Deploying OpenShift 3.9 Cluster

################################

Infrastructure Setup:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Hostname IP Address CPUs RAM HDD OS

master.cse.iitb.ac.in 10.129.132.111 4 16 GB (1000 GB) CentOS7.6

node1.cse.iitb.ac.in 10.129.132.101 4 8 GB (1000 GB) CentOS7.6

node2.cse.iitb.ac.in 10.129.132.108 2 4 GB (500 GB) CentOS7.6

node3.cse.iitb.ac.in 10.129.132.112 2 2 GB (500 GB) CentOS7.6

#################################

# Preparing Nodes: #

#################################

Step 1: Set the hostname:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

[root@master ~]# hostnamectl set-hostname master.cse.iitb.ac.in # For master node

Use the above command to set the hostname for other nodes accordingly.

Configure /etc/hosts file for name resolution as following on all nodes:

~]# vim /etc/hosts

10.129.132.111 master.cse.iitb.ac.in master

10.129.132.101 node1.cse.iitb.ac.in node1

10.129.132.108 node2.cse.iitb.ac.in node2

10.129.132.112 node3.cse.iitb.ac.in node3

Step2 : Configure Static Ips on all nodes and master .

Step 3: Use the below command to update the System on all nodes:

~]# yum update -y

Use the below command to compare the kernel on all nodes:

~]# echo "Latest Installed Kernel : $(rpm -q kernel --last | head -n 1 | awk '{print $1}')" ; echo "Current Running Kernel : kernel-$(uname -r)"

If you have different kernel in above command output, then you need to reboot all the system. otherwise jump to Step 4.

~]# reboot

Step 4: Once the systems came back UP/ONLINE, Install the following Packages on all nodes:

~]# yum install -y wget git nano net-tools docker-1.13.1 bind-utils iptables-services bridge-utils bash-completion kexec-tools sos psacct openssl-devel httpd-tools NetworkManager python-cryptography python-devel python-passlib java-1.8.0-openjdk-headless "@Development Tools"

Step 5: Configure Ansible Repository on master Node only.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

[root@master ~]# vim /etc/yum.repos.d/ansible.repo

[ansible]

name = Ansible Repo

baseurl = https://releases.ansible.com/ansible/rpm/release/epel-7-x86\_64/

enabled = 1

gpgcheck = 0

:wq (save and exit)

Step 6: Start and Enable NetworkManager and Docker Services on all nodes:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

~]# systemctl start NetworkManager

~]# systemctl enable NetworkManager

~]# systemctl status NetworkManager

~]# systemctl start docker && systemctl enable docker && systemctl status docker

Step 7: Install Ansible Package and Clone Openshift-Ansible Git Repo on Master Machine :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

[root@master ~]# yum -y install ansible-2.6\* pyOpenSSL

[root@master ~]# git clone https://github.com/openshift/openshift-ansible.git

[root@master ~]# cd openshift-ansible && git fetch && git checkout release-3.9

Step 8: Generate SSH Keys on Master Node and install it on all nodes:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

[root@master ~]# ssh-keygen -f ~/.ssh/id\_rsa -N ''

[root@master ~]# for host in master.cse.iitb.ac.in node1.cse.iitb.ac.in node2.cse.iitb.ac.in node3.cse.iitb.ac.in ; do ssh-copy-id -i ~/.ssh/id\_rsa.pub $host; done

Step 9: Now Create Your Own Inventory file for Ansible as following on master Node:

[root@master ~]# vim ~/inventory.ini

[OSEv3:children]

masters

nodes

etcd

[masters]

master.cse.iitb.ac.in openshift\_ip=10.129.132.111

[etcd]

master.cse.iitb.ac.in openshift\_ip=10.129.132.111

[nodes]

master.cse.iitb.ac.in openshift\_ip=10.129.132.111 openshift\_schedulable=true

node1.cse.iitb.ac.in openshift\_ip=10.129.132.101 openshift\_schedulable=true openshift\_node\_labels="{'region': 'infra', 'zone': 'default'}"

node2.cse.iitb.ac.in openshift\_ip=10.129.132.108 openshift\_schedulable=true openshift\_node\_labels="{'region': 'primary', 'zone': 'default'}"

node3.cse.iitb.ac.in openshift\_ip=10.129.132.112 openshift\_schedulable=true openshift\_node\_labels="{'region': 'primary', 'zone': 'default'}"

[OSEv3:vars]

debug\_level=4

ansible\_ssh\_user=root

enable\_excluders=False

enable\_docker\_excluder=False

openshift\_enable\_service\_catalog=False

ansible\_service\_broker\_install=False

containerized=True

os\_sdn\_network\_plugin\_name='redhat/openshift-ovs-multitenant'

openshift\_disable\_check=disk\_availability,docker\_storage,memory\_availability,docker\_image\_availability

openshift\_node\_kubelet\_args={'pods-per-core': ['10']}

deployment\_type=origin

openshift\_deployment\_type=origin

openshift\_release=v3.9.0

openshift\_pkg\_version=-3.9.0

openshift\_image\_tag=v3.9.0

openshift\_service\_catalog\_image\_version=v3.9.0

template\_service\_broker\_image\_version=v3.9.0

osm\_use\_cockpit=true

# put the router on dedicated infra node

openshift\_hosted\_router\_selector='region=infra'

openshift\_master\_default\_subdomain=apps.cse.iitb.ac.in

openshift\_public\_hostname=master.cse.iitb.ac.in

# put the image registry on dedicated infra node

openshift\_hosted\_registry\_selector='region=infra'

# use htpasswd authentication with demo/demo

openshift\_master\_identity\_providers=[{'name': 'htpasswd\_auth', 'login': 'true', 'challenge': 'true', 'kind': 'HTPasswdPasswordIdentityProvider', 'filename': '/etc/origin/master/htpasswd'}]

openshift\_master\_htpasswd\_users={'demo': '$apr1$.MaA77kd$Rlnn6RXq9kCjnEfh5I3w/.'}

:wq (save and exit)

Step 10: Use the below ansible playbook command to check the prerequisites to deply OpenShift Cluster on master Node:

[root@master ~]# ansible-playbook -i ~/inventory.ini playbooks/prerequisites.yml

#################################################################################################

# NOTE: #

# If you want to speed up Openshift Cluster Installation, #

# then you have to pre-pull the below docker images on mentioned nodes. #

# otherwise, the below images will be pulled during the installation. #

# #

# docker pull registry.fedoraproject.org/latest/etcd:latest # Only on master #

# docker pull docker.io/openshift/openvswitch:v3.9.0 # on all nodes #

# docker pull docker.io/openshift/node:v3.9.0 # on all nodes #

# docker pull docker.io/openshift/origin:v3.9.0 # on all nodes #

# #

#################################################################################################

Step 11: Once prerequisites completed without any error use the below ansible playbook to Deploy OpenShift Cluster on master Node:

[root@master ~]# ansible-playbook -i ~/inventory.ini playbooks/deploy\_cluster.yml

Now you have to wait approx 20-30 Minutes to complete the Installation.

Step 12: Once the Installation is completed, Create a admin user in OpenShift with Password "Pas$$w0rd" from master Node:

[root@master ~]# ls -l /etc/origin/master/htpasswd

[root@master ~]# cat /etc/origin/master/htpasswd

[root@master ~]# htpasswd /etc/origin/master/htpasswd admin

New password: Pas$$w0rd

Re-type new password: Pas$$w0rd

[root@master ~]# cat /etc/origin/master/htpasswd

Step 13: Use the below command to assign cluster-admin Role to admin user:

[root@master ~]# oc adm policy add-cluster-role-to-user cluster-admin admin

Step 14: Use the below command to login as admin user on CLI:

[root@master ~]# oc login

Username: admin

Password: Pas$$w0rd

[root@master ~]# oc whoami

Step 15: Use below command to list the projects, pods, nodes, Replication Controllers, Services and Deployment Config.

[root@master ~]# oc get projects

[root@master ~]# oc get nodes

[root@master ~]# oc get pod --all-namespaces

[root@master ~]# oc get rc

[root@master ~]# oc get svc

[root@master ~]# oc get dc

Verifying Multiple etcd Hosts:

##############################

On a master host, verify the etcd cluster health, substituting for the FQDNs of your etcd hosts in

the following:

[root@master ~]# yum install etcd

[root@master ~]# etcdctl -C https://master.cse.iitb.ac.in:2379 --ca-file=/etc/origin/master/master.etcd-ca.crt --cert-file=/etc/origin/master/master.etcd-client.crt --key-file=/etc/origin/master/master.etcd-client.key cluster-health

Also verify the member list is correct:

[root@master ~]# etcdctl -C https://master.cse.iitb.ac.in:2379 --ca-file=/etc/origin/master/master.etcd-ca.crt --cert-file=/etc/origin/master/master.etcd-client.crt --key-file=/etc/origin/master/master.etcd-client.key member list

Step 16: Now you can access OpenShift Cluster using Web Browser as following:

https://master.cse.iitb.ac.in:8443

Username: admin

Password: Pas$$w0rd

Step 17: Now Create a Demo Project

Click on "Create Project"

Name: demo

Display Name: demo

Description: Demo Project

Click on Create.

Step 18: Now Deploy an application in demo project for testing:

Click in demo project -> Click on Brows Catalog -> Select PHP -> Next

Version : 7.0 - latest

Application Name: testapp

Git Repo: https://github.com/sureshchandrarhca15/OpenShift39.git

Next -> Finish.

Now click on Overview in demo project

See, testapp build is running. so wait for build completion.

Once build completed, there is a Pod Running for testapp and will have an URL as below:

http://testapp-demo.apps.cse.iitb.ac.in

Now click on Pod Icon to get the details.

In my case, this pod is running on node2.cse.iitb.ac.in system, so at this point we don't have DNS to resolve App URL.

I am using /etc/hosts file to resolve it using infra node IP Address. because on infra node our router pod is running so all traffic will redirect from infra node in OpenShift Cluster.

~]# vim /etc/hosts

#Add the below line

10.129.132.101 testapp-demo.apps.cse.iitb.ac.in

:wq (save and exit)

Now Click on Pod URL Link and application should be accessible.

NOTE: You have to configure /etc/hosts file on that system from where you are accessing the Openshift Dashboard.

######################################

1. While Running deploy\_cluster.yml

In the task Running Handler [openshift\_master:restart master-controllers]

Error :- Starting openshift.io/sdn

IP: 10.128.0.0 conflicts with host network : 10.129.132.0/24

Resolution :- vi /etc/origin/master/master-config.yaml

under networkconfig-

change clusternetwork CIDR from 14 to 16.