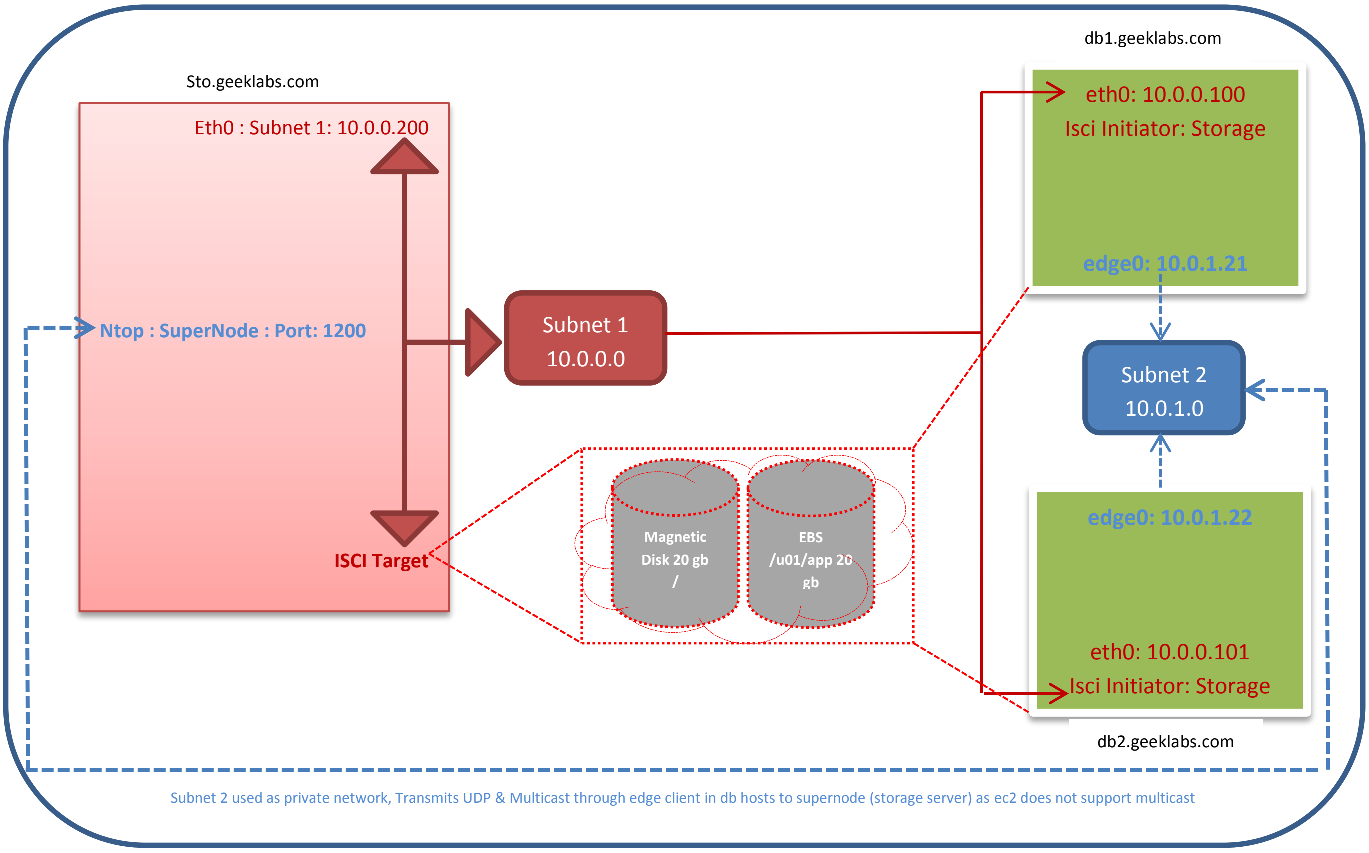
Installing Two Node RAC in Amazon Cloud



Subnet 2 used as private network, Transmits UDP & Multicast through edge client in db hosts to supernode (storage server) as ec2 does not support multicast

Node Configurations

Details	Sto.geeklabs.com	Db1.geeklabs.com	Db2.geeklabs.com
AWS Type	Ec2	Ec2	Ec2
Instance Class	M3.medium	M3.medium	M3.medium
Multicast Support	Ntop- Super Node	Ntop – edge	Ntop-edge
Shared Storage	iSCSi Target	iSCSi Initiator	iSCSi Initiator
Storage Type	EBS/Magnetic	EBS/Magnetic	EBS/Magnetic
Storage Size	Root Volume – 20gb EBS Volumes – 10 gb * 2	Root Volume- 20gb	Root Volume -20gb
VPC	Custom VPC Internet gate Way Enabled	Custom VPC Internet gate Way Enabled	Custom VPC Internet gate Way Enabled
Public Subnet	Subnet 1 : 10.0.0.74	Subnet 1 : 10.0.0.233	Subnet 1 : 10.0.0.83
Secondary Public IP’s	Nil	Subnet 1 : 10.0.0.100 (VIP) Subnet 1 : 10.0.0.101 (SCAN) Subnet 1 : 10.0.0.102 (SCAN) Subnet 1 : 10.0.0.103 (SCAN)	Subnet 1 : 10.0.0.104 (VIP)
Private Subnet	Nil	Subnet 2: 10.0.1.21	Subnet 2: 10.0.1.22
OS - AWS Image	OEL 5.11 UEK ami-c5b2dfff	OEL 5.11 UEK ami-c5b2dfff	OEL 5.11 UEK ami-c5b2dfff

High Level Steps

1. Configuring Custom VPC & Public & Private Subnets
2. Create AWS Linux EC2 Instance with AWS Cli Tools
3. Creating a Key Pair & Download
4. Creating & Configuring Storage Node
5. Creating & Configuring Database Nodes (db1,db2)
6. Install & Configure 12c Grid Infrastructure
7. Install & Configure 12c RAC Database

Configuring Custom VPC & Public & Private Subnets

#Creating & Configuring VPC

```
aws ec2 create-vpc --cidr-block 10.0.0.0/16
aws ec2 create-tags --tags Key=Name,Value=MyRacVPC --resources vpc-c90f2828
aws ec2 modify-vpc-attribute --vpc-id vpc-c90f2828 --enable-dns-support
aws ec2 modify-vpc-attribute --vpc-id vpc-c90f2828 --enable-dns-hostnames
```

#Creating & Configuring Internet Gateway

```
aws ec2 create-internet-gateway
aws ec2 attach-internet-gateway --internet-gateway-id igw-928503f7 --vpc-id vpc-c90f2828
aws ec2 describe-route-tables --filters "Name=vpc-id,Values=vpc-c90f2828"
aws ec2 create-route --route-table-id rtb-66c52922 --destination-cidr-block 0.0.0.0/0 --gateway-id igw-928503f7
aws ec2 create-subnet --vpc-id vpc-c90f2828 --cidr-block 10.0.0.0/24
aws ec2 create-tags --resources subnet-ff223939 --tags Key=Name,Value=Subnet1
```

#Creating & Configuring Security Group

```
aws ec2 create-security-group --group-name MyRACSecurityGroup --description "My RAC Security Group" --vpc-id vpc-c90f2828
aws ec2 authorize-security-group-ingress --group-id sg-2ae22282 --protocol -1 --port -1 --source-group sg-2ae22282
```

#Creating Security Key Pair

```
aws ec2 create-key-pair --key-name MyRACKeyPair
chmod 600 MyRACKeyPair.pem
```

#Creating Storage Node

```
aws ec2 run-instances --image-id ami-c5b2dfff --instance-type m3.medium  --key MyRACKeyPair \
--placement AvailabilityZone=ap-southeast-2b --associate-public-ip-address --subnet subnet-ff223939 \
--private-ip-address 10.0.0.11 --security-group-ids sg-2ae22282 \
--block-device-mappings
'[{"DeviceName":"/dev/xvda","Ebs":{"VolumeSize":15,"DeleteOnTermination":true,"VolumeType":"standard"}}]' \
--block-device-mappings
'[{"DeviceName":"/dev/xvdb","Ebs":{"VolumeSize":10,"DeleteOnTermination":true,"VolumeType":"standard"}}]' \
--block-device-mappings
'[{"DeviceName":"/dev/xvdc","Ebs":{"VolumeSize":10,"DeleteOnTermination":true,"VolumeType":"standard"}}]' \

aws ec2 create-tags --resources i-79aewi22 --tags Key=Name,Value=sto1
```

#Creating DB1 Node

```
aws ec2 run-instances --image-id ami-c5b2dfff --instance-type m3.medium  --key MyRACKeyPair \
--placement AvailabilityZone=ap-southeast-2b --associate-public-ip-address --subnet subnet-ff223939 \
--private-ip-address 10.0.0.11 --secondary-private-ip-address-count  4 --security-group-ids sg-2ae22282 \
--block-device-mappings
'[{"DeviceName":"/dev/xvda","Ebs":{"VolumeSize":20,"DeleteOnTermination":true,"VolumeType":"standard"}}]'

aws ec2 create-tags --resources i-7e7375bb --tags Key=Name,Value=db1
```

#Creating DB2 Node

```
aws ec2 run-instances --image-id ami-c5b2dfff --instance-type m3.medium  --key MyRACKeyPair \
--placement AvailabilityZone=ap-southeast-2b --associate-public-ip-address --subnet subnet-ff223939 \
--private-ip-address 10.0.0.11 --secondary-private-ip-address-count  1 --security-group-ids sg-2ae22282 \
--block-device-mappings
'[{"DeviceName":"/dev/xvda","Ebs":{"VolumeSize":20,"DeleteOnTermination":true,"VolumeType":"standard"}}]'


aws ec2 create-tags --resources i-7e7375bb --tags Key=Name,Value=db2
```

Configure Storage Node

1. Install Oracle Validated Package

```
yum install oracle-validated –y
yum install unzip -y
yum install unzip -y
yum update perl -y
yum install perl -y
yum install net-snmp -y
yum install net-snmp-utils -y
yum install "perl(LWP)" -y
yum -y install svn make gcc s3cmd -y
yum -y install svn -y
yum -y install subversion make gcc s2cmd -y
yum install scsi-target-utils -y
```

2. Configure Network & HostName

```
cp /etc/sysconfig/network /etc/sysconfig/network.orig
sed 's/^HOSTNAME=.*/HOSTNAME=sto1.geekslabs.com/' /etc/sysconfig/network.orig
>/etc/sysconfig/network
echo "`ifconfig eth0 | grep "inet addr" | cut -d ":" -f2 | cut -d " " -f1` sto1.geekslabs.com sto1"
>> /etc/hosts
```

3. Configure Swap Disk

```
dd if=/dev/zero of=/swapfile1 bs=1024 count=2097152
chown root:root /swapfile1
chmod 0600 /swapfile1
mkswap /swapfile1
swapon /swapfile1
vi /etc/fstab
        /swapfile1 none swap sw 0 0
```

4. Install Ntop – SuperNode & Edge

```
svn co https://svn.ntop.org/svn/ntop/trunk/n2n
cd n2n_v2
sed -i "s/#N2N_OPTION_AES=no/N2N_OPTION_AES=no/g" Makefile
sed -i "s/#define N2N_COMPRESSION_ENABLED 1/#define N2N_COMPRESSION_ENABLED 0/g" n2n.h
make
cp ./supernode /usr/bin/
supernode -l 1200
```

5. Install iSCSi Target & Configure Disks

```
fdisk /dev/xvdb
input → n
input→ p
input →1
input →enter
input → enter
intput →w
Repeat for disk /dev/xvdc
```

```
service tgtd start
chkconfig tgtd on
vi /etc/tgt/targets.conf
            <target sto1:drive1>
             backing-store /dev/xvdb1
             backing-store /dev/xvdc1
            </target>
service tgtd restart
```

6. Disable Firewall

```
service iptables stop
chkconfig iptables off
```

Configure db1 node

1. Install Oracle Validated Package

```
yum install oracle-validated –y
yum install oracle-rdbms-server-12cR1-preinstall -y
yum install unzip -y
yum install unzip -y
yum update perl -y
yum install perl -y
yum install net-snmp -y
yum install net-snmp-utils -y
yum install "perl(LWP)" -y
yum -y install svn make gcc s3cmd -y
yum -y install svn -y
yum -y install subversion make gcc s2cmd -y
yum install scsi-target-utils –y
yum install iscsi-initiator-utils -y
```

2. Install Ntop Edge and configure Private Network

```
Copy the edge binary from sto1 server to db1 host
scp edge db1.geekslabs.com:/usr/bin/edge
#Start the edge service and enable route
edge -l stocell1:1200 -c Intershop -a 10.1.0.21  -E >> /etc/rc.local
route add -net 224.0.0.0 netmask 240.0.0.0 dev edge0
route add -net 169.254.0.0 netmask 255.255.0.0 dev edge0
```

3. Configure Public Network

```
#Get the IP Addresses & Update the /etc/hosts
echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '5p'` db1.geekslabs.com db1" >> /etc/hosts

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '1p'` db1-vip.geekslabs.com db1-vip"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '2p'` db-scan.geekslabs.com db-scan"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '3p'` db-scan.geekslabs.com db-scan"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '4p'` db-scan.geekslabs.com db-scan"
```

4. Configure Storage Server Details

```
#Get the IP Addresses & Update the /etc/hosts
echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '5p'` sto1.geekslabs.com sto1" >> /etc/hosts
```

5. Configure iSCSi Initiator and Scan the disks from Storage Server

```
service iscsi start
chkconfig iscsi on
scsiadm --mode discoverydb --type sendtargets --portal sto1:3260 --discover
service iscsi restart
```

6. Configure Oracleasm and provision the disks

```
#Download the oracleasm rpm
wget http://oss.oracle.com/projects/oracleasm-support/dist/files/RPMS/rhel5/amd64/2.1.8/oracleasm-support-2.1.8-1.el5.x86_64.rpm

wget http://download.oracle.com/otn_software/asmlib/oracleasmlib-2.0.4-1.el5.x86_64.rpm

#Install the RPMS’s
rpm –ivu oracleasm-support-2.1.8-1.el5.x86_64.rpm  oracleasmlib-2.0.4-1.el5.x86_64.rpm

#Install the oracleasm
oracleasm configure –i
input → oracle
input → oinstall
input → y
input → y

#Create Provision Disk
oracleasm createdisk CRSVOL1 /dev/xvdb1
oracleasm createdisk DATAVOL1 /dev/xvdc1

#Scan & List Disks
oracleasm scandisks
oracleasm listdisks
```

7. Disable NTP & Firewall

```
service ntpd stop;  chkconfig ntpd of
mv /etc/ntp.conf /etc/ntp.conf.orig ; rm /var/run/ntpd.pid ; service iptables stop ; chkconfig iptables off
```

Configure db2 node

1. Install Oracle Validated Package

```
yum install oracle-validated –y
yum install oracle-rdbms-server-12cR1-preinstall -y
yum install unzip -y
yum install unzip -y
yum update perl -y
yum install perl -y
yum install net-snmp -y
yum install net-snmp-utils -y
yum install "perl(LWP)" -y
yum -y install svn make gcc s3cmd -y
yum -y install svn -y
yum -y install subversion make gcc s2cmd -y
yum install scsi-target-utils –y
yum install iscsi-initiator-utils -y
```

2. Install Ntop Edge and configure Private Network

```
Copy the edge binary from sto1 server to db1 host
scp edge db2.geekslabs.com:/usr/bin/edge
#Start the edge service and enable route
edge -l stocell1:1200 -c Intershop -a 10.1.0.22  -E >> /etc/rc.local
route add -net 224.0.0.0 netmask 240.0.0.0 dev edge0
route add -net 169.254.0.0 netmask 255.255.0.0 dev edge0
```

3. Configure Public Network

```
#Get the IP Addresses & Update the /etc/hosts
echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '5p'` db2.geekslabs.com db2" >> /etc/hosts

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '1p'` db2-vip.geekslabs.com db2-vip"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '2p'` db-scan.geekslabs.com db-scan"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '3p'` db-scan.geekslabs.com db-scan"

echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n +4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '4p'` db-scan.geekslabs.com db-scan"
```

4. Configure Storage Server Details

```
#Get the IP Addresses & Update the /etc/hosts
echo "`aws ec2 describe-instances --instance-id "i-398879e8" | grep "PrivateIpAddress" | tail -n
+4 | head -5 | cut -d ':' -f2 | tr -d ' "' | sed -n '5p'` sto1.geekslabs.com sto1" >> /etc/hosts
```

5. Configure iSCSi Initiator and Scan the disks from Storage Server

```
service iscsi start
chkconfig iscsi on
scsiadm --mode discoverydb --type sendtargets --portal sto1:3260 --discover
service iscsi restart
```

6. Configure Oracleasm and provision the disks

```
#Download the oracleasm rpm
wget http://oss.oracle.com/projects/oracleasm-support/dist/files/RPMS/rhel5/amd64/2.1.8/oracleasm-support-2.1.8-1.el5.x86_64.rpm

wget http://download.oracle.com/otn_software/asmlib/oracleasmlib-2.0.4-1.el5.x86_64.rpm

#Install the RPMS’s
rpm –ivu oracleasm-support-2.1.8-1.el5.x86_64.rpm  oracleasmlib-2.0.4-1.el5.x86_64.rpm

#Install the oracleasm
oracleasm configure –i
input → oracle
input → oinstall
input → y
input → y

#Scan & List Disks , Disk Should be visible if not check you are reachable to sto1 server
oracleasm scandisks
oracleasm listdisks
```

7. Disable NTP & Firewall

```
service ntpd stop;  chkconfig ntpd of
mv /etc/ntp.conf /etc/ntp.conf.orig ; rm /var/run/ntpd.pid; ; service iptables stop ; chkconfig iptables off
```

Installing Grid Infrastructure

1. Copy the Software

```
Using winscp if you already have a software or download from the oracle site
mkdir /u01/stage
wget
cd /u01/stage
unzip *.zip
```

2. Create Directories & Update Permissions

```
mkdir -p  /u01/app/12.1.0.1/grid
mkdir -p /u01/app/oracle/product/12.1.0.1/db_1
chown -R oracle:oinstall /u01
chmod -R 775 /u01/
```

3. Run Userequivalency Setup

```
cd /u01/stage/grid
./sshUserSetup.sh -user oracle -hosts "db1 db2" -noPromptPassphrase
```

4. Run Cluster Verfication Utility

```
cd /u01/stage/grid
runcluvfy.sh stage -pre crsinst -n ol6-121-rac1,ol6-121-rac2 -verbose
```

5. Edit the response file , vi /u01/stage/grid/response/grid_response.rsp (change as below)

```
< ORACLE_HOSTNAME=db1.geekslabs.com
< INVENTORY_LOCATION=/u01/app/oraInventory
< oracle.install.option=CRS_CONFIG
< ORACLE_BASE=/u01/app/oracle
< ORACLE_HOME=/u01/app/12.1.0.1/grid
< oracle.install.asm.OSDBA=asmdba
< oracle.install.asm.OSASM=asmadmin
< oracle.install.crs.config.gpnp.scanName=myrac-scan.geekslabs.com
< oracle.install.crs.config.gpnp.scanPort=1521
< oracle.install.crs.config.ClusterType=STANDARD
< oracle.install.crs.config.clusterName=geekcluster
< oracle.install.crs.config.gpnp.configureGNS=false
< oracle.install.crs.config.autoConfigureClusterNodeVIP=false
< oracle.install.crs.config.clusterNodes=db1.geekslabs.com:myrac01-
vip.geekslabs.com,db2.geekslabs.com:myrac02-vip.geekslabs.com
< oracle.install.crs.config.networkInterfaceList=eth0:10.0.0.0:1,edge0:10.1.0.0:2
< oracle.install.crs.managementdb.configure=false
< oracle.install.crs.config.storageOption=LOCAL_ASM_STORAGE
< oracle.install.crs.config.useIPMI=false
< oracle.install.asm.SYSASMPassword=admin123
< oracle.install.asm.diskGroup.name=OCRDG
< oracle.install.asm.diskGroup.redundancy=EXTERNAL
<
oracle.install.asm.diskGroup.disks=/dev/oracleasm/disks/CRSVOL1,/dev/oracleasm/disks/CRSVOL2,/dev/oracleasm/d
isks/CRSVOL3
< oracle.install.asm.diskGroup.diskDiscoveryString=/dev/oracleasm/disks/*
< oracle.install.asm.monitorPassword=admin123
```

6. Run Installer

```
cd /u01/stage/grid
./runInstaller -silent -responseFile /home/oracle/grid_install.rsp -
ignoreSysprereqs -showProgress -ignorePrereq
```

7. Run Root.sh in Node 1

```
cd /u01/app/oraInventory
./orarootInst.sh

Cd /u01/app/12.1.0.1/grid
./root.sh

#** IMPORTANT DO NOT SKIP*  Root.sh may fail in node 2, due to HAIP issues, to fix this log to ASM
Instance in db1 and set cluster_interconnect parameters

su – oracle
. oraenv
+ASM1
sqlplus / as sysasm
SQL> alter system set cluster_interconnects=”10.0.1.21” scope=spfile sid=’+ASM1’;
SQL> alter system set cluster_interconnects=”10.0.1.22” scope=spfile sid=’+ASM2’;
```

8. Run Root.sh in Node 2

```
cd /u01/app/oraInventory
./orarootInst.sh

Cd /u01/app/12.1.0.1/grid
./root.sh
```

9. Configure Failover for SCAN & VIP (EC2 Specific)

```
#Run the Configure_EC2_VIP.sh to configure a Elastic VIP Failover (Specific to AWS as EC2 ip cannot
failover)

Place the scripts ec2_vip_failover.sh to /etc/oracle
Copy the Configure_EC2_VIP.sh to /home/oracle
cd/home/oracle
./Configure_EC2_VIP.sh
```

10. Check the status of the Cluster

```
crsctl stat res  -t –init
crsctl stat res -t
```

Installing RAC Database

1. Copy the Software

2. Edit the Response File, vi /u01/stage/database/response/db_install.rsp

```
oracle.install.option=INSTALL_DB_SWONLY
ORACLE_HOSTNAME=db1
UNIX_GROUP_NAME=oinstall
INVENTORY_LOCATION=/u02/app/oraInventory
ORACLE_HOME=/u01/app/oracle/product/12.1.0/db_1
ORACLE_BASE=/u01/app/oracle
oracle.install.db.InstallEdition=EE
oracle.install.db.DBA_GROUP=dba
oracle.install.db.OPER_GROUP=oper
oracle.install.db.BACKUPDBA_GROUP=dba
oracle.install.db.DGDBA_GROUP=asmadmin
oracle.install.db.KMDBA_GROUP=dba
SECURITY_UPDATES_VIA_MYORACLESUPPORT=false
DECLINE_SECURITY_UPDATES=true
```

3. Install Database Software

```
Cd /u01/stage/database
./runInstaller -silent -ignoresysprereqs -responsefile
/home/oracle/database/response/db_install.rsp

Once installed, run root.sh in both nodes
```

4. Create Disk Group DATA to hold the database files

```
On db1 node as Oracle User
. oraenv
+ASM1
sqlplus / as sysasm
create diskgroup DATA external redundancy disk ‘/dev/oracleasm/disks/DATAVOL1’;
alter diskgroup DATA set attribute ‘compatible.rdbms’=’12.1.0’ ;
srvctl start diksgroup DATA –n db2
```

5. Create Database Using DBCA

```
./dbca -silent \
        -createDatabase \
        -templateName General_Purpose.dbc \
        -gdbName db12c \
        -sid db12c     \
        -SysPassword oracle123 \
        -createAsContainerDatabase true \
           -numberofPDBs 1 \
           -pdbName PDB1 \
        -SystemPassword oracle123 \
        -emConfiguration NONE  \
        -redoLogFileSize 100   \
        -recoveryAreaDestination FRA \
        -storageType ASM             \
          -asmsnmpPassword oracle123 \
          -asmSysPassword oracle123  \
          -diskGroupName DATA \
        -listeners LISTENER   \
        -registerWithDirService false \
        -characterSet AL32UTF8 \
        -nationalCharacterSet AL16UTF16 \
        -databaseType MULTIPURPOSE \
        -nodelist db1,db2 \
        -initparams
audit_file_dest='/u01/app/oracle/admin/db12c/adump' \
            -initparams compatible='12.1.0.0' \
            -initparams db_create_file_dest='+DATA' \
            -initparams db_create_online_log_dest_1='+DATA' \
            -initparams db_create_online_log_dest_2='+DATA\
            -initparams db_recovery_file_dest='+DATAA' \
            -initparams pga_aggregate_target=100M \
            -initparams diagnostic_dest='/u01/app/oracle' \
            -initparams parallel_max_servers=8 \
            -initparams processes=400 \
            -initparams sga_target=524288000 \
            -initparams db_recovery_file_dest_size=4322230272
```