RAC 11gR2 Setup requirements document

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Architecture

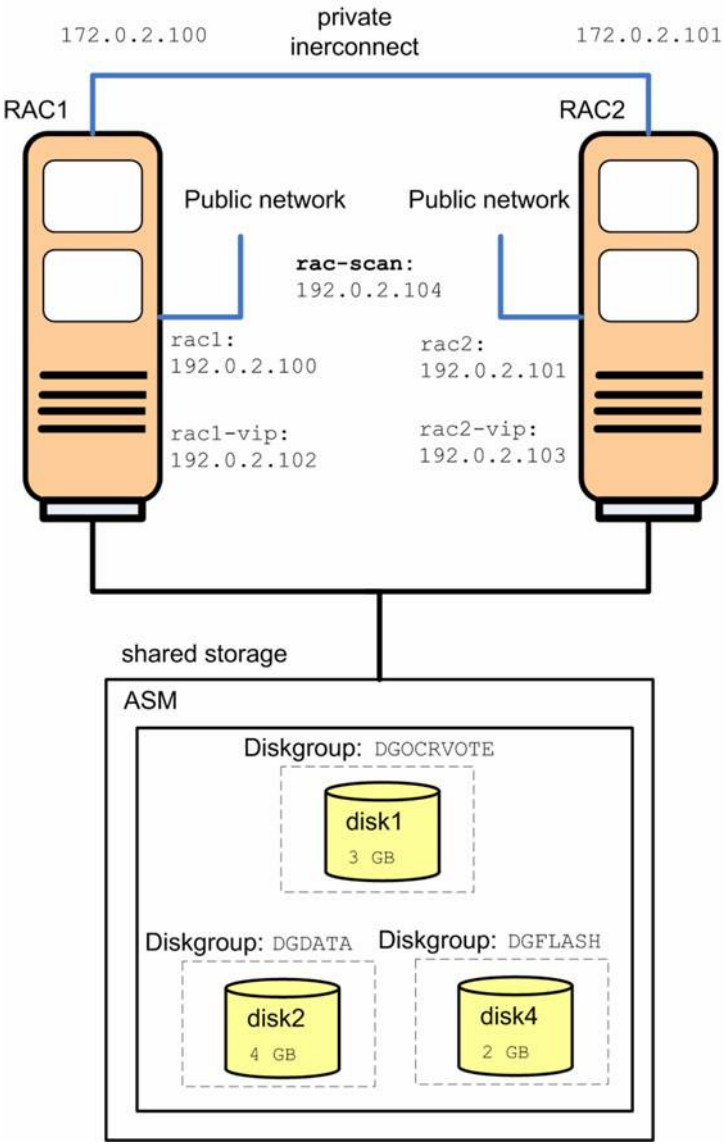

Diagram 1

- Shown above is very basic 2-node 11gR2 RAC architecture.
- IP addresses shown are just for the sake of example purpose only.
- 'rac-scan' will have 3 IP address associated with it (discussed below).

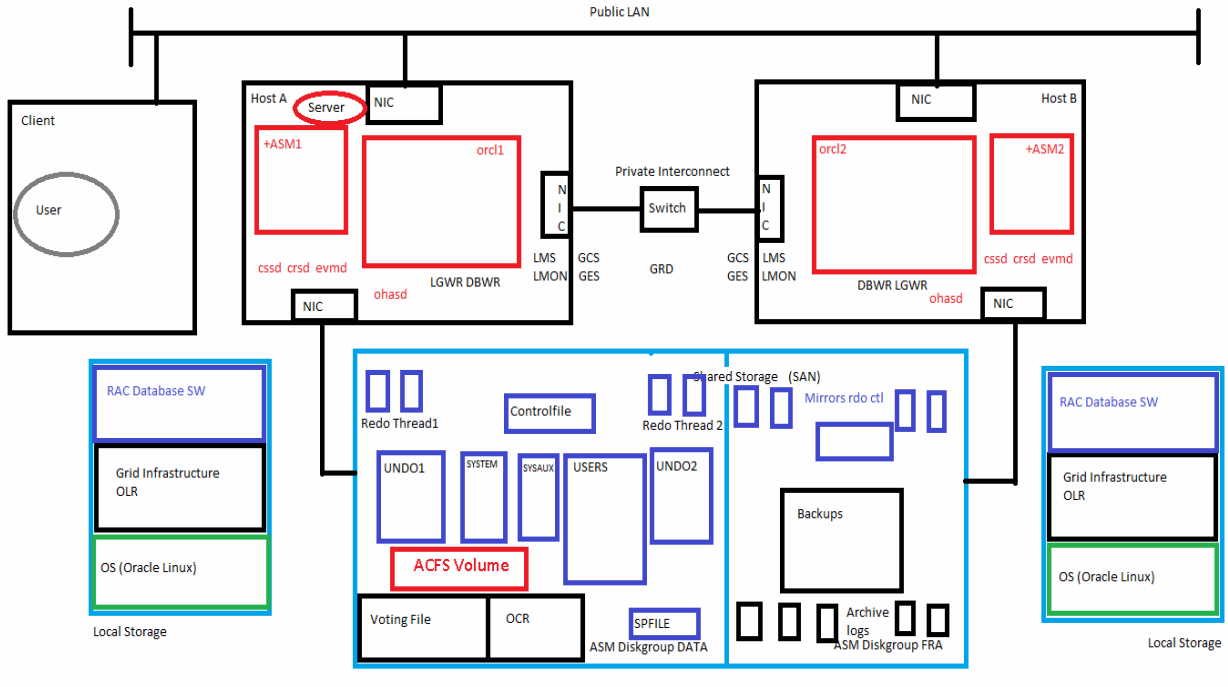

Diagram 2

- Shown above is the line diagram for a 2-node 11gR2 RAC architecture.

Setup Requirements

1) Hardware

- Ensure servers run the same operating system binary
- At least 1024 x 768 display resolution, so that OUI displays correctly.
- Minimum 1 GB of space in the /tmp directory.

2) Network

a) NIC requirement

- Each node must have at least two network adapters or network interface cards (NICs): one for the public network interface and one for the private network interface (the interconnect).
- Network Interface Card (NIC) names must not contain "." (DOT)
- The network interfaces must have the same name on all nodes

For example: With a two-node cluster, you cannot configure network adapters on node1 with eth0 as the public interface, but on node2 have eth1 as the public interface. Public interface names must be the same, so you must configure eth0 as public on *both* nodes. You should configure the private interfaces on the same network adapters as well. If eth1 is the private interface for node1, then eth1 should be the private interface for node2.

- The use of a switch (or redundant switches) is required for the private network (crossover cables are NOT supported)
- For the public network, each network adapter must support TCP/IP.
- For the private network, the interface must support the user datagram protocol (UDP) using high-speed network adapters and switches that support TCP/IP (minimum requirement 1 Gigabit Ethernet).
- IP address 127.0.0.1 should only map to localhost and/or localhost.localdomain, not anything else.
- 127.*.*.* should not be used by any network interface.
- NIC bonding technique can be used for redundancy and high availability (need to look further into this area)
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b) IP requirements

- *A public IP address and A virtual IP (VIP) address for each node, with the following characteristics*:

a) Static IP address
b) Configured before installation for each node, and resolvable to that node before installation
c) On the same subnet as all other public IP addresses, VIP addresses, and SCAN addresses

- *A private IP address for each node, with the following characteristics*:

a) Static IP address
b) Configured before installation, but on a separate, private network, with its own subnet, that is not resolvable except by other cluster member nodes

- *A Single Client Access Name (SCAN) for the cluster, with the following characteristics*:

a) Three Static IP addresses configured on the domain name server (DNS) before installation so that the three IP addresses are associated with the name provided as the SCAN, and all three addresses are returned using a round-robin algorithm by the DNS to the requestor. Also, the IP addresses should not be specifically assigned to any of the nodes in the cluster.
b) Configured before installation in the DNS to resolve to addresses that are not currently in use
c) The name must be 15 characters or less in length and must be resolvable without the domain suffix
d) Given a name that does not begin with a numeral

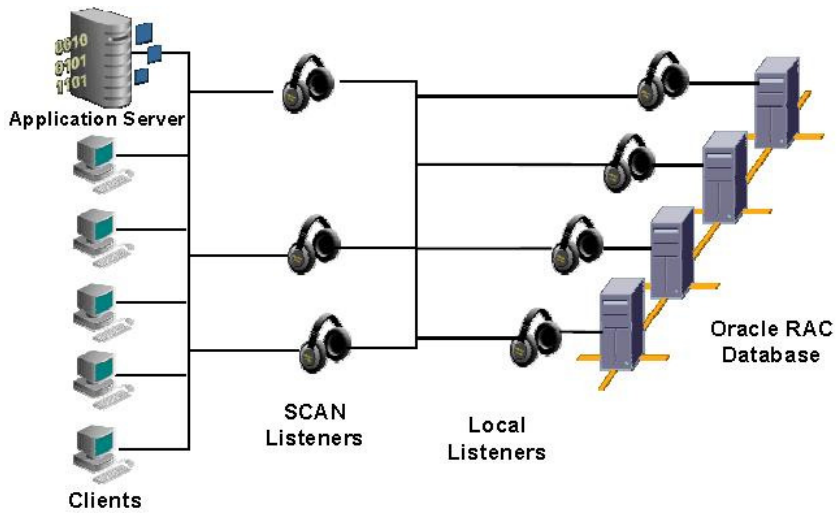
e) On the same subnet as all other public IP addresses, VIP addresses, and SCAN addresses
f) Conforms with the RFC 952 standard, which allows alphanumeric characters and hyphens ("-"), but does not allow underscores ("_").

So in all we will have 9 IP addresses configured for our 2-node 11gR2 RAC system

SCAN In brief:

We will be using *Single Client Access Name (SCAN)* feature of Oracle Real Application Clusters (RAC) 11g Release 2.

- The SCAN works as a cluster alias for databases in the cluster.
- Three IP addresses are recommended considering load balancing and high availability requirements regardless of the number of servers in the cluster.
- For each of the 3 IP addresses that the SCAN resolves to, a SCAN VIP resource is created and a SCAN Listener (as shown below) is created during cluster configuration.
- In our case, where we are using a 2-node-cluster (for which 3 IPs are still recommended for simplification reasons), one server in the cluster will host two sets of SCAN resources under normal operations.
- If the node where a SCAN VIP is running fails, the SCAN VIP and its associated listener will failover to another node in the cluster



3) Storage

- With Grid Infrastructure 11gR2, RAW and block devices have been deprecated, making ASM the recommended method of storing the OCR and Voting Disks.
- ASM disks will be used to store OCR, Voting disks, db files, recovery files.
- Raw or block devices can be used for ASM storage but Oracle strongly recommend to use **block devices** for ASM setup in 11.2 onwards.
- ASM disks must be accessible from all the nodes in the cluster.

- Details on number and size of disks required will be provided by DBAs.
- Block devices should be owned by `grid:asmadmin`

  Note: In any installation, non-ASM managed operating system storage repositories are required, and are used for swap files, execution libraries, and user file systems. The Oracle database and ASM executable files and libraries must reside on the server's operating system file system and cannot reside in an ASM files.

4) Operating System/ Software requirements

1. ***OS groups***:

a) dba
b) oinstall
c) oper
d) asmadmin
e) asmdba
f) asmoper

2. ***OS users***:

a) oracle (oracle software owner ; primary group > oinstall ; secondary groups > dba, asmdba, oper)

b) grid (primary group > oinstall ; secondary groups > asmadmin, asmdba, asmoper)

Note: OS groups, group numbers and user must exist and be identical on all cluster nodes.

3. ***Directory structure***:

a) `/u01/app` owned by `grid:oinstall` with `775` permissions before installation, and by root after the root.sh script is run during installation. This ownership and permissions enables OUI to create the Oracle Inventory directory, in the path `/u01/app/oraInventory`.
b) `/u01` owned by `grid:oinstall` before installation, and by root after the root.sh script is run during installation.
c) `/u01/app/11.2.0/grid` owned by `grid:oinstall` with `775` permissions. These permissions are required for installation, and are changed during the installation process.
d) `/u01/app/grid` owned by `grid:oinstall` with `775` permissions before installation, and `755` permissions after installation.
e) `/u01/app/oracle` owned by `oracle:oinstall` with `775` permissions.

4. ***Ensure that OpenSSH is installed on your servers.*** *OpenSSH is the required SSH software.*

5. ***The following packages (or later versions) must be installed*:**

`asmlib rpms` (to be downloaded from http://www.oracle.com/technetwork/server-storage/linux/downloads/rhel5-084877.html)
(suitable for our linux kernel version 2.6.18-238.19.1.el5)

```
oracleasm-support-2.1.7-1.el5.x86_64.rpm
oracleasmlib-2.0.4-1.el5.x86_64.rpm
oracleasm-2.6.18-238.19.1.el5-2.0.5-1.el5.x86_64.rpm
oracleasm-2.6.18-238.el5-2.0.5-1.el5.x86_64.rpm

binutils-2.17.50.0.6
compat-libstdc++-33-3.2.3
elfutils-libelf-0.125
elfutils-libelf-devel-0.125
gcc-4.1.2
gcc-c++-4.1.2
glibc-2.5-24
glibc-common-2.5
glibc-devel-2.5
glibc-headers-2.5
ksh-20060214
libaio-0.3.106
libaio-devel-0.3.106
libgcc-4.1.2
libstdc++-4.1.2
libstdc++-devel 4.1.2
make-3.81
sysstat-7.0.2
unixODBC-2.2.11
unixODBC-devel-2.2.11
```

6. ***Set the default file mode creation mask (umask) to 022*** *for installation software owner user (`grid`, `oracle`).*

7. ***DNS related entries should be correct and same in files*** `/etc/resolv.conf` **and** `/etc/nsswitch.conf` **on *all the RAC nodes.***

IMPORTANT- Besides the above OS requirements, it will be required to update few root owned configuration files (for example /etc/sysctl.conf, /etc/hosts, /etc/security/limits.conf etc), which will be taken care by DBA team as per Oracle stated requirements and for doing this `root` access to server will be required.
`root` access will also be required by DBA team at the time of Oracle Grid Infrastructure software installation.