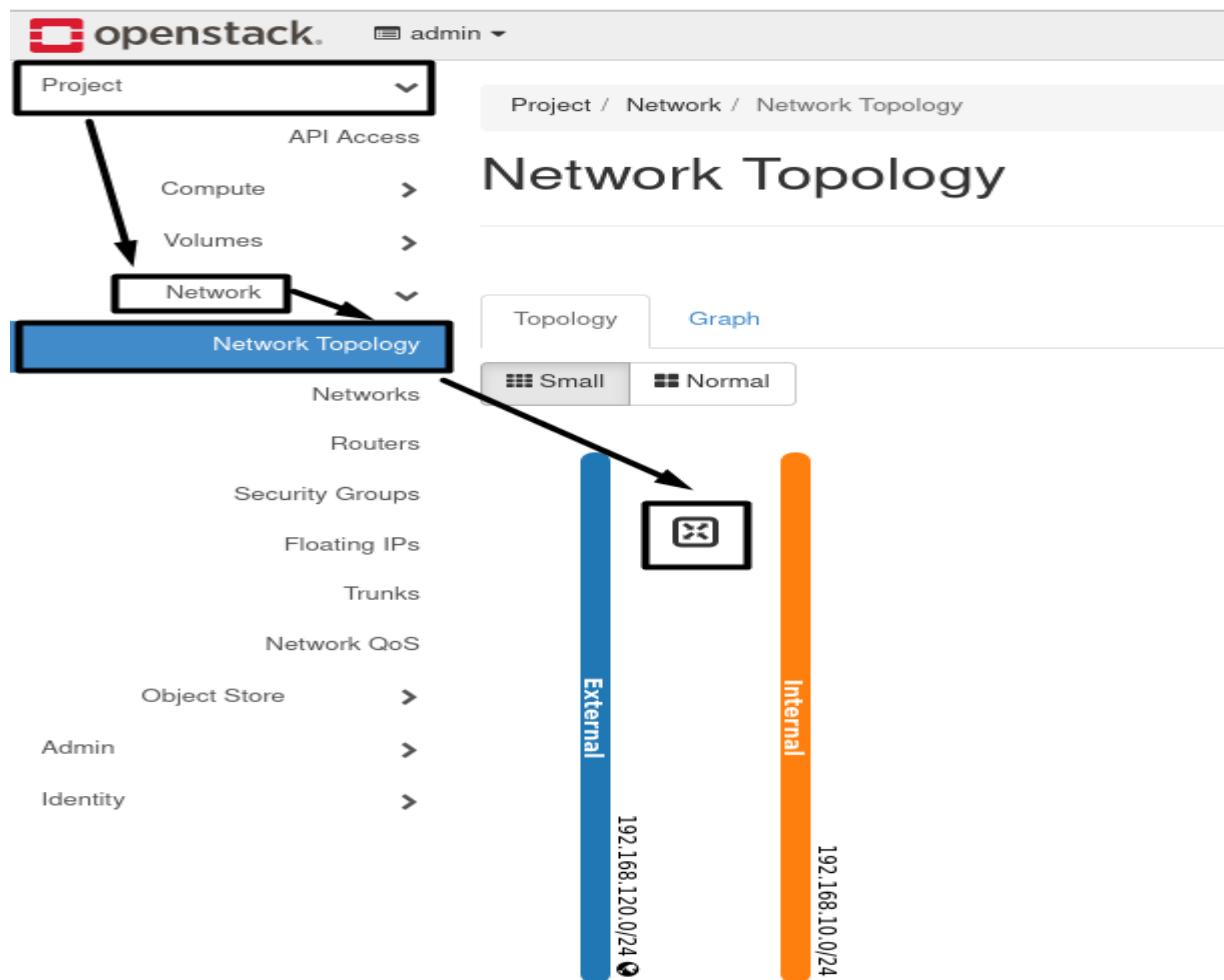


5.5- Create a Router:

To connect the external network and the internal network to each other.

```
neutron router-create router
```

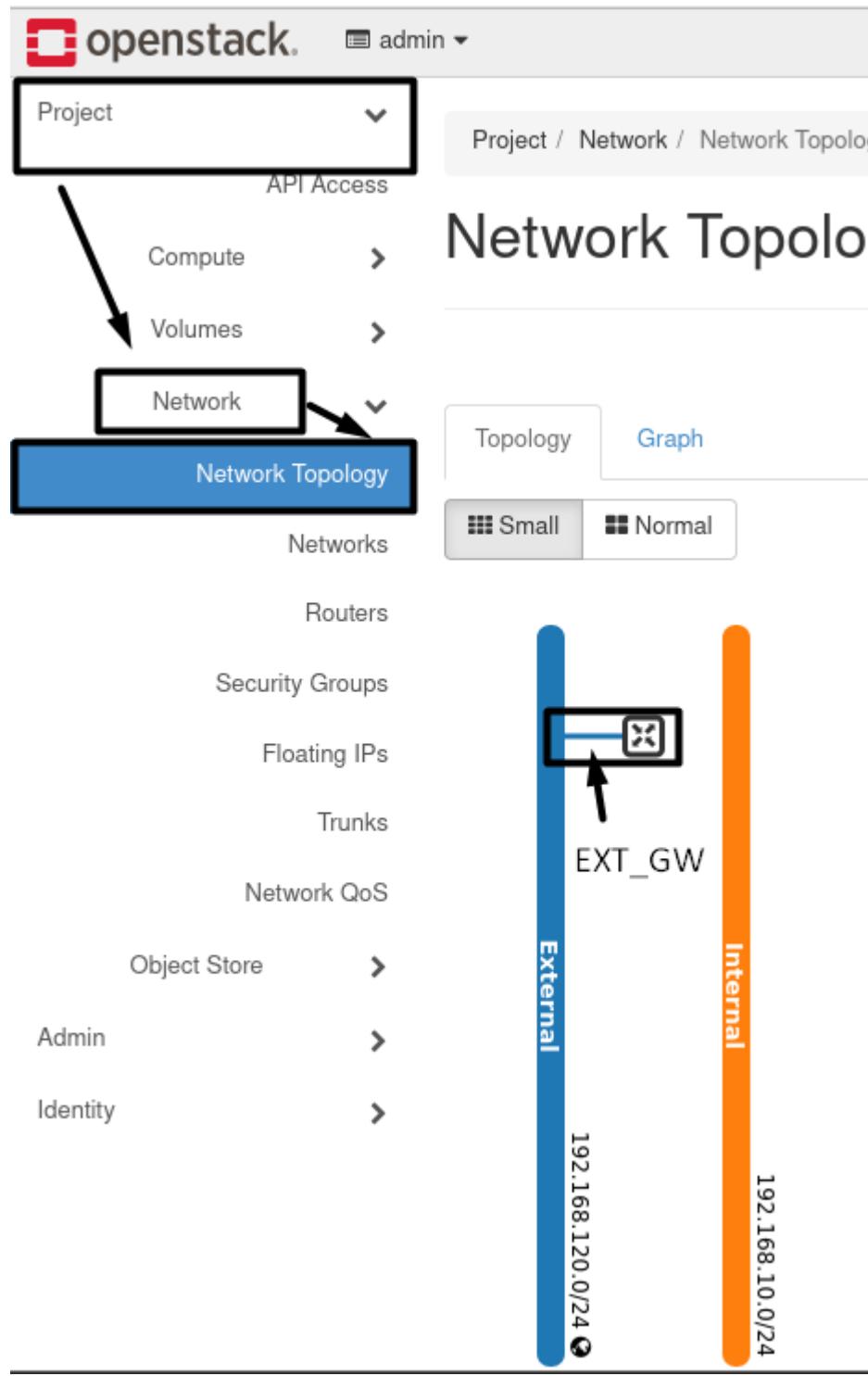
```
[root@openstack ~]# neutron router-create router
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.
Created a new router:
+-----+-----+
| Field | Value |
+-----+-----+
| admin_state_up | True |
| availability_zone_hints |  |
| availability_zones |  |
| created_at | 2023-03-10T14:09:13Z |
| description |  |
| distributed | False |
| external_gateway_info |  |
| flavor_id |  |
| ha | False |
| id | 44e388cd-e59e-4ce6-993b-1c31960a35c2 |
| name | router |
| project_id | b9b772e1d11f401a8f488ee9eff93302 |
| revision_number | 1 |
| routes |  |
| status | ACTIVE |
| tags |  |
| tenant_id | b9b772e1d11f401a8f488ee9eff93302 |
| updated_at | 2023-03-10T14:09:13Z |
+-----+-----+
```



5.6- Set Router Gateway, Using External Network:

```
neutron router-gateway-set router External
```

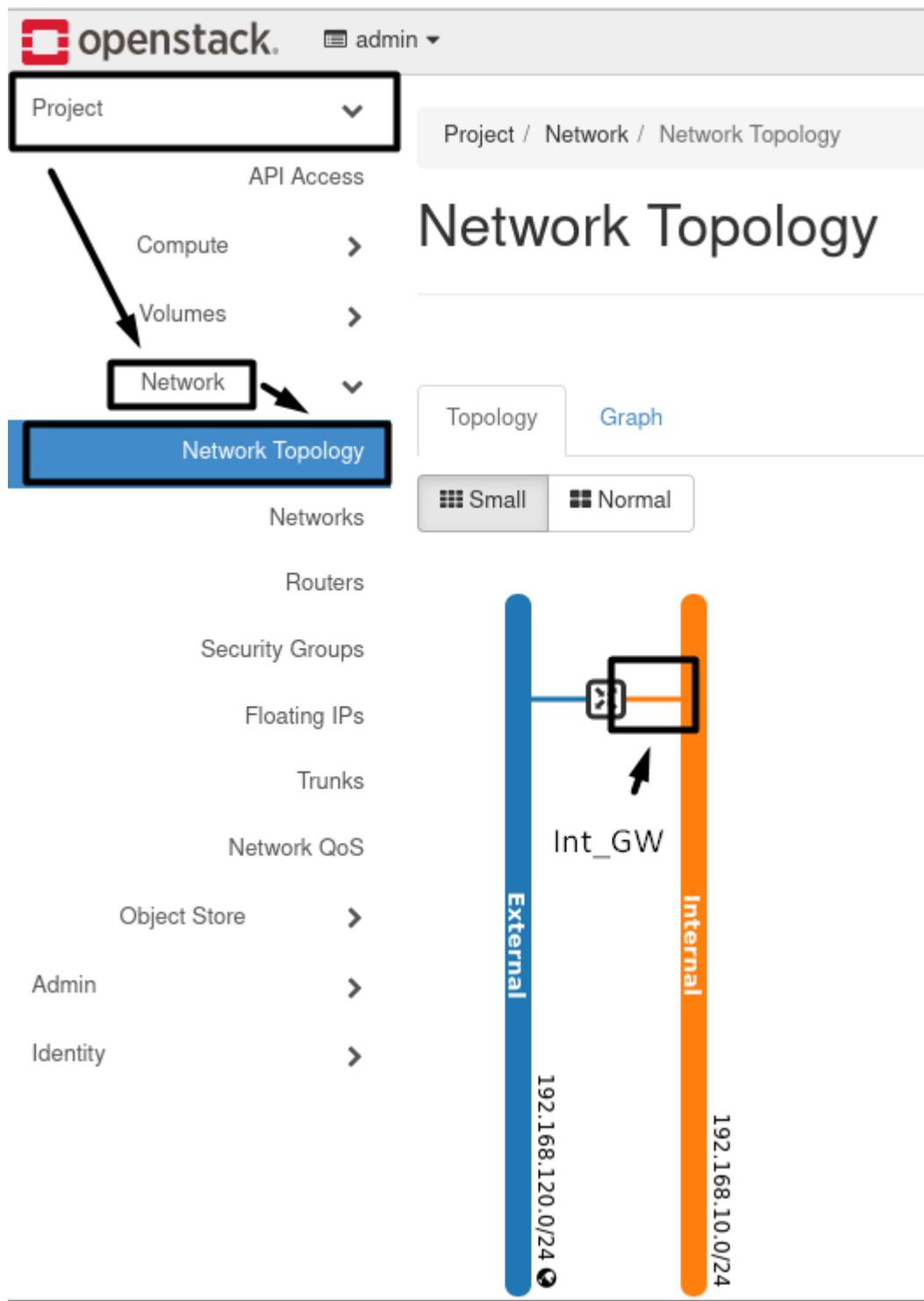
```
root@openstack:~  
File Edit View Search Terminal Help  
[root@openstack ~]# neutron router-gateway-set router External  
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.  
Set gateway for router router  
[root@openstack ~]#
```



5.7- Set Router Gateway, Using Internal Network:

```
neutron router-interface-add router Internal_subnet
```

```
root@openstack:~  
File Edit View Search Terminal Help  
[root@openstack ~]# neutron router-interface-add router Internal_subnet  
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.  
Added interface 4187bbf4-3594-4061-be1b-ee8272446383 to router router.  
[root@openstack ~]#
```



Network Topology

Full Topology

Topology Graph

Small Normal



Q1. We do these steps using GUI?

Ans. Yes, we can, let's do it together,

Firstly we need to Delete the router then delete the Internal and External networks.

1. Create **External** Network:

The screenshot shows the OpenStack Horizon interface. On the left, there's a sidebar with 'Project' dropdown (Admin), 'Compute', 'Volume', 'Network' (highlighted with a red box), 'Routers', 'Floating IPs', 'Trunks', 'RBAC Policies', 'System', and 'Identity'. In the center, there's a 'Networks' section with 'Project', 'Network Name', and 'Subnets' tabs. A large 'Create Network' wizard dialog is open over the network list. The 'Network' tab is selected. Inside, there's a 'Name' field with 'External', a 'Project' dropdown set to 'admin', a 'Provider Network Type' dropdown set to 'Flat', a 'Physical Network' dropdown set to 'extnet', and checkboxes for 'Enable Admin State' (checked), 'Shared' (unchecked), 'External Network' (checked), and 'Create Subnet' (checked). Below these are 'Availability Zone Hints' (with 'nova') and an 'MTU' dropdown. At the bottom are 'Cancel', '< Back', and a blue 'Next >' button. A large black arrow points from step 4 (the 'Name' field) down to the 'Next >' button.

The screenshot shows the 'Create Network' wizard on the 'Subnet' tab. It has three tabs: 'Network *' (disabled), 'Subnet' (selected and highlighted with a red box), and 'Subnet Details'. The 'Subnet' tab contains fields for 'Subnet Name' (set to 'External_Subnet'), 'Network Address' (set to '192.168.120.0/24'), 'IP Version' (set to 'IPv4'), 'Gateway IP' (set to '192.168.120.2'), and a 'Disable Gateway' checkbox (unchecked). To the right of the form, there's a note: 'Creates a subnet associated with the network. You need to enter a valid "Network Address" and "Gateway IP". If you did not enter the "Gateway IP", the first value of a network will be assigned by default. If you do not want gateway please check the "Disable Gateway" checkbox. Advanced configuration is available by clicking on the "Subnet Details" tab.' At the bottom are 'Cancel', '< Back', and a blue 'Next >' button.

Create Network



Network *

Subnet

Subnet Details

Enable DHCP

Specify additional attributes for the subnet.

Allocation Pools

192.168.120.160,192.168.120.170

DNS Name Servers

Host Routes

[Cancel](#)

[« Back](#)

[Create](#)

2. Create Internal Network:

Create Network

Network Subnet Subnet Details

Network Name: Internal

Enable Admin State

Shared

Create Subnet

Availability Zone Hints: nova

MTU: 1500

Cancel **< Back** **Next >**

Create Network

Network **Subnet** Subnet Details

Subnet Name: Internal_Subnet

Network Address: 192.168.10.0/24

IP Version: IPv4

Gateway IP: 192.168.10.1

Disable Gateway

Cancel **< Back** **Next >**

Creates a subnet associated with the network. You need to enter a valid "Network Address" and "Gateway IP". If you did not enter the "Gateway IP", the first value of a network will be assigned by default. If you do not want gateway please check the "Disable Gateway" checkbox. Advanced configuration is available by clicking on the "Subnet Details" tab.

Create Network

Network **Subnet** **Subnet Details**

Enable DHCP

Allocation Pools: 192.168.10.10,192.168.10.20

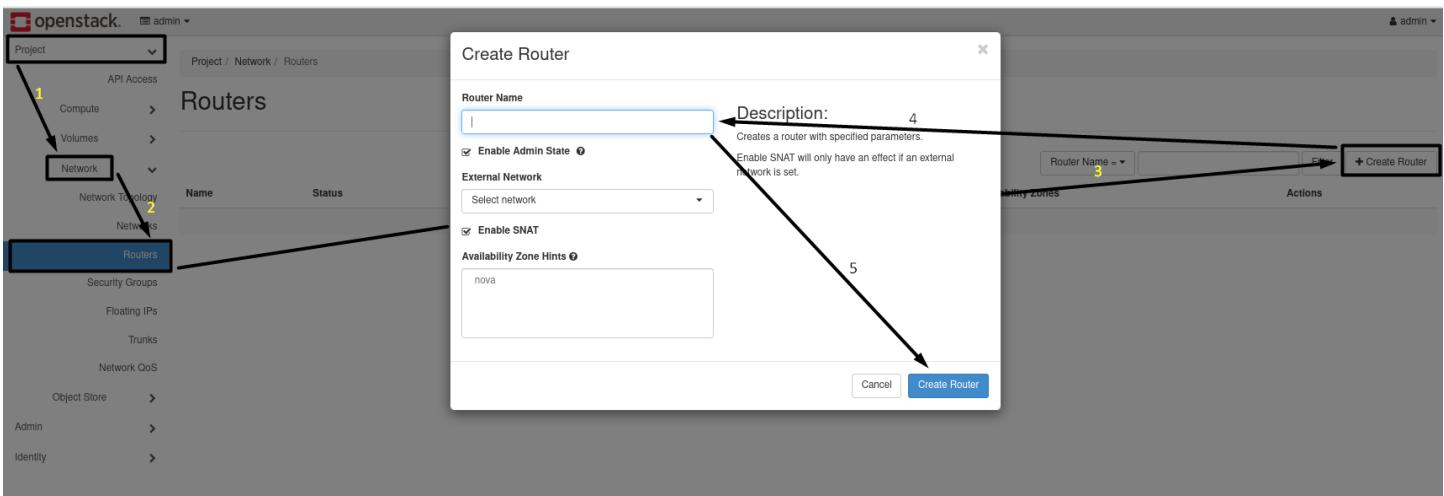
DNS Name Servers

Host Routes

Specify additional attributes for the subnet.

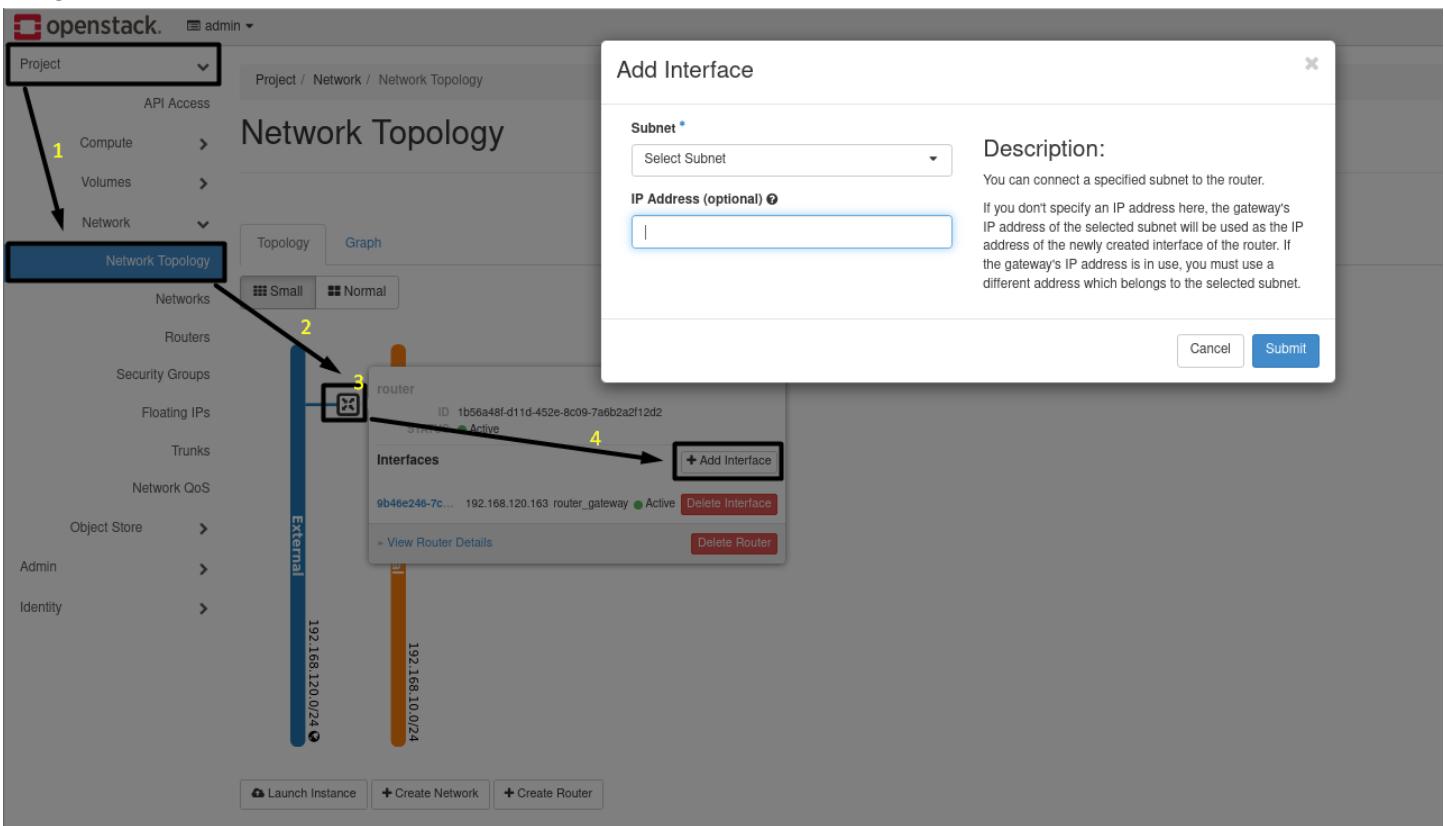
Cancel **< Back** **Create**

3. Create Router and set his GW:



4. Create Router Interface for the Internal Network:

5.



Note: -

You will choose the subnet for the private network that you want, but the IP Address must be the GW of this network.

Full Topology

Project / Network / Network Topology

Network Topology

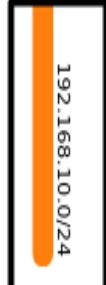
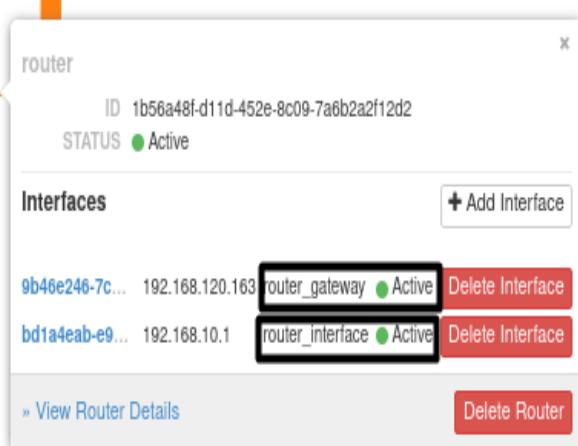
Topology

Graph

Small

Normal

External



Launch Instance

Create Network

Create Router

5.8- Install image file and Create image using `glance` component:

```
curl -L http://download.cirros-cloud.net/0.3.4/cirros-0.3.4-x86_64-disk.img | glance image-create --name='cirros image' --visibility=public --container-format=bare --disk-format=qcow2
```

```
root@openstack ~ (keystone_admin)]# curl -L http://download.cirros-cloud.net/0.3.4/cirros-0.3.4-x86_64-disk.img | glance image-create --name='cirros image' --visibility=public --container-format=bare --disk-format=qcow2
% Total    % Received % Xferd  Average Speed   Time     Time      Current
          Dload  Upload Total Spent   Left Speed
100  273  100  273    0     0  388      0 --:--:-- 0:00:01 --:--:-- 388
  0     0     0     0     0     0      0 --:--:-- 0:00:01 --:--:-- 0
100 12.6M 100 12.6M    0     0 1067k      0 0:00:12 0:00:12 --:--:-- 1724k
Property      Value
checksum      ee1eca47dc88f4879d8a229cc70a07c6
container_format  bare
created_at    2023-03-10T15:13:48Z
disk_format    qcow2
id            77837a61-5da5-4272-b235-a8dfbd478973
min_disk       0
min_ram        0
name          cirros image
os_hash_algo   sha512
os_hash_value  lb03ca1bc3fafef448b90583c12f367949f8b0e665685979d95b004e48574b953316799e23240f4f7
39d1b5eb4c4ca24d38fdc6f4f9d8247a2bc64db25d6bbdb2
os_hidden      False
owner          b9b772e1d11f401a8f488ee9eff93302
protected      False
size           13287936
status         active
stores         file
tags          []
updated_at    2023-03-10T15:13:58Z
virtual_size   41126400
visibility     public
root@openstack ~ (keystone_admin)]#
```

Validate the Image from the GUI:

Name	Type	Status	Visibility	Protected	Disk Format	Size	Launch
cirros image	Image	Active	Public	No	QCOW2	12.67 MB	Launch

Q. What is CirrOS?

CirrOS is a minimal Linux distribution that was designed for use as a test image on clouds such as OpenStack Compute.

Now We Ready to Start our Instance. 😊

1- Create Instance:

```
openstack server create --image 'cirros image' --flavor m1.tiny --network Internal server1
```

```
root@openstack:~#
File Edit View Search Terminal Help
[root@openstack ~](keystone_admin)]# openstack server create --image 'cirros image' --flavor m1.tiny --network Internal server1
+-----+
| Field | Value |
+-----+
| OS-DCF:diskConfig | MANUAL |
| OS-EXT-AZ:availability_zone | None |
| OS-EXT-SRV-ATTR:host | None |
| OS-EXT-SRV-ATTR:hypervisor_hostname | None |
| OS-EXT-SRV-ATTR:instance_name | None |
| OS-EXT-STS:power_state | NOSTATE |
| OS-EXT-STS:task_state | scheduling |
| OS-EXT-STS:vm_state | building |
| OS-SRV-USG:launched_at | None |
| OS-SRV-USG:terminated_at | None |
| accessIPv4 |  |
| accessIPv6 |  |
| addresses |  |
| adminPass | DCnaUsa9gGK7 |
| config_drive |  |
| created | 2023-03-10T15:25:54Z |
| flavor | m1.tiny (1) |
| hostId |  |
| id | 1a17d264-3511-4723-b243-6401245ed730 |
| image | cirros image (77837a61-5da5-4272-b235-a8dfbd478973) |
| key_name | None |
| name | server1 |
| progress | 0 |
| project_id | b9b772e1d11f401a8f488ee9eff93302 |
| properties | name='default' |
| security_groups | BUILD |
| status | 2023-03-10T15:25:55Z |
| updated | b8198308c336419bb9ee834533a77c62 |
| user_id |  |
| volumes_attached |  |
+-----+
[root@openstack ~](keystone_admin)]#
```

Validate the Instance from the GUI:

Instance ID	Filter	Launch Instance	Delete Instances	More Actions
1a17d264-3511-4723-b243-6401245ed730				
server1				

2- Create FloatingIP, to reach our instance from the Internet.

```
openstack floating ip create External
```

```
[root@openstack ~ (keystone_admin)]# openstack floating ip create External
+-----+-----+
| Field | Value |
+-----+-----+
| created_at | 2023-03-10T15:31:46Z |
| description | None |
| dns_domain | None |
| dns_name | None |
| fixed_ip_address | None |
| floating_ip_address | 192.168.120.162 |
| floating_network_id | 83e850a8-9206-46a0-97e2-ad2af8e4ac98 |
| id | 8069f54f-f83e-4dfd-b093-f459c2e31aca |
| name | 192.168.120.162 |
| port_details | None |
| port_id | None |
| project_id | b9b772e1d11f401a8f488ee9eff93302 |
| qos_policy_id | None |
| revision_number | 0 |
| router_id | None |
| status | DOWN |
| subnet_id | None |
| tags | [] |
| updated_at | 2023-03-10T15:31:46Z |
+-----+-----+
[root@openstack ~ (keystone_admin)]#
```

Remember → 192.168.120.162 is the FloatingIP that we created.

3- Assign the FloatingIP to the Instance_Port.

Firstly, we need to know the IP for this Instance, We can know them from GUI,

The screenshot shows the OpenStack Compute interface under the 'Instances' tab. A search bar at the top right contains 'Instance ID: server1'. Below it, a table lists one item: 'server1' with 'cirros image' as the image name, '192.168.10.19' as the IP Address, and 'm1.tiny' as the flavor. The status is 'Active' and the power state is 'Running'. An arrow points to the 'server1' entry in the table.

So 192.168.10.19 is the IP for this instance, Then lets list the ports,

```
openstack port list
```

ID	Name	MAC Address	Fixed IP Addresses	Status
61aec729-e37b-4d8c-8482-80701d420255		fa:16:3e:e7:37:92	ip_address='192.168.10.10', subnet_id='154666e4-d0f0-4dac-ba07-87dad53bf7b8'	ACTIVE
967bac43-0eca-4ba2-be64-dfe0a86893d5		fa:16:3e:17:2d:41	ip_address='192.168.10.19', subnet_id='154666e4-d0f0-4dac-ba07-87dad53bf7b8'	ACTIVE
9b46e246-7c3c-4b8b-94ec-724742b79e37		fa:16:3e:11:35:79	ip_address='192.168.120.163', subnet_id='8221ea9-749e-4c2d-b4a9-0067897f128a'	ACTIVE
b1da4eab-e991-4f6a-9f88-7b58c3da3fe7		fa:16:3e:06:81:af	ip_address='192.168.10.1', subnet_id='154666e4-d0f0-4dac-ba07-87dad53bf7b8'	ACTIVE
df5c4eb2-930f-41e9-95c1-cce142c36e1b		fa:16:3e:43:19:20	ip_address='192.168.120.162', subnet_id='8221ea9-749e-4c2d-b4a9-0067897f128a'	N/A
fd934d94-9121-451d-82e2-efe1444e5eab		fa:16:3e:3f:52:ac	ip_address='192.168.120.160', subnet_id='8221ea9-749e-4c2d-b4a9-0067897f128a'	ACTIVE

Then let's assign the FloatingIP for the Instance Port,

```
openstack floating ip set --port 967bac43-0eca-4ba2-be64-dfe0a86893d5 192.168.120.162
```

```
[root@openstack ~]# openstack floating ip set --port 967bac43-0eca-4ba2-be64-dfe0a86893d5 192.168.120.162
```

Validate the Instance from the GUI:

The screenshot shows the OpenStack Compute interface under the 'Instances' tab. A search bar at the top right contains 'Instance ID: server1'. Below it, a table lists one item: 'server1' with 'cirros image' as the image name, '192.168.10.19' as the primary IP Address, and '192.168.120.162' as the floating IP Address. The flavor is 'm1.tiny', status is 'Active', and power state is 'Running'. An arrow points to the '192.168.120.162' entry in the table.

- 4- Add two rules in the default security group to enable ssh port and ICMP
 Project → Network → Security Groups → Manage Rule

The screenshot shows the OpenStack interface with the following navigation path:

- Project
- Compute
- Volumes
- Network
- Security Groups

Below the navigation, it says "Displaying 1 item".

Name	Security Group ID	Description	Shared	Actions
default	8bbe8e1-ff99-41b0-80e1-6cb367951e8	Default security group	False	Manage Rules

Then, Add the first Rule, for ICMP.

The screenshot shows the "Add Rule" dialog for ICMP:

- Rule: ALL ICMP
- Description: ICMP
- Direction: Ingress
- Remote: CIDR
- CIDR: 0.0.0.0/0

The "Add" button is highlighted with a blue box.

Then, Add the second Rule, for SSH.

The screenshot shows the "Add Rule" dialog for SSH:

- Rule: SSH
- Description: (empty)
- Remote: CIDR
- CIDR: 0.0.0.0/0

The "Add" button is highlighted with a blue box.

After Adding them you can validate from this screen,

Manage Security Group Rules: default (8bbe8e1-ff99-41b0-80e1-6cb367f951e8)							
							+ Add Rule Delete Rules
Displaying 6 items							
□ Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Description	Actions
□ Egress	IPv4	Any	Any	0.0.0.0/0	-	-	Delete Rule
□ Egress	IPv6	Any	Any	::/0	-	-	Delete Rule
□ Ingress	IPv4	Any	Any	-	default	-	Delete Rule
□ Ingress	IPv4	ICMP	Any	0.0.0.0/0	-	ICMP	Delete Rule
□ Ingress	IPv4	TCP	22 (SSH)	0.0.0.0/0	-	-	Delete Rule
□ Ingress	IPv6	Any	Any	-	default	-	Delete Rule

Displaying 6 items

5- Connect to your instance by SSH,

User Name: cirros

Password: cubswin:)

```
ssh cirros@192.168.120.162
```

```
root@openstack:~#
File Edit View Search Terminal Help
[root@openstack ~](keystone admin)]# ssh cirros@192.168.120.162
cirros@192.168.120.162's password:
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
    link/ether fa:16:3e:17:2d:d1 brd ff:ff:ff:ff:ff:ff
    inet 192.168.10.19/24 brd 192.168.10.255 scope global eth0
        inet6 fe80::f816:3eff:fe17:2dd1/64 scope link
            valid_lft forever preferred_lft forever
$
```

Ping from the **instance** to the **host**,

```
[root@openstack ~]# ssh cirros@192.168.120.162
cirros@192.168.120.162's password:
$ ping 192.168.120.152
PING 192.168.120.152 (192.168.120.152): 56 data bytes
64 bytes from 192.168.120.152: seq=0 ttl=63 time=7.227 ms
64 bytes from 192.168.120.152: seq=1 ttl=63 time=0.604 ms
64 bytes from 192.168.120.152: seq=2 ttl=63 time=0.574 ms
64 bytes from 192.168.120.152: seq=3 ttl=63 time=0.615 ms
64 bytes from 192.168.120.152: seq=4 ttl=63 time=0.521 ms
64 bytes from 192.168.120.152: seq=5 ttl=63 time=0.751 ms
^C
--- 192.168.120.152 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 0.521/1.715/7.227 ms
$
```

Ping from the **host** to the **instance**,

```
[root@openstack ~]# ping 192.168.120.162
PING 192.168.120.162 (192.168.120.162) 56(84) bytes of data.
64 bytes from 192.168.120.162: icmp_seq=1 ttl=63 time=1.61 ms
64 bytes from 192.168.120.162: icmp_seq=2 ttl=63 time=0.581 ms
64 bytes from 192.168.120.162: icmp_seq=3 ttl=63 time=0.404 ms
64 bytes from 192.168.120.162: icmp_seq=4 ttl=63 time=0.938 ms
64 bytes from 192.168.120.162: icmp_seq=5 ttl=63 time=4.02 ms
64 bytes from 192.168.120.162: icmp_seq=6 ttl=63 time=5.82 ms
64 bytes from 192.168.120.162: icmp_seq=7 ttl=63 time=1.65 ms
64 bytes from 192.168.120.162: icmp_seq=8 ttl=63 time=1.45 ms
64 bytes from 192.168.120.162: icmp_seq=9 ttl=63 time=3.61 ms
^C
--- 192.168.120.162 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8133ms
rtt min/avg/max/mdev = 0.404/2.230/2.824/1.152 ms
[root@openstack ~]#
```

Lets Launch and Instance from GUI,

1.

Project API Access Compute Overview Instances

Images Displaying 1 item Key Pairs Server Groups Volumes Network Object Store

Instance Name Image Name IP Address Flavor Key Pair Status Availability Zone Task Power State Age Actions

server1	cirros image	192.168.10.19, 192.168.120.162	m1.tiny	-	Active	nova	None	Running	55 minutes	Create Snapshot
---------	--------------	--------------------------------	---------	---	--------	------	------	---------	------------	-----------------

Instance ID Filter Launch Instance Delete Instances More Actions

2.

Launch Instance

Details

Source * Flavor * Networks *

Network Ports Security Groups Key Pair Configuration Server Groups Scheduler Hints Metadata

Instance Name * Description Availability Zone Count *

admin server 2| nova 1

Total Instances (10 Max)
20%
1 Current Usage
1 Added
8 Remaining

< Back Next > Launch Instance

3.

Launch Instance

Details

Source * Flavor * Networks *

Network Ports Security Groups Key Pair Configuration Server Groups Scheduler Hints Metadata

Select Boot Source Create New Volume

Image Yes No

Delete Volume on Instance Delete

Yes No

Allocated

Volume Size (GB) *

1

Available

Click here for filters or full text search.

Select one

Name	Updated	Size	Format	Visibility
cirros image	3/10/23 3:13 PM	12.67 MB	QCOW2	Public

< Back Next > Launch Instance

4.

Launch Instance

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

Source

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Allocated

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
Select an item from Available items below						
Available 5						
Select one						
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 **Next >** **Launch Instance**

5.

Launch Instance

Details Networks provide the communication channels for instances in the cloud.

Source

Flavor

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Allocated

Network	Subnets Associated	Shared	Admin State	Status
Select an item from Available items below				
Available				
Select at least one network				
Network	Subnets Associated	Shared	Admin State	Status
Internal	Internal_Subnet	No	Up	Active
External	External_Subnet	No	Up	Active

Cancel **Next >** **Launch Instance**

6.

Launch Instance

Details A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or generate a new key pair.

Source

Flavor

Networks

Network Ports

Security Groups

Key Pair *

Configuration

Server Groups

Scheduler Hints

Metadata

Allocated

Displaying 0 items

Name	Type	Fingerprint
Select a key pair from the available key pairs below.		

Available 0

Select one

Name	Type	Fingerprint
Click here for filters or full text search.		

Cancel **Next >** **Launch Instance**

Set admin password

Create Key Pair

Key Pairs are how you login to your instance after it is launched. Choose a key pair name you will recognize. Names may only include alphanumeric characters, spaces, or dashes.

Key Pair Name *

Key Type *

Private Key

```
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQDQWzqLQbqVQjBtPt0+KyPBXO7zyk4k9U266qP0jGpbDmjApo+
AnfAmVU0
N7mZp6pQAw/cLbIzz38dnJmX689K0s9TG+B2gAxUAoREuwCiM3jMuzkCgYEAYfd
IP69TA0Trdje0da4BrstLJZ77x5j37AsMMMicjqaKt2qPcuqQvmhQ1SPD0+BP
UVutHHEthya17+bjzPuY3GAz2L+7Q3b0gtmH1Y18qADAb/wfLExyd zg9sGivs6h
tdbQ+UQ1c1yzKjO1QQqTO8sGj+0h1WZKIRPpXECgYAGs4UvvRteIXXHc/ODiy3E
WT2V1ryuEB89RXJEaiEgPJE8w12mNs7SDS6+CZkWPAsm3uz+OSimuBTIRXXM6MT9
/p4guCmZE8pEBinrSh26lFFq/hzMILauRNJUNKCol4sC9tq3rWxS3ystJQlhHvuo
vvWq27a1JTwiulBJWxCpMQKBgGdfgtvn5uvJYxtF57EGYhl9Z3fKe/X08JKYdP
zjMX5yv8YA/wnyHlf7Sdc0IKTFhNI2eRDOHPb+ujCz9XznGctXjWpLLRF5H17hds
TjDr52DwFZnnrCemaig07dBe/X7UNEQ8l2i+R/1sDcgnknzITOFj6abixFdLL8UFo
pHuBAoGAaReArZJMvTngO015cPwgYPHTAUcq3afXsSmnMd+6XOfLPp5KeJ/dw/
otSywPyJAQoAlp0lp9H9LYbULo5XodbfjveXc4g2Xt30EQnJoryiHmRpPcraMys4E
+y21tj/6j7ApMmDb22AJZDz0jLpr+lkgDcEwX0elDyJl5jpaYSo...
-----END RSA PRIVATE KEY-----
```

Create Keypair **Copy Private Key to Clipboard** **Done**

Launch Instance

Details A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or generate a new key pair.

Source **+ Create Key Pair** **Import Key Pair**

Flavor Allocated

Networks Displaying 1 item

Name	Type	Fingerprint
Key	ssh	82:30:fc:4f:77:59:0d:1c:e9:9a:c1:0b:b2:cd:b2:d5

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Displaying 1 item

Available 0 Select one

Click here for filters or full text search.

Displaying 0 items

Name	Type	Fingerprint
No items to display.		

Displaying 0 items

Set admin password

< Back **Next >** **Launch Instance**

Validate from GUI and please waiting to be running,

Project / Compute / Instances

Instances

Displaying 2 items

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
server 2	-	192.168.10.11	m1.tiny	Key	Build	nova	Block Device Mapping	No State	0 minutes	Associate Floating IP
server1	cirros image	192.168.10.19, 192.168.120.162	m1.tiny	-	Active	nova	None	Running	1 hour, 4 minutes	Create Snapshot

Displaying 2 items

Running Now,

Project / Compute / Instances

Instances

Displaying 2 items

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
server 2	cirros image	192.168.10.11	m1.tiny	Key	Active	nova	None	Running	1 minute	Create Snapshot
server1	cirros image	192.168.10.19, 192.168.120.162	m1.tiny	-	Active	nova	None	Running	1 hour, 5 minutes	Create Snapshot

Displaying 2 items

Let's Associate Floating IP for this instance,

Project / Compute / Instances

Instances

Displaying 2 items

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
server 2	cirros image	192.168.10.11	m1.tiny	Key	Active	nova	None	Running	3 minutes	Create Snapshot
server1	cirros image	192.168.10.19, 192.168.120.162	m1.tiny	-	Active	nova	None	Running	1 hour, 7 minutes	Associate Floating IP

Displaying 2 items

- Associate Floating IP
- Attach Interface
- Detach Interface
- Edit Instance
- Attach Volume
- Detach Volume
- Update Metadata
- Edit Security Groups
- Edit Port Security Groups
- Console
- View Log
- Rescue Instance
- Pause Instance
- Suspend Instance
- Shelve Instance
- Resize Instance
- Lock Instance
- Soft Reboot Instance
- Hard Reboot Instance
- Shut Off Instance
- Rebuild Instance

Then Allocate new floating IP,

Manage Floating IP Associations

IP Address *

No floating IP addresses allocated



Select the IP address you wish to associate with the selected instance or port.

Port to be associated *

server 2: 192.168.10.11

Cancel

Associate

Then,

Allocate Floating IP

Pool *

External

Description**Description:**

Allocate a floating IP from a given floating IP pool.

Project Quotas**Floating IP**

1 of 50 Used

Cancel

Allocate IP

Now we can add Floating IP,

Success: Allocated Floating IP
192.168.120.169.

Validate from GUI,

Project / Compute / Instances

Instances

Displaying 2 items

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
server 2	cirros image	192.168.10.11, 192.168.120.169	m1.tiny	Key	Active	nova	None	Running	7 minutes	Create Snapshot
server1	cirros image	192.168.10.19, 192.168.120.162	m1.tiny	-	Active	nova	None	Running	1 hour, 7 minutes	Create Snapshot

Displaying 2 items

Let's try to connect to it and ping,

User Name: cirros

Password: cubswin:)

```
ssh cirros@192.168.120.169
```

The screenshot shows a terminal window titled "root@openstack:~". The command "ssh cirros@192.168.120.169" is entered, followed by a warning about host authenticity. The user responds "yes" to the prompt. The terminal then displays the output of the "ip a" command, listing the network interfaces "lo" and "eth0" with their respective details like MTU, link layer address, and IP configurations.

```
root@openstack:~ [root@openstack ~]# ssh cirros@192.168.120.169
The authenticity of host '192.168.120.169 (192.168.120.169)' can't be established.
RSA key fingerprint is SHA256:neK0zPvWSeALqJ4qbzMcdCb03daR25rjGTblZkC1Ljo.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.120.169' (RSA) to the list of known hosts.
cirros@192.168.120.169's password:
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
    link/ether fa:16:3e:2d:cc:25 brd ff:ff:ff:ff:ff:ff
    inet 192.168.10.11/24 brd 192.168.10.255 scope global eth0
        inet6 fe80::f816:3eff:fe2d:cc25/64 scope link
            valid_lft forever preferred_lft forever
$
```

Ping from the **instance** to the **host**,

```
root@openstack:~  
File Edit View Search Terminal Help  
$ ping 192.168.120.152  
PING 192.168.120.152 (192.168.120.152): 56 data bytes  
64 bytes from 192.168.120.152: seq=0 ttl=63 time=1.407 ms  
64 bytes from 192.168.120.152: seq=1 ttl=63 time=0.726 ms  
64 bytes from 192.168.120.152: seq=2 ttl=63 time=0.683 ms  
64 bytes from 192.168.120.152: seq=3 ttl=63 time=1.041 ms  
64 bytes from 192.168.120.152: seq=4 ttl=63 time=0.692 ms  
64 bytes from 192.168.120.152: seq=5 ttl=63 time=0.750 ms  
64 bytes from 192.168.120.152: seq=6 ttl=63 time=0.651 ms  
64 bytes from 192.168.120.152: seq=7 ttl=63 time=1.085 ms  
^C  
--- 192.168.120.152 ping statistics ---  
8 packets transmitted, 8 packets received, 0% packet loss  
round-trip min/avg/max = 0.651/0.879/1.407 ms  
$
```

Ping from the **host** to the **instance**,

```
root@openstack:~  
File Edit View Search Terminal Help  
[root@openstack ~ (keystone_admin)]# ping 192.168.120.169  
PING 192.168.120.169 (192.168.120.169) 56(84) bytes of data.  
64 bytes from 192.168.120.169: icmp_seq=1 ttl=63 time=3.58 ms  
64 bytes from 192.168.120.169: icmp_seq=2 ttl=63 time=5.22 ms  
64 bytes from 192.168.120.169: icmp_seq=3 ttl=63 time=1.04 ms  
64 bytes from 192.168.120.169: icmp_seq=4 ttl=63 time=2.99 ms  
64 bytes from 192.168.120.169: icmp_seq=5 ttl=63 time=0.854 ms  
64 bytes from 192.168.120.169: icmp_seq=6 ttl=63 time=5.80 ms  
^C  
--- 192.168.120.169 ping statistics  
6 packets transmitted, 6 received, 0% packet loss, time 5067ms  
rtt min/avg/max/mdev = 0.854/3.246/5.797/1.878 ms  
[root@openstack ~ (keystone_admin)]#
```

Now Delete This VM and Go Home 😊