Oracle Database

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1. Oracle RAC

1.1 Networks

A RAC environment is all about networks and the subsequent interconnect network traffic.

At a bare minimum we need 1 public,1 VIP, 1 private & 3 SCAN IP addresses. The public and private networks should be on a different separate subnet. The SCAN IP should be on the same public network segment.

1.1.1 bonding

Network bonding is a way so that two interfaces can be simultaneously connected together for redundancy purposes.

Example:- eth0✓eth1✓The two interfaces will be bonded together and connected to a bond interface so that even if one physical network is disconnected the cluster can be still up and running.

Command 1.1.1 — HOME. `cat /etc/sysconfig/network-scripts/ifcfg-bond0`

```
DEVICE=bond0
NAME=bond0
TYPE=Bond
BONDING_MASTER=yes
IPADDR=172.16.232.18
PREFIX=24
ONBOOT=yes
BOOTPROTO=none
BONDING_OPTS="mode=1 miimon=100"


cat /etc/sysconfig/network-scripts/ifcfg-eth0
HWADDR=
TYPE="Ethernet"
BOOTPROTO="none"
DEFROUTE="yes"
PEERDNS="yes"
PEERROUTES="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_PEERDNS="yes"
IPV6_PEERROUTES="yes"
IPV6_FAILURE_FATAL="no"
NAME="eth0"
UUID=
\textbf{ONBOOT="yes"}
\textbf{MASTER=bond0}
\textbf{SLAVE=yes}

cat /etc/sysconfig/network-scripts/ifcfg-eth1
HWADDR=
TYPE=Ethernet
BOOTPROTO=none
DEFROUTE=yes
PEERDNS=yes
PEERROUTES=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
IPV6_FAILURE_FATAL=no
NAME=eth1
UUID=
\textbf{ONBOOT=yes
MASTER=bond0
SLAVE=yes
}

nmcli con reload
systemctl restart network

Verify
cat /proc/net/bonding/bond0
```

1.1.2 GNS

GNS VIP is a static IP which is configured in the DNS. DNS delegates queries to GNS which provides name resolution at that address.

Command 1.1.2 — GNS.

```
srvctl add gns -i ip_address -d domain
srvctl config gns
srvctl relocate gns -n node1
srvctl start gns
srvctl status gns
srvctl stop gns
```

ip_address is the virtual ip of the gns.

1.2 Storage

Data is stored in diskgroups at a minimum you should have the following diskgroups.

+DATA +FRA +RECO

The oracle database binaries will take up about 6.7 Gig of space.

Command 1.2.1 — oracleasm.

```
fdisk /dev/sdb
mkfs.ext4 /dev/sdb1
oracleasm createdisk +DATA /dev/sdb1
    fdisk /dev/sdc
    mkfs.ext4 /dev/sdc1
    oracleasm createdisk +FRA /dev/sdc1
fdisk /dev/sdd
mkfs.ext4 /dev/sdd1
    oracleasm createdisk +FRA /dev/sdd1
    oracleasm listdisks
    DATA
    FRA
    RECO
```

1.3 Oracle

1.3.1 RAC

You can only have one installation of Oracle Clusterware running in a cluster. This means that the Oracle clusterware should be at the highest level of all the current running databases.

This means that Clusterware 12c will support databases running on 10,11 & 12.

There can be only one clusterware running on a given oracle home.

1. Extended Distance Cluster

Extended distance clusters in a nutshell is a RAC implementation separated by Geographical distance. The distance should be approximately 50 Miles or so. The connection for the networks have to be in the mili second range.

In a extended distance cluster the parameter ASM_PREFERRED_READ_GROUP is most notable as a node may benefit from reading from a local ASM copy rather than a Primary copy which could technically be in another data center.

In order to set the parameter you can issue the following command:-

In order to administer the GI home you have to set the environment ORACLE_HOME to the grid home.

Command 1.3.1 — HOME.
```
ORACLE_HOME=/u01/app/12.1.0/grid; export ORACLE_HOME
```

During installation, ownership of the entire path to the Grid home is changed to root. (/u01, /u01/app, /u01/app/12.1.0, /u01/app/12.1.0/grid

Command 1.3.2 — s.
```
ALTER SYSTEM SET ASM_PREFERRED_READ_GROUP=DATA.SITE1
scope=spfile;
```

The benefit of using Oracle extended RAC is extremely fast recovery times.

There are various key points to keep in mind when configuring extended clusters namely:-

- Spread the Workload Evenly Across the Sites in the Extended Cluster
- Add a Third Voting Disk to Host the Quorum Disk
- Configure the Nodes to Be Within the Proximity of a Metropolitan Area
- Use Host-Based Storage Mirroring with Oracle ASM Normal or High Redundancy

In a extended cluster it is advisable to add a third voting disk for recovery. The voting disk is utilized by the CSS process of a Oracle Clusterware.

The commands to add a third voting disk are as:-

Command 1.3.3 — votingdisk.
```
Take a backup of existing voting disk.
$CRS_HOME/bin/ocrconfig -export /tmp/ocrbackup -s online

List the current voting disks
$crsctl query css votedisk

 Stop the CRS
 #crsctl stop crs
 #crsctl check crs
 #crsctl add css votedisk /voting_disk/vote_disk3 -force
 #crsctl query css votedisk
 #crsctl delete css votedisk /dev/raw/raw3 -force
 #crsctl query css votedisk
 #crsctl start crs
```

1.4 OCR

OCR is Oracle cluster registry.

Command 1.4.1 — OCR.
```
#ocrconfig -add +DATA
#ocrconfig -delete /ocrdata/ocr_1
#ocrconfig -delete /ocrdata/ocr_2
```

1.5 OLR

OLR is Oracle Local registry. OLR is a registry similar to OCR located on each node in a cluster, but contains information specific to each node.

Command 1.5.1 ocrcheck -local
/etc/olr.loc

1.6 backups

Managing backups in a RAC environment. Backups in a RAC environment are similar to a non-RAC environment.

Command 1.6.1

```
run { Allocate channel; }
```

1.7 Recovery

Managing recovery in a RAC environment. Only one node undertakes the responsibility of recovering in a RAC environment.

1.8 Single Instance to RAC

Converting a database from single instance to RAC is achieved either manually or through rconfig.

1.9 Patching

You can apply patches in a RAC environment by using the Oracle OPatch utility.

1.10 Performance

RAC wait events are usually identified by running AWR reports.

The typical RAC events are gc current block request gc cr block request gc current block 3-way gc current block busy gc cr block grant 2-way

The column CLUSTER_WAIT_TIME in V$SQLAREA represents the wait time incurred by individual SQL statements for global cache events and will identify the SQL which may need to be tuned.

1.11 Upgrades

1.12 AddingNewNode

Adding new nodes in a RAC environment are archived by running the addnode.sh script.

1.13 DeleteNode

Adding new nodes in a RAC environment are archived by running the deletenode.sh script.

1.14 AddClusterDBtoOEM

Adding cluster database to OEM 12c.

1.15 BuildDataGuard

Building Dataguard in a RAC Environment.

1.16 Deinstall

Command 1.16.1

```
runInstaller -deinstall -h /u01/app/12.1.0/grid rm -rf /etc/oraInst.loc rm -rf /u01/app/12.1.0/ rm -rf /etc/oracle/
```

2. Oracle Exadata

2.1 Networks