

INSTRUCTIONS TO PROVISION OPENSTACK MANILA AND CINDER (MITAKA-BASED) USING NETAPP CLUSTERED DATA ONTAP (CDOT), PACKSTACK, AND RDO

Akshai Parthasarathy

Technical Marketing Engineer, Cloud Solutions

Data Fabric Group

NetApp

akshai@netapp.com

Table of Contents

ARCHITECTURE	3
SETUP CLUSTERED DATA ONTAP (CDOT)	5
OPENSTACK SERVER CONFIGURATION	7
NETWORKING PRE-CONFIGURATION	7
INSTALL OPENSTACK LIBERTY USING SCRIPT	10
SETUP NEUTRON NETWORKING	11
SETUP SECURITY GROUP, GLANCE, KEY-PAIR, AND UBUNTU INSTANCE/VM	12
SETUP MANILA AND CREATE A SHARE	14
LOGIN TO THE UBUNTU INSTANCE AND MOUNT THE SHARE	15
SETUP CINDER AND CREATE A VOLUME	18
LOGIN TO THE UBUNTU INSTANCE AND USE THE CINDER VOLUME	21
TROUBLESHOOTING	21
ACKNOWLEDGMENTS	24

Instructions to Provision OpenStack Manila (Mitaka-based) Using NetApp Clustered Data ONTAP (cDOT), PackStack, and RDO

The following instructions setup OpenStack Manila and Cinder (Mitaka-based) using PackStack and RDO. RDO is a community of people using and deploying OpenStack on CentOS, Fedora, and Red Hat Enterprise Linux. These instructions are for CentOS7.

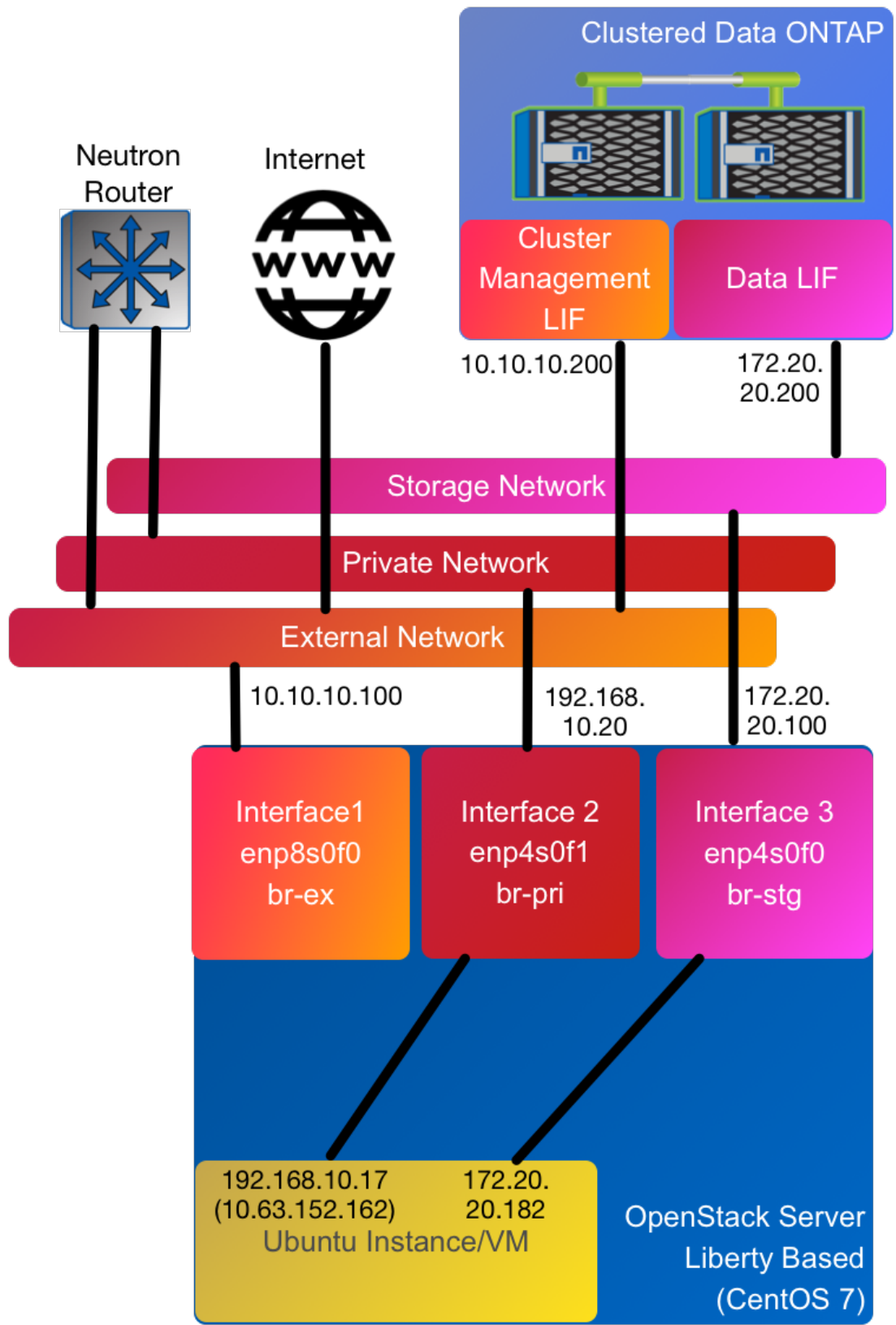
Architecture

This exercise will walk you through installing OpenStack on a single server with 3 network interface cards. Clustered Data ONTAP should be setup with a Cluster Management LIF prior to proceeding. Our recommendation is to provision sufficient disk space (100GB or more), memory (16GB or more), and networking (1Gbps or more) for the OpenStack server. The instructions assume the availability of:

- An external network that you can use to SSH to your server and Clustered Data ONTAP.
- A private network that is used for OpenStack instance-to-instance communication. It is not heavily used in this lab guide, but is needed for instance-to-instance communication.
- A storage network on which the Clustered Data ONTAP NFS Data LIFS are located. In our lab, the Clustered Data ONTAP Cluster Management LIF was located on the external network, but it should still be functional if you have it on the Storage Network along with the NFS Data LIF.

You will also step through the deployment of a Neutron router, creation of a Nova instance, setup and use of a Manila share, and setup and use of a Cinder volume.

The architecture is shown below.



Setup Clustered Data ONTAP (CDOT)

Please setup your CDOT with a Cluster Management LIF on the external network before proceeding.

#Login to CDOT using your username and password

```
[user@local-machine]$ ssh admin@<cluster-mgt-lif-ip-address>
```

```
Password: <password>
```

Example:

```
$ ssh admin@10.10.10.200
```

#Create a new vservers (SVM). The name used was "netapp-vs" and aggregate (disk pool) used was "aggr1." Your aggregate may be different.

```
OPSK-02::> vserver create -vserver netapp-vs -rootvolume root -aggregate aggr1 -rootvolume-security-style unix
```

#Ensure that the vserver was created

```
OPSK-02::> vserver show
```

Vserver	Type	Subtype	Admin	Operational	Root
Volume	Aggregate		State	State	
netapp-vs	data	default	running	running	root
aggr1					

<output-removed>

#Create a new NFS Data LIF with the appropriate port, address, and netmask

```
OPSK-02::> network interface create -vserver netapp-vs -lif nfs_lif -role data -data-protocol nfs -home-node OPSK-02-n1 -home-port e0b -address 172.20.20.200 -netmask 255.255.255.0
```

#Note that NFS Data LIF was created

```
OPSK-02::> network interface show
```

Current	Logical	Status	Network	
Vserver	Current	Is	Admin/Oper	Address/Mask
Port	Home	Interface		Node
netapp-vs				

```

nfs_lif      up/up      172.20.20.200/24    OPSK-
02-n1      e0b      true
<output-removed>

```

#Create a default export policy

```

OPSK-02::> vserver export-policy rule create -vserver
netapp-vs -policyname default -clientmatch 0.0.0.0/0 -
rwrule any -rorule any -allow-suid true -allow-dev true -
protocol any

```

#Note that the export policy was created

```

OPSK-02::> vserver export-policy rule show

```

	Policy	Rule	Access	Client
RO				
Vserver	Name	Index	Protocol	Match
Rule				
netapp-vs	default	1	any	0.0.0.0/0
any				

```

<output-removed>

```

#Add aggregates to the vserver. Your aggregate names may be different.

```

OPSK-02::>vserver add-aggregates -vserver netapp-vs -
aggregates aggr1 aggr2

```

#Add NFS protocols to the vserver (use tab-completion)

```

OPSK-02::> vserver nfs create -vserver netapp-vs -access
true -v3 enabled -tcp enabled -mount-rotonly enabled -nfs-
rotonly disabled -permitted-enc-types des,des3,aes-
128,aes-256 -showmount disabled -name-service-lookup-
protocol udp

```

The CDOT filer has now been configured for Manila.

OpenStack Server Configuration

Obtain an x86_64 server.

Setup 3 network interface cards on the box.

Ensure it has 16GB of memory, 100GB of disk space, and 1GbE networking.

Install Centos 7 on it. The version installed in the lab was:

CentOS Linux release 7.2.1511 (Core) with GUI

Networking Pre-Configuration

#Login to the server

```
[user@local-machine ~]$ ssh root@<external-network-  
interface-ip-address>
```

```
Password: <password>
```

#Turn NetworkManager off

```
[root@stlrx300s7-102 ~]$ service NetworkManager stop
```

```
[root@stlrx300s7-102 ~]$ chkconfig NetworkManager off
```

#For name resolution, use the following in /etc/resolv.conf

```
nameserver 8.8.8.8
```

```
nameserver 8.8.4.4
```

```
nameserver 127.0.0.1
```

As mentioned previously, there should be 3 interfaces on the CentOS server.

1. Interface1 connects to your LAN is the external interface
2. Interface2 connects to your private network
3. Interface3 connects to your storage network

	Interface 1	Interface 2	Interface 3
ID	enp8s0f0	enp4s0f1	enp4s0f0
IP Address	10.10.10.100	192.168.10.20	172.20.20.100
Network	10.10.10.0/24	192.168.10.0/24	172.20.20.0/24
Description	External Interface	Internal Interface	Storage Network Interface

The initial configuration of each of these interfaces is shown below, please adapt these to suit your networking.

#ifcfg- enp8s0f0

#Interface 1 initial configuration

TYPE=Ethernet

BOOTPROTO=static

IPADDR=10.10.10.100

```
NETMASK=255.255.255.0
GATEWAY=10.10.10.1
DNS1=10.60.60.100
DNS2=10.70.70.200
DEFROUTE=yes
PEERDNS=yes
PEERROUTES=yes
NAME=enp8s0f0
UUID=a82d2cc3-7e94-496f-9085-54c88ea6983b
DEVICE=enp8s0f0
ONBOOT=yes
```

```
#ifcfg- enp4s0f1
#Interface 2 initial configuration
TYPE=Ethernet
BOOTPROTO=static
IPADDR=192.168.10.20
NETMASK=255.255.255.0
DEFROUTE=no
NAME=enp4s0f1
UUID=6d6d7592-f005-4bc1-b5b3-377bdc4aa8b8
DEVICE=enp4s0f1
ONBOOT=yes
```

```
#ifcfg- enp4s0f0
#Interface 3 initial configuration
TYPE=Ethernet
BOOTPROTO=static
IPADDR=172.20.20.100
NETMASK=255.255.255.0
DEFROUTE=no
NAME=enp4s0f0
UUID=1844b13f-baaf-4708-96bc-a4e6bb6ecf60
DEVICE=enp4s0f0
ONBOOT=yes
```

Once the interfaces are configured according to your network infrastructure, please:

- ensure that you can ping other hosts in the external (LAN) and storage networks
- ensure that private network interface is up and configured with an IP address.

Use the command `ifconfig`

```
[root@stlrx300s7-36 network-scripts]# service network  
restart
```

```
Restarting network (via systemctl):
```

```
[ OK ]
```

```
#ping the Clustered Data ONTAP Cluster Management LIF
[root@stlrx300s7-36 network-scripts]$ ping 10.10.10.200
PING 10.10.10.200 (10.10.10.200) 56(84) bytes of data.
64 bytes from 10.10.10.200: icmp_seq=1 ttl=64 time=1.09 ms
...
```

```
#ping the Clustered Data ONTAP Data LIF
[root@stlrx300s7-36 network-scripts]# ping 172.20.20.200
PING 172.20.20.200 (172.20.20.200) 56(84) bytes of data.
64 bytes from 172.20.20.200: icmp_seq=1 ttl=255 time=0.180
ms
...
```

```
#ensure that the private network interface is UP
[root@stlrx300s7-36 network-scripts]# ifconfig enp4s0f1
enp4s0f1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.10.20 netmask 255.255.255.0
broadcast 192.168.10.255
    ether 00:19:99:e0:0b:75 txqueuelen 1000
(Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0
collisions 0
```

Create a new user for OpenStack RDO (optional-you may already have a user created, but it may be easier to follow future instructions if you create this user)

```
[root@stlrx300s7-102 ~]$ useradd rdouser
[root@stlrx300s7-102 ~]$ sudo visudo
```

#Make the following change (comment out the first line and uncomment the second line):

```
....
## Allows people in group wheel to run all commands
# %wheel          ALL=(ALL)          ALL

## Same thing without a password
%wheel ALL=(ALL)        NOPASSWD: ALL
....
```

```
#Add rdouser to wheel group
[rdouser@stlrx300s7-102 ~]$ usermod -aG wheel rdouser
```

```
[rdouser@stlrx300s7-102 ~ ]$ passwd rdouser
Password: <password>
Confirm: <password>
```

#Transfer the install script from your local machine

```
[user@local-machine ~ ] $ scp provision-packstack-mitaka.sh
rdouser@<external-interface-ip-address>: /home/rdouser
```

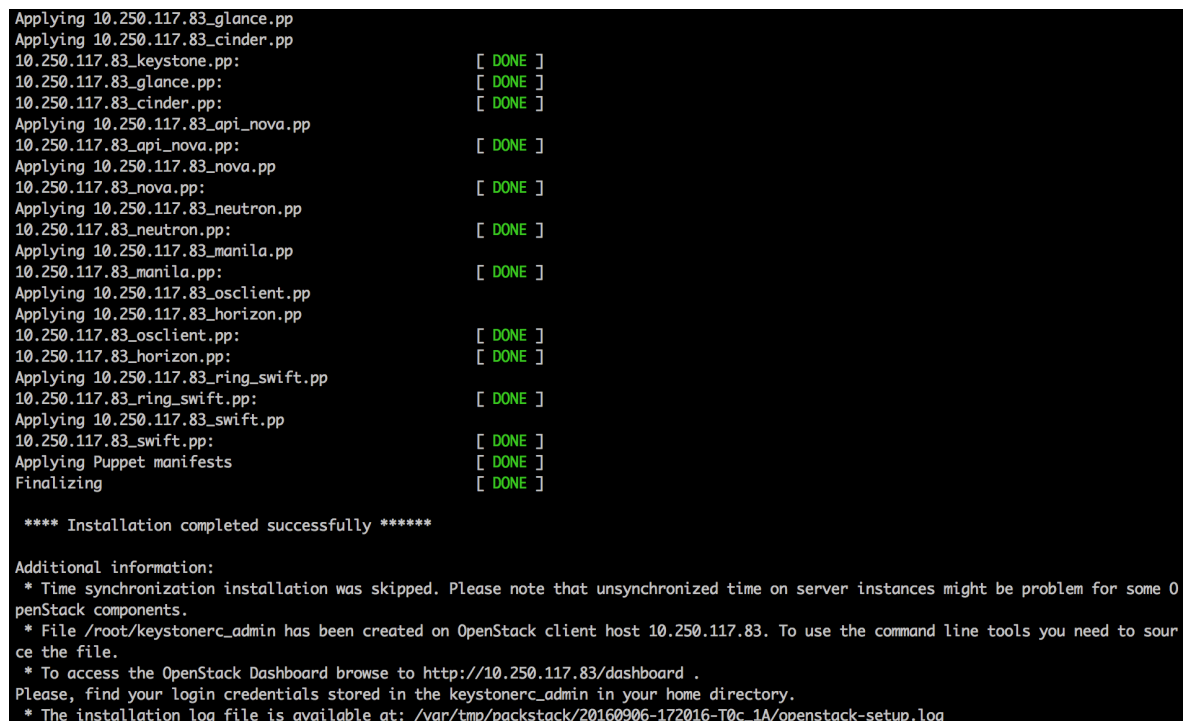
Install OpenStack Mitaka Using Script

```
$. /provision-packstack-mitaka.sh <answer-file-name>
<cluster-management-lif-ip-address> <vserver-name> <CDOT-
username> <CDOT-password> <external-ethernet-interface>
<private-ethernet-interface> <storage-ethernet-interface>
```

Example:

```
[rdouser@stlrx300s7-102 ~ ]$. /provision-packstack-mitaka.sh
ans.txt 10.10.10.200 netapp-vs admin Netapp123 enp8s0f0
enp4s0f1 enp4s0f0
```

Wait 30-45 mins for the install to complete. In order to assess your installation success, please scroll up on the console until you see a message similar to the screenshot below.



```
Applying 10.250.117.83_glance.pp
Applying 10.250.117.83_cinder.pp
10.250.117.83_keystone.pp: [ DONE ]
10.250.117.83_glance.pp: [ DONE ]
10.250.117.83_cinder.pp: [ DONE ]
Applying 10.250.117.83_api_nova.pp
10.250.117.83_api_nova.pp: [ DONE ]
Applying 10.250.117.83_nova.pp
10.250.117.83_nova.pp: [ DONE ]
Applying 10.250.117.83_neutron.pp
10.250.117.83_neutron.pp: [ DONE ]
Applying 10.250.117.83_manila.pp
10.250.117.83_manila.pp: [ DONE ]
Applying 10.250.117.83_osclient.pp
Applying 10.250.117.83_horizon.pp
10.250.117.83_osclient.pp: [ DONE ]
10.250.117.83_horizon.pp: [ DONE ]
Applying 10.250.117.83_ring_swift.pp
10.250.117.83_ring_swift.pp: [ DONE ]
Applying 10.250.117.83_swift.pp
10.250.117.83_swift.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 10.250.117.83. To use the command line tools you need to source the file.
* To access the OpenStack Dashboard browse to http://10.250.117.83/dashboard .
Please, find your login credentials stored in the keystonerc_admin in your home directory.
* The installation log file is available at: /var/tmp/packstack/20160906-172016-T0c_1A/openstack-setup.log
```

Note: You will need to scroll up to check on the installation success.

Setup Neutron Networking

Continue working on the OpenStack server.

#Source the keystone_admin file

```
[rdouser@stlrx300s7-102 ~] $. keystone_admin
```

#Create an external network and subnet. Note that you need to change the subnet configuration ip addresses to suit your networking. We have allocated a pool of 5 addresses in this example for OpenStack instances/VMs (10.10.10.160-165).

#Note: These ip addresses are not arbitrary. They have to match your topology.

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron net-  
create external-net --router:external --  
provider:physical_network exnet --provider:network_type  
flat
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron subnet-  
create external-net 10.10.10.0/24 --name external-subnet --  
allocation-pool start=10.10.10.160,end=10.10.10.165 --  
disable-dhcp --gateway 10.10.10.1
```

#Create a private network and subnet. You have to change the ip addresses to suit your networking.

#Note: These ip addresses are not arbitrary. They have to match your topology.

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron net-  
create private-net
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron subnet-  
create private-net 192.168.10.0/24 --name private-subnet --  
gateway 192.168.10.1
```

#Create a router between private and external networks

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron router-  
create pri-ext-router
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron router-  
interface-add pri-ext-router private-subnet
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron router-  
gateway-set pri-ext-router external-net
```

#Create a storage network and subnet. You have to change the ip addresses to suit your networking. We have again allocated a pool of 5 addresses for OpenStack VMs/instances. (172.20.20.180-185)

#Note: These ip addresses are not arbitrary. They have to match your topology.

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron net-
create storage-net --provider:physical_network stgnet --
provider:network_type flat
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron subnet-
create storage-net 172.20.20.0/24 --name storage-subnet --
allocation-pool start=172.20.20.180,end=172.20.20.185
```

Setup Security Group, Glance, Key-Pair, and Ubuntu Instance/VM

#Allow Security Group Access for VMs/instances

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova secgroup-
add-rule default tcp 1 65535 0.0.0.0/0
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova secgroup-
add-rule default udp 1 65535 0.0.0.0/0
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova secgroup-
add-rule default icmp -1 -1 0.0.0.0/0
```

#Create a Glance Image

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ curl
http://uec-images.ubuntu.com/trusty/current/trusty-server-
cloudimg-amd64-disk1.img | glance image-create --
name=ubuntu --container-format=bare --disk-format=qcow2
```

#Create a key-pair

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ mkdir
/home/rdouser/.ssh
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ ssh-keygen -t
rsa -N "" -f id_rsa
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ mv id_rsa
/home/rdouser/.ssh/
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ mv id_rsa.pub
/home/rdouser/.ssh/
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova keypair-
add openstack_key --pub-key /home/rdouser/.ssh/id_rsa.pub
```

#Get the network IDs for the private and storage networks

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ neutron net-
list
```

```
+-----+-----+-----+
| id | name |
+-----+-----+-----+
| 22bdde43-f4ae-4254-adac-b9f33274f2b6 | private-net |
| 143d2345-8314-448b-bde4-921bfa39a0b4 | 192.168.10.0/24 |
```

```
| 7e79c010-a71b-4261-beaa-b2ea25eefcd2 | storage-net |
14d911f6-6c9c-4664-a79c-f23b117c5189 172.20.20.0/24 |
| de1ddd64-b905-43de-bf3f-31b8f36f90c8 | external-net |
ee0f4aab-7bfa-4bb5-88c4-1796bc423f52 10.10.10.0/24 |
+-----+-----+-----+
-----+
```

#Create an instance using the network UUIDs from the previous command

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova boot --
flavor m1.medium --image ubuntu --key-name openstack_key --
nic net-id=<network-id-for-private> --nic net-id=<network-
id-for-storage> <instance-name>
```

#Example: Creating an instance called 'test'

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova boot --
flavor m1.medium --image ubuntu --nic net-id=22bdde43-f4ae-
4254-adac-b9f33274f2b6 --nic net-id=7e79c010-a71b-4261-
beaa-b2ea25eefcd2 test
```

#Create a floating IP address and associate it with the instance

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova floating-
ip-create external-net
+-----+-----+-----+
-----+
| Id | IP |
Server Id | Fixed IP | Pool |
+-----+-----+-----+
-----+
| f67ddc23-b6e3-4b6c-8a5c-9864c1153387 | 10.10.10.162 | -
| - | external-net |
+-----+-----+-----+
-----+
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova floating-
ip-associate test 10.10.10.162
```

#Wait until the instance is **Running** and has **3 ip addresses**

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ nova list
+-----+-----+-----+-----+
-----+
| ID | Name | Status |
Task State | Power State | Networks |
|
+-----+-----+-----+-----+
-----+
-----+
```

```
| 87b3c024-3e43-4f36-b85b-a23f4ba4a0f4 | test | ACTIVE | -
| Running | private-net=192.168.10.17, 10.10.10.162;
storage-net=172.20.20.182 |
+-----+-----+-----+-----+
-----+-----+-----+-----+
-----+-----+-----+-----+
```

You will connect to your Nova instance using its **floating ip address**.

Setup Manila and Create a Share

#Setup Manila to use Single Storage Virtual Machine Mode (Single SVM)

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ manila type-
create ontap_share false
```

#Create and enable access to the share

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ manila create -
-share-type ontap_share nfs 1
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ manila list
```

```
+-----+-----+-----+-----+
-----+-----+-----+-----+
-----+-----+-----+-----+
-----+
| ID | Name | Size |
Share Proto | Status | Is Public | Share Type | Export
location | Host |
|
+-----+-----+-----+-----+
-----+-----+-----+-----+
-----+-----+-----+-----+
-----+
| 02ff4bc6-5143-4d6d-b399-c47e377c601b | None | 1 | NFS
| creating | False | ontap_share |
172.20.20.200:/share_02ff4bc6_5143_4d6d_b399_c47e377c601b |
stlrx300s7-102@netapp#aggr2 |
+-----+-----+-----+-----+
-----+-----+-----+-----+
-----+-----+-----+-----+
-----+
+-----+-----+-----+-----+
```

```
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ manila access-
allow 02ff4bc6-5143-4d6d-b399-c47e377c601b ip 0.0.0.0/0
```

#Ensure that the share is **available**

```
[rdouser@stlrx300s7-102 rdouser(keystone_admin)]# manila
list
```

```

+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+
| ID | Name | Size |
Share Proto | Status | Is Public | Share Type | Export
location | Host
|
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+
| 02ff4bc6-5143-4d6d-b399-c47e377c601b | None | 1 | NFS
| available | False | ontap_share |
172.20.20.200:/share_02ff4bc6_5143_4d6d_b399_c47e377c601b |
stlrx300s7-102@netapp#aggr2 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+

```

#If the share is still being created, please run the `manila list` command again and wait.

Login to the Ubuntu Instance and Mount the Share

#Open new shell and ssh to the OpenStack Server

```
[user@local-machine]$ ssh root@10.10.10.100
```

#Login to the Ubuntu instance. The **external network ip address** (floating ip) indicated here can be obtained from the output of the `nova list` command from your other shell on OpenStack. (Highlighted)

```

[root@stlrx300s7-102 ~]$ su - rdouser
[rdouser@stlrx300s7-102 ~]$ . keystone_admin
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ ssh
ubuntu@10.10.10.162

```

#make the following change in `/etc/hosts`. "test" is the name of this instance (the value that was specified in the `nova boot` command)

```
root@test:~$ sudo vim /etc/hosts
```

#replace the following lines

```
#127.0.0.1 localhost
```

```
127.0.0.1 test
```

#make the following change to dns

```
root@test:~$ sudo vim /etc/resolv.conf
```

```
nameserver 8.8.8.8
```

```
#Setup Networking for eth1 – the storage network interface
```

```
ubuntu@test:~$ sudo su -
```

```
root@test:~$ apt-get install nfs-common -y
```

```
#update the eth1 interface
```

```
root@test:~$ vim /etc/network/interfaces.d/eth1.cfg
```

```
#insert the following lines for the secondary network interface
```

```
auto eth1
```

```
iface eth1 inet dhcp
```

```
#restart eth1
```

```
root@test:~$ ifdown eth1 && ifup eth1
```

```
#Ensure that eth1 has an ip address in the storage network
```

```
root@test:~$ ifconfig eth1
```

```
eth1      Link encap:Ethernet  HWaddr fa:16:3e:c5:cb:5a
          inet addr:172.20.20.182  Bcast:172.20.20.255
Mask:255.255.255.0
          inet6 addr: fe80::f816:3eff:fec5:cb5a/64
Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1400
Metric:1
          RX packets:1193 errors:0 dropped:0 overruns:0
frame:0
          TX packets:30 errors:0 dropped:0 overruns:0
carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:110852 (110.8 KB)  TX bytes:2846 (2.8
KB)
```

```
#Get the mount point of the share. Switch to the OpenStack shell and run manila
list
```

```
[rdouser@stlrx300s7-102 rdouser(keystone_admin)]# manila
list
```

```
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+
| ID                                     | Name | Size |
Share Proto | Status      | Is Public | Share Type | Export
location                                     | Host
|
```

```

+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+
| 02ff4bc6-5143-4d6d-b399-c47e377c601b | None | 1 | NFS
| available | False | ontap_share |
172.20.20.200:/share_02ff4bc6_5143_4d6d_b399_c47e377c601b |
stlrx300s7-102@netapp#aggr2 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+-----+-----+-----+
+-----+

```

#On the Ubuntu instance, mount the share using its export path

```
root@test:~$ exit
```

```
ubuntu@test:~$ sudo mkdir /mnt/nfs_share
```

```
ubuntu@test:~$ sudo mount -t nfs
```

```
172.20.20.200:/share_02ff4bc6_5143_4d6d_b399_c47e377c601b
/mnt/nfs_share
```

#Confirm that the share is mounted

```
root@test~# df -kh
```

```
Filesystem
```

```
Size Used Avail Use% Mounted on
```

```
udev
```

```
2.0G 12K 2.0G 1% /dev
```

```
tmpfs
```

```
396M 344K 396M 1% /run
```

```
/dev/disk/by-label/cloudimg-rootfs
```

```
40G 872M 37G 3% /
```

```
none
```

```
4.0K 0 4.0K 0% /sys/fs/cgroup
```

```
none
```

```
5.0M 0 5.0M 0% /run/lock
```

```
none
```

```
2.0G 0 2.0G 0% /run/shm
```

```
none
```

```
100M 0 100M 0% /run/user
```

```
172.20.20.200:/share_02ff4bc6_5143_4d6d_b399_c47e377c601b
973M 128K 973M 1% /mnt/nfs_share
```

#Ensure that the share is writable

```
ubuntu@test:~$ sudo ls /mnt/nfs_share
```

```
ubuntu@test:~$ sudo touch /mnt/nfs_share/file.txt
```

```
ubuntu@test:~$ sudo ls /mnt/nfs_share
```

```
file.txt
```

You have now setup Manila, created a share and accessed from an OpenStack instance. If your networking is setup to provide access to the storage network (with or without routing), you should also be able to create shares using Manila for clients outside the OpenStack cloud.

Setup Cinder and Create a Volume

On your CDOT, please create a FlexVol volume container, ensuring that your “**unix-permissions**” and “**junction-path**” are as shown below. You will use the junction path as the **Cinder back end** later.

```
OPSK-02::> volume create -vserver netapp-vs -volume
cinderbe -aggregate aggr1 -size 25G -state online -type RW
-policy default -unix-permissions ---rwxrwxrwx -security-
style unix -junction-path /cinderbe
```

The CDOT filer has now been configured for Cinder. We will perform the remaining steps on the OpenStack.

#change to the root user

```
[rdouser@stlrx300s7-102 rdouser(keystone_admin)]# sudo su
```

#”cd” to /etc/cinder and modify cinder.conf as shown below

```
[root@stlrx300s7-102 rdouser(keystone_admin)]#
cd /etc/cinder/
```

#edit cinder.conf as shown below. Pay particular attention to **netapp_server_hostname** (the CDOT IP Address), **netapp_password** (the CDOT password), and **netapp_vserver** (should be “netapp-vs”)

```
[root@stlrx300s7-35 cinder]# vim cinder.conf
```

...

...

...

```
enabled_backends=netapp
```

...

...

...

```
[netapp]
```

```
volume_backend_name=netapp
```

```
volume_driver=cinder.volume.drivers.netapp.common.NetAppDriver
```

```
netapp_server_hostname=10.10.10.200
```



```
| 83514593-ceff-4331-a5f7-e6add0f08d25 | ontap |
{u'volume_backed_name': u'netapp'} |
+-----+-----+-----+-----+
+-----+
```

#create a Cinder volume

```
[root@stlrx300s7-35 cinder(keystone_admin)]# cinder create
--volume-type ontap 1
```

<output-removed>

```
[root@stlrx300s7-35 cinder(keystone_admin)]# cinder list
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+
| ID | Status |
+-----+-----+-----+-----+-----+-----+
| Migration Status | Name | Size | Volume Type | Bootable |
+-----+-----+-----+-----+-----+-----+
| Multiattach | Attached to |
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+
| 7ad7e231-292a-45ac-ac7a-37149dcfc436 | available |
+-----+-----+-----+-----+-----+-----+
| - | - | 1 | ontap | false | False |
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+
```

#attach the cinder volume the "test" nova instance

```
[root@stlrx300s7-35 manila(keystone_admin)]# nova volume-
attach test 7ad7e231-292a-45ac-ac7a-37149dcfc436
```

```
+-----+-----+-----+-----+-----+
| Property | Value |
+-----+-----+-----+-----+-----+
| device | /dev/vdb |
| id | 7ad7e231-292a-45ac-ac7a-37149dcfc436 |
| serverId | 87b3c024-3e43-4f36-b85b-a23f4ba4a0f4 |
| volumeId | 7ad7e231-292a-45ac-ac7a-37149dcfc436 |
+-----+-----+-----+-----+-----+
```

#confirm that the volume is attached

```
[root@stlrx300s7-35 manila(keystone_admin)]# cinder list
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+
| ID | Status | Migration
+-----+-----+-----+-----+-----+-----+
| Status | Name | Size | Volume Type | Bootable | Multiattach
+-----+-----+-----+-----+-----+-----+
| | Attached to |
+-----+-----+-----+-----+-----+-----+
```

```

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1cae0e72-b8ae-4d42-9430-74380e4400ce | in-use |           -
| - | 1 | packstack | false | False |
87b3c024-3e43-4f36-b85b-a23f4ba4a0f4 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```

Login to the Ubuntu Instance and Use the Cinder Volume

#Open new shell and ssh to the OpenStack Server

```
[user@local-machine]$ ssh root@10.10.10.100
```

#Login to the Ubuntu instance. The **external network ip address** (floating ip) indicated here can be obtained from the output of the `nova list` command.

```

[root@stlrx300s7-102 ~]$ su - rdouser
[rdouser@stlrx300s7-102 ~]$ . keystone_admin
[rdouser@stlrx300s7-102 ~(keystone_admin)]$ ssh
ubuntu@10.10.10.162

```

#confirm that the 1GB volume is present and available for use

```
ubuntu@test:~$ lsblk
```

```
ubuntu@test4-ubuntu-updated:~$ lsblk
```

```

NAME      MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda       253:0    0  40G  0 disk
└─vda1    253:1    0  40G  0 part /
vdb       253:16   0   1G  0 disk

```

--end of instructions --

Troubleshooting

PackStack Install: RabbitMQ

PackStack install fails because rabbitmq-server cannot be started.

Ensure that that `/etc/hosts` and `/etc/hostname` are similar.

Example:

```

/etc/hosts
::1          localhost
127.0.0.1    centos7.corp.com    centos7

```

```
/etc/hostname
centos7
```

PackStack Install: NetworkManager

PackStack installs fail with NetworkManager errors.

Ensure that NetworkManager is stopped and turned off prior to PackStack install

```
$ service NetworkManager stop
$ chkconfig NetworkManager off
```

Commands on Nova, Cinder and Manila fail with “You must provide a user...” ERROR

Please source the keystoneadmin file if you see the following error when running commands:

ERROR: You must provide a user name through --os-username or env[OS_USERNAME].

```
$ source ~/keystonerc_admin
$ cinder list
```

```
+-----+-----+-----+-----+-----+-----+
|          ID          |          Status          |
Migration Status | Name | Size | Volume Type | Bootable |
Multiattach | Attached to |
+-----+-----+-----+-----+-----+-----+
|          ID          |          Status          |
+-----+-----+-----+-----+-----+-----+
|          ID          |          Status          |
+-----+-----+-----+-----+-----+-----+
|          ID          |          Status          |
+-----+-----+-----+-----+-----+-----+
```

Creating a Nova Instance Error

Nova instances don't boot and show an ERROR status almost immediately.

The Glance image you're using may be fetched from an outdated URL. For the latest URLs, please check <http://docs.openstack.org/image-guide/obtain-images.html#official-ubuntu-images>. In order to try with the new URL, please run the following command with the updated URL:

```
$ curl <replace-with-updated-image-url> | glance image-
create --name=ubuntu-updated --container-format=bare --
disk-format=qcow2
```

Use the ubuntu-updated image in your nova boot command.

```
$ nova boot --flavor m1.medium --image ubuntu-updated --  
key-name openstack_key test2
```

What were the changes made to manila.conf through the install script?

Manila.conf will have a new stanza called 'netapp' and this stanza will be enabled using the enabled_share_backends parameter.

```
#####  
# manila.conf      #  
#####...  
...  
enabled_share_backends=netapp  
...  
...  
[netapp]  
netapp_volume_name_template=share_%(share_id)s  
netapp_vserver_name_template=os_%s  
netapp_vserver=netapp-vs  
netapp_password=Netapp123  
driver_handles_share_servers=False  
netapp_server_port=80  
netapp_server_hostname=10.10.10.200  
netapp_transport_type=http  
netapp_login=admin  
netapp_storage_family=ontap_cluster  
netapp_aggregate_name_search_pattern=(.*)  
netapp_lif_name_template=os_%(net_allocation_id)s  
netapp_port_name_search_pattern=(.*)  
share_driver=manila.share.drivers.netapp.common.NetAppDrive  
r  
share_backend_name=netapp  
...  
....
```

Do I need to setup Manila first if I only want Cinder?

No, you don't need to setup Manila for Cinder. However, in order to setup Cinder, you should setup CDOT first and install OpenStack. To setup only Cinder, your sequence of steps will be:

1. Architecture
2. Setup Clustered Data ONTAP (CDOT)
3. OpenStack Server Configuration
4. Networking Pre-Configuration

5. Install OpenStack Mitaka Using Script
6. Setup Neutron Networking
7. Setup Security Group, Glance, Key-Pair, And Ubuntu Instance/VM
8. Setup Cinder and Create a Volume
9. Login to the Ubuntu Instance and Use the Cinder Volume

Acknowledgments

The author would like to thank Dave Cain for his guidance and feedback.