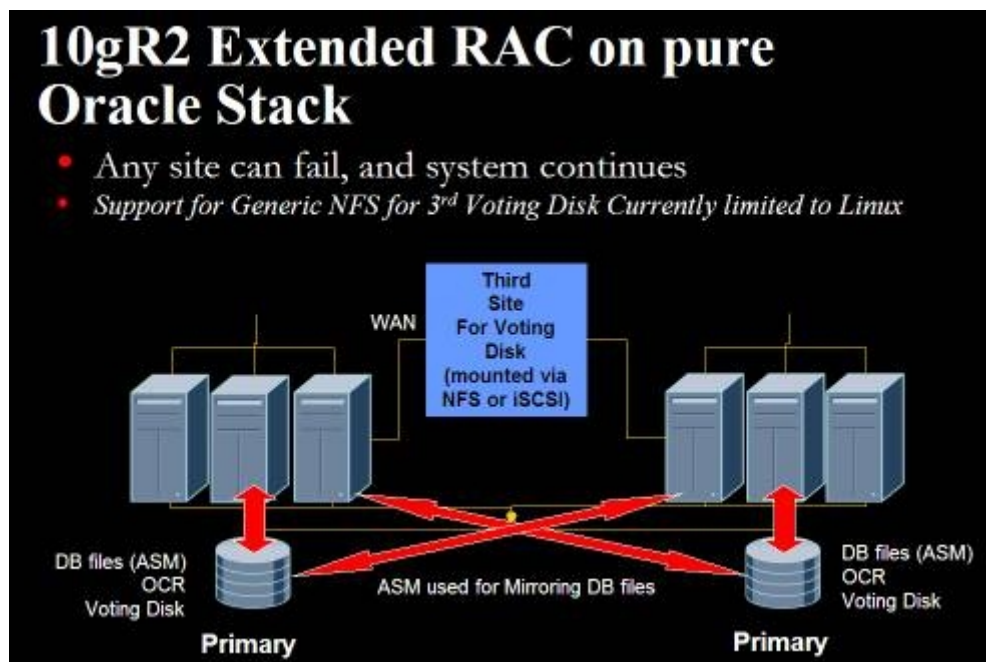


Summary Implementation of Extended Rac On Pure Oracle Stack

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Introduction

Extended RAC is a Tier 6 DRP technology that enable zero data loss in case of major disaster at a local site, and near 0 downtime if well configured and well managed.

It is an expensive technology because of the costs associated with the required infrastructure, dark fiber over long distances and redundant components on all hardware layers.

A strict change control procedure must be in place, with an identical test environment where all changes to the infrastructure and new code versions are carefully tested before implementation on the production site.

Oracle 11g provides new features that greatly help on implementing extended clusters, and makes it the version that best fit the challenge.

The synchronization between sites is obtained using ASM redundancy, reads are made locally at each site using ASM preferred mirror read feature, and in case of a local storage failure ASM fast mirror resync make recovery much easier.

10g R2 and 11g Data guard FSFO (Fast Start Fail Over) technology provide a similar level of protection at less cost and at greater distances, as it relays on TCP for communications, so it is convenient considering it as an option when evaluating extended RAC for DRP.

Implementation Details

- Storage from both sites is connected to both sites.
- Can use Storage Raid (1+0 / 5), on both sites, + ASM redundancy to provide maximum protection.
- Must use ASM redundancy to keep both nodes in sync.
- Use 3rd site for additional voting disk. If on Linux, can be an NFS mount from any production server available on the network
- Use dark fiber for distances >10 Km with DWDM (Dense Wavelength-division Multiplexing) Technology.
- Must use SAN buffer credits for distances >10 km
- 11g ASM features “fast mirror resync” and “preferred mirror read” makes it the best version for extended RAC

Buffer Credits Calculation

Example:

If distance = 10km Then round trip = 20km.

If throughput = 2 Gbps Then frame lenght= 2k

Then, we need 10 buffer credits to get full bandwidth

Setting Up 11g Compatibility

Advancing the disk group RDBMS and ASM compatibility settings enables you to use the new ASM features that are available on 11g.

For example, a disk group with the RDBMS and ASM compatibility set to 11.1 can take advantage of variable extent sizes, fast mirror resync and preferred mirror read.

To take advantage of the 11g new features related to extended RAC the ASM Disk group Compatibility must be set to 11g for both ASM and RDBMS:

Changing Diskgroup compatibility

```
SQL> alter diskgroup <dgname> set attribute 'compatible.asm'='11.1';
SQL> alter diskgroup <dgname> set attribute 'compatible.rdbms'='11.1';
```

```
SQL> select compatibility, database_compatibility
2   from v$asm_diskgroup
3  where name = '<dgname>'
4   /
```

COMPATIBILITY	DATABASE_COMPATIBILITY
11.1.0.0.0	11.1.0.0.0

Setting Preferred Mirror read

When you configure ASM failure groups, it may be more efficient for a node to read from an extent that is closest to the node, even if that extent is a secondary extent. You can configure ASM to read from a secondary extent if that extent is closer to the node instead of ASM reading from the primary copy which might be farther from the node. Using preferred read failure groups is most beneficial in an extended distance cluster.

To configure this feature, set the ASM_PREFERRED_READ_FAILURE_GROUPS initialization parameter to specify a list of failure group names as preferred read disks. Oracle recommends that you configure at least one mirrored extent copy from a disk that is local to a node in an extended cluster. However, a failure group that is preferred for one instance might be remote to another instance in the same Oracle RAC database. The parameter setting for preferred read failure groups is instance specific.

Parameter Syntax:

```
ASM_PREFERRED_READ_FAILURE_GROUPS =
<diskgroup_name>.<failure_group_name>, ...
```

This parameter can be modified using alter system:

```
SQL> alter system set asm_preferred_read_failure_groups =
'DG2.DG2_0000', 'DG3.DG3_0000'
```

ASM Fast Mirror Resync

Restoring the redundancy of an ASM disk group after a transient disk path failure can be time consuming. This is especially true if the recovery process requires rebuilding an entire ASM failure group. ASM fast mirror resync significantly reduces the time to resynchronize a failed disk in such situations. When you replace the failed disk, ASM can quickly resynchronize the ASM disk extents.

References

[11g Storage Administration Guide](#)

Erik Peterson, [Rac at a Distance](#)

Clemens Bleile, [Extended RAC POC](#)

Christian Bilien, [Article on Extended RAC](#)

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