RACifying Multitenant

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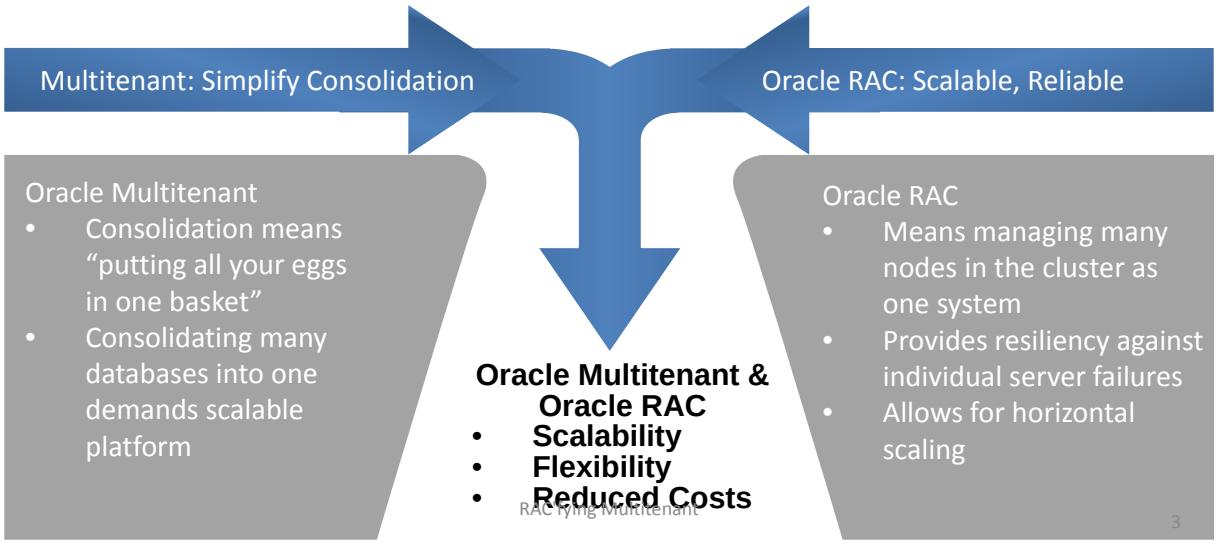
Agenda

1. Introduction
2. Oracle Multitenant and RAC Basics
3. Why use database Services
4. Q & A

Oracle Multitenant and Oracle RAC



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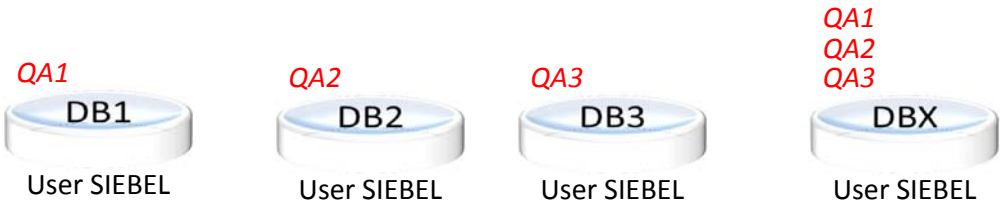
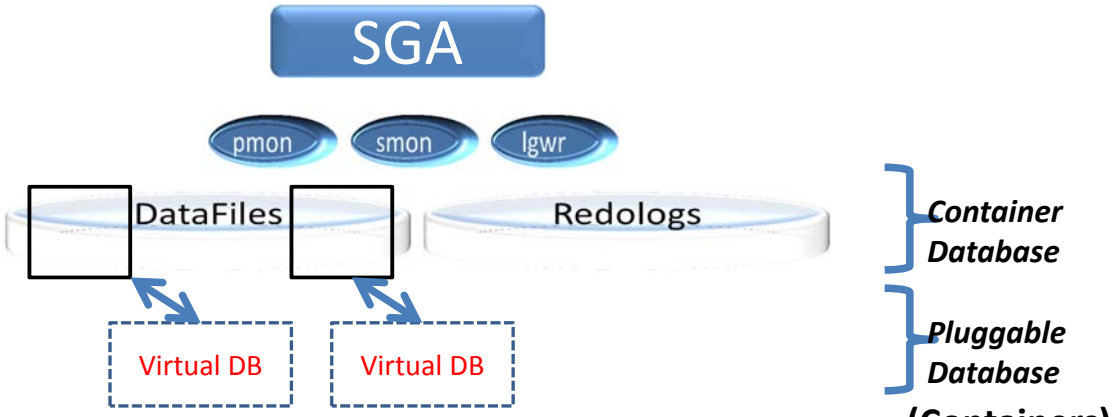
Vexing Problem of Consolidation



Enter: Pluggable Database



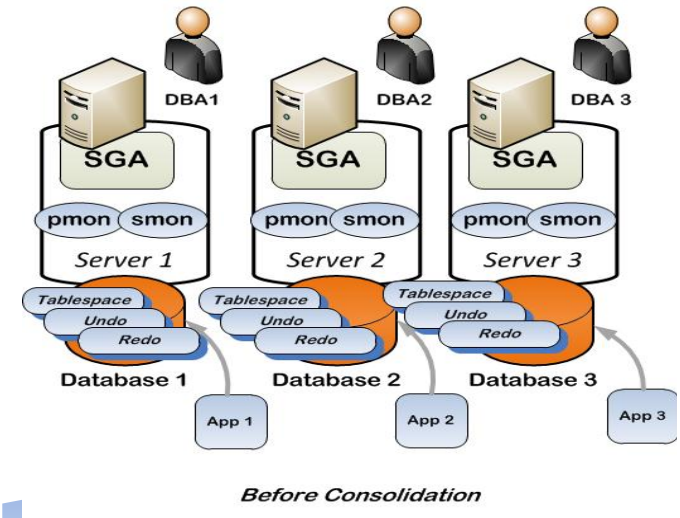
DBA_USERS

```
SELECT 1 AS CON_ID, NAME
FROM USER$@cdb
SELECT 2 AS CON_ID, NAME
FROM USER$@pdb1
SELECT 3 AS CON_ID, NAME
FROM USER$@pdb2
```

PDB1
CON_ID=2

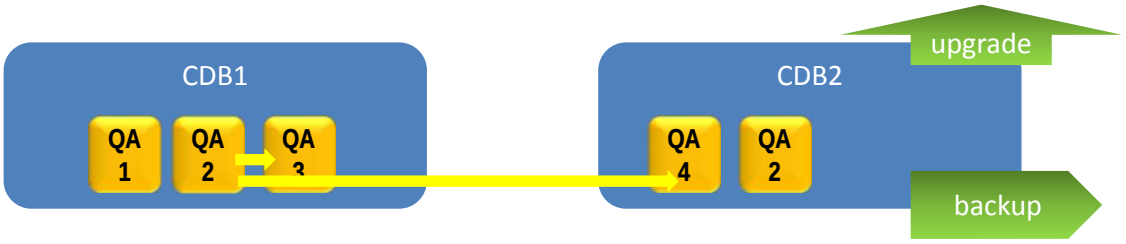
PDB2
CON_ID=3

PDB3
CON_ID=4



Before Consolidation

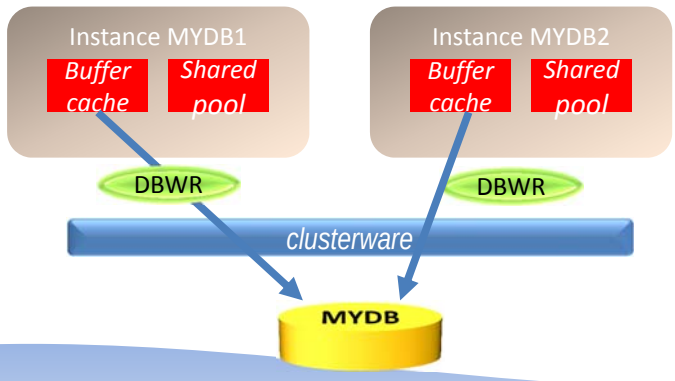
Why Multitenant



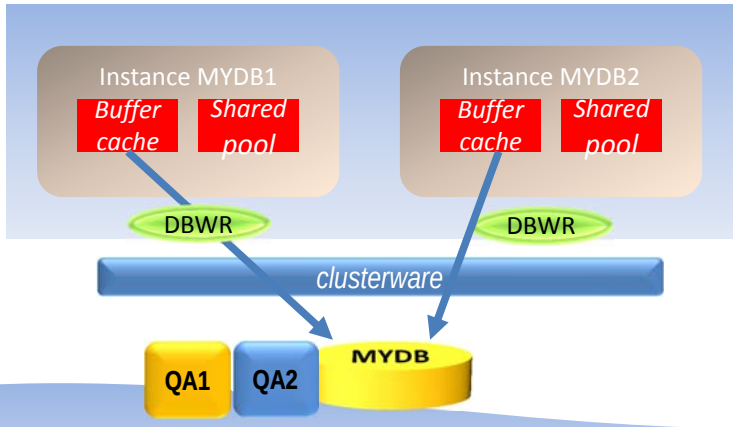
Cloning on same host
Cloning on a different host
Unplug and Plug
Upgrade/backup/ as a whole

Granular control when needed

Oracle RAC



RAC + Multitenant



Individualized Instances of PDBs

PDBs can be opened on selected instances

```
select name, inst_id, open_mode
from gv$pdbs;

NAME     IN OPEN_MODE
-------- -- ----------
PDB$SEED  1 READ ONLY
PDB$SEED  4 READ ONLY
PLUG1     1 READ WRITE
PLUG1     4 MOUNTED
PLUG2     1 READ WRITE
PLUG2     4 MOUNTED
SARPRD    1 READ WRITE
SARPRD    4 READ WRITE
```

Note: PLUG1 is opened on one instance and just mounted on the other.

Save State

- Set PDB SAVE STATE (12.1.0.2)
  - Service pulls up the PDB by default
  - Open mode must be consistent across the cluster

```
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 TEST                           READ ONLY  NO
SQL>

SQL> alter pluggable database test save state;

Pluggable database altered.

SQL> alter pluggable database test open read write force;

Pluggable database altered.
```

```
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 TEST                           READ WRITE NO
SQL>

SQL> shutdown
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup
ORACLE instance started.

Total System Global Area 4.0668E+10 bytes
Fixed Size                  7653480 bytes
Variable Size            6442452888 bytes
Database Buffers         3.4091E+10 bytes
Redo Buffers              126562304 bytes
Database mounted.
Database opened.
SQL>

SQL> select inst_id, name, open_mode from gv$pdbs;

   INST_ID NAME                           OPEN_MODE
---------- ------------------------------ ----------
         1 PDB$SEED                       READ ONLY
         1 TEST                           READ ONLY
```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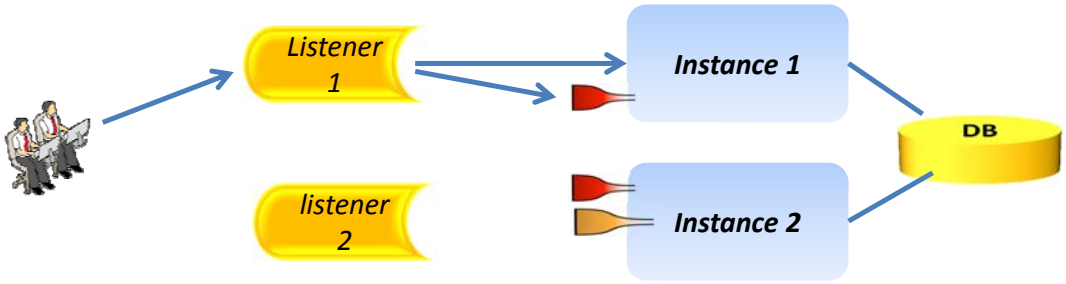
Services in RAC

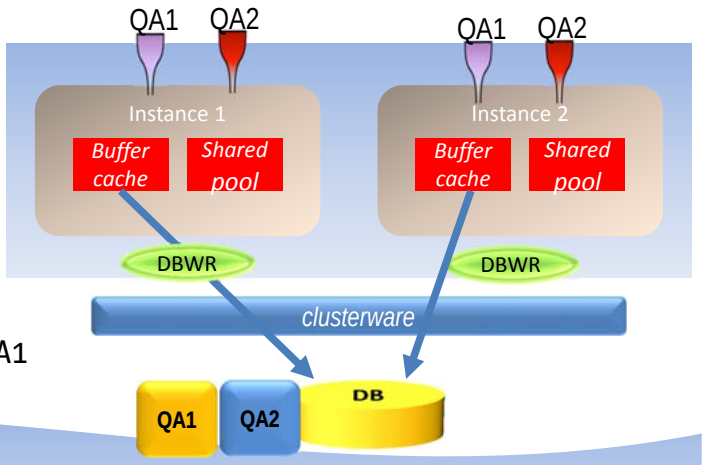



```
sqlplus <user>/<pwd>@SCAN/serv1
```

GV$SERVICEMETRIC
Service based Resource Manager

Services in Multitenant

- Default service of CDB is started
- Default service for each PDB is started



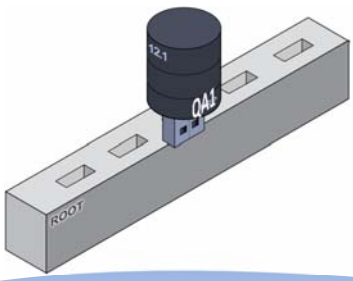

```
sqlplus <user>/<pwd>@SCAN/QA1
```

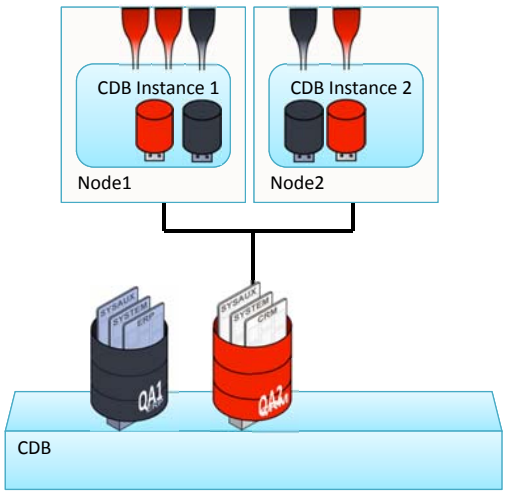
Do not Use Default Service

- PDBs provide location independence (plug/unplug/clone) but exist within a CDB
- Moving PDBs between CDB may need changing names of PDBs
- Use a unique service for an app
- If the PDB moves to another location the app does not need to change
- This requires uniqueness of service names

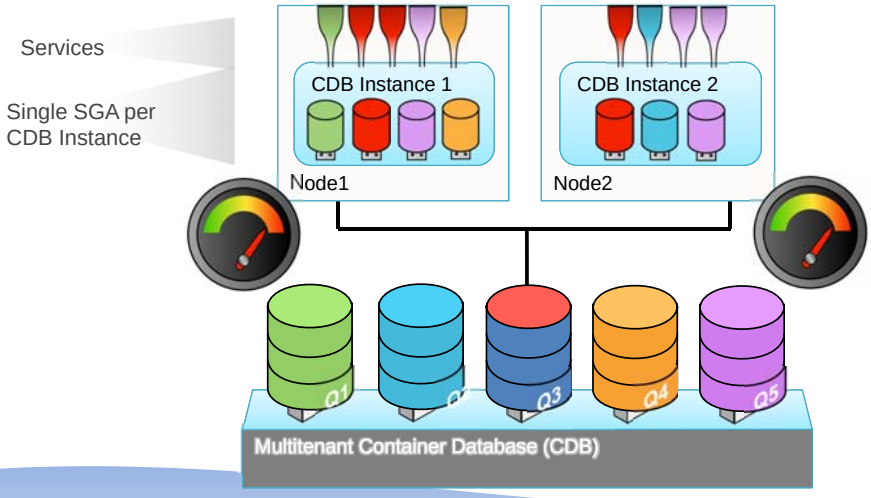
Converting to RAC

The simplest way of converting a SI PDB to RAC: unplug/plug

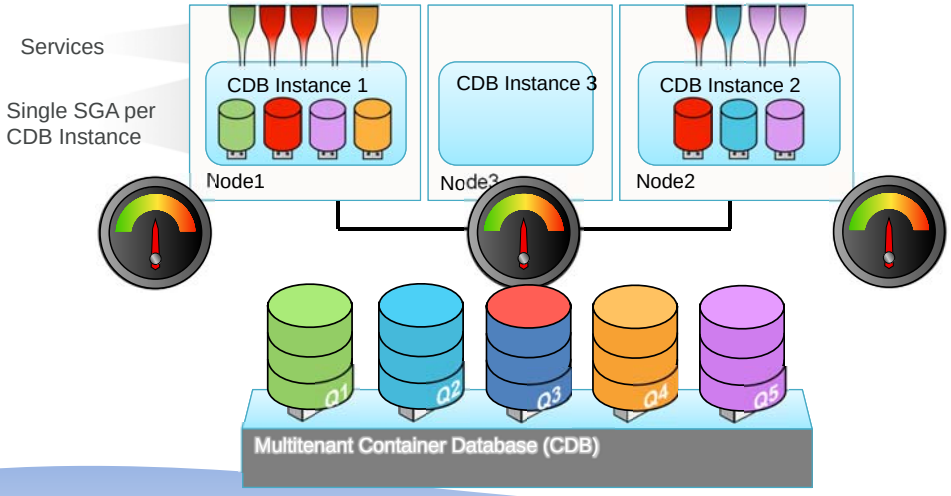




Changing Workloads



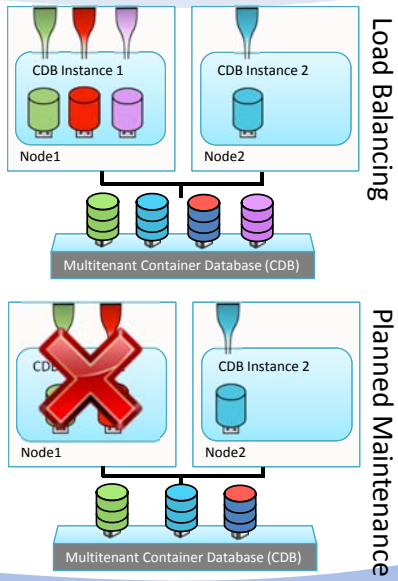
Changing Workloads



PDB Relocation

```
SQL> alter pluggable database pdb1 close
immediate relocate to 'cdb2';
```

- PDB Relocate
  - migrate some tenants off an overloaded node
  - migrate all tenants off a node that needs to be taken down for maintenance
    - without downtime for migrated tenants
    - minimal impact on QoS of migrated (and other) tenants



Takeaways

- During 12c upgrade, create a CDB, even if with just one container
- If you are migrating from another database, simply unplug and plug into the multitenant RAC database
- Later, as you consolidate, just create several containers instead of separate databases
- Create unique service names for all applications, even if they will share the same CDB, e.g. SALESPRD1 and SALESDEV1
- Make sure you understand the differences between CDB and PDB in V$ views

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Thank You!

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