

### **ORACLE®**

# Why and How You Should Be Using Policy-Managed RAC Databases

Mark V. Scardina

Director of Product Management

Oracle Quality of Service Management

# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

# In The Beginning ...

Parallel Server	Real Application Clusters		Private Database Cloud
Performance	<ul><li>Performance</li><li>Scalability</li></ul>	<ul><li>Performance</li><li>Scalability</li><li>High Availability</li></ul>	<ul> <li>Performance</li> <li>Scalability</li> <li>High Availability</li> <li>Consolidation</li> <li>Provisioning</li> <li>Quality of Service</li> </ul>

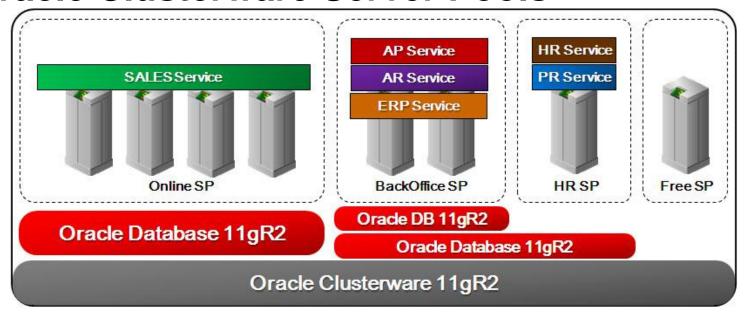
# **Policy-Managed Databases**

- An Evolutionary Step
- Deploy on demand
- Actively manage to business requirements
- Scale just-in-time
- Manage performance to SLAs
- Achieve predictable failure and recovery
- Maximize IT spend and Datacenter efficiency

# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

#### **Oracle Clusterware Server Pools**



- Dynamically manage DB resources for services by Policy
- Control availability with Min, Max, & Importance attributes
- Easily Manage large clusters consolidating databases

#### **Server Pool Properties**

- min [-I (Max ≥ int ≥ 0)]:
  - The minimum count of servers to maintain within the server pool
  - Satisfied in order of decreasing Imp value
- max [-u (-1 < int ≥ Min)]:</li>
  - The maximum count of servers permitted within the server pool
  - Satisfied in order of decreasing Imp value once all Min values have been met.
- imp  $[-i (0 \le int \le 1000)]$ :
  - The higher Imp value server pools are filled to their Min values first
  - Servers logically move to replace failed servers based upon lower Imp pools satisfying higher Imp pools to preserve Min

#### **Default Server Pools - GENERIC**

- Used to model databases in "The traditional WAY!"
  - "The traditional WAY!" → "Administrator-Managed"
- Parent of all server pools for "Administrator-Managed" databases
- Always exists but may be of size 0
- Used for upgrade from 10g or 11g Release 1
- Use SRVCTL of the respective version of the database home to manage the databases in the Generic Pool.
- Servers in Generic are named (hosting member in cluster resource)

#### **Default Server Pools - FREE**

- A special default server pool, used for management of spare capacity
- Any unassigned server will go to FREE
- Always exists, but may be of size 0
- Default Importance is 0, and is editable.
- CAUTION: If Importance is higher than other pools, may steal servers from other pools above Min upon HA event
- Min and Max are defined automatically.

# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

#### **Server Pools and Database Management**

- Two Management Styles for Oracle RAC Databases

#### Administrator Managed

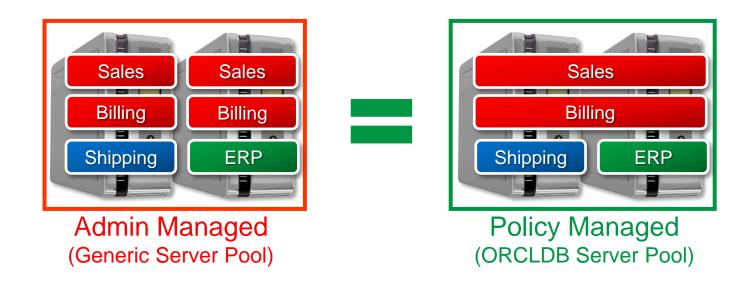
- Specify where the database should run with a list of servers names ("traditional way")
- Specify exactly where services should run within the database

#### Policy Managed

- Specify resource requirements for expected workload
- Specify database service ranking or availability management
- Enough instances are started to support expected workload
- Goal: remove hard coding of a service to a specific instance or instance to specific server and preserve business critical services.

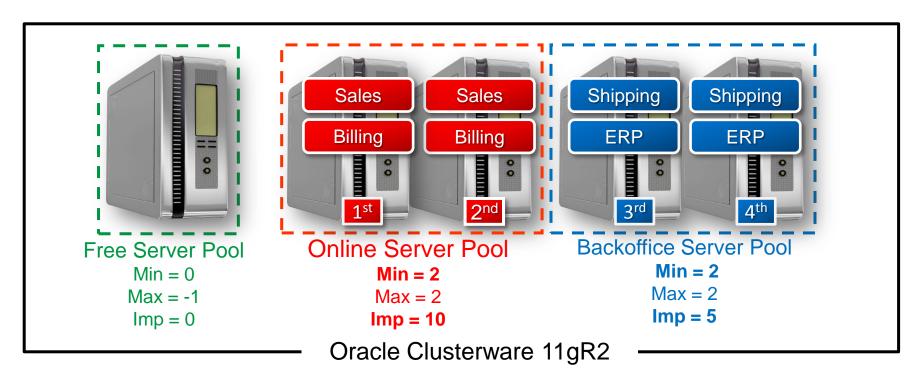
#### **Two Node Clusters Are Equivalent**

- Singleton and Uniform Services behave the same



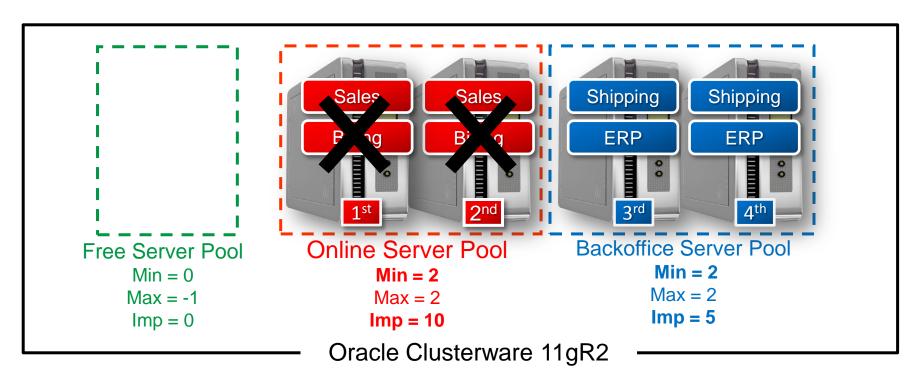
### **Managing Service Start Order**

- Using Server Pool's Min and Imp Attributes



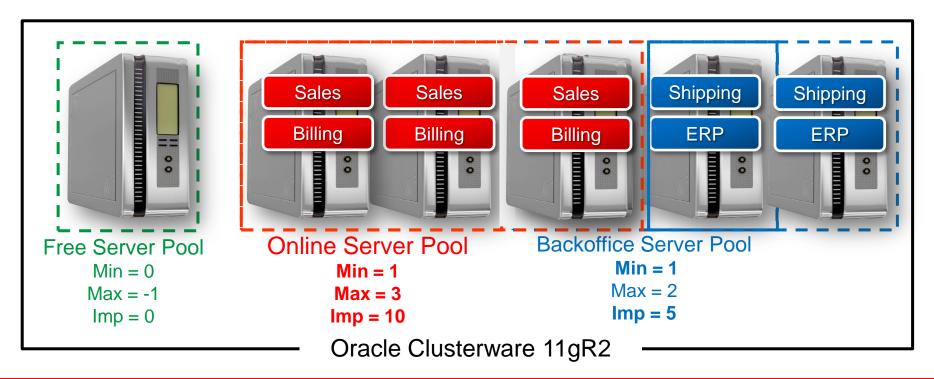
#### **Managing Last Service Standing**

- Using Server Pool's Min and Imp Attributes



#### **Zero-Configuration Dynamic Provisioning**

- Using Relocate Server or Add Node

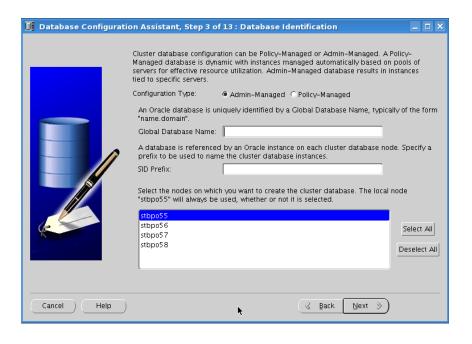


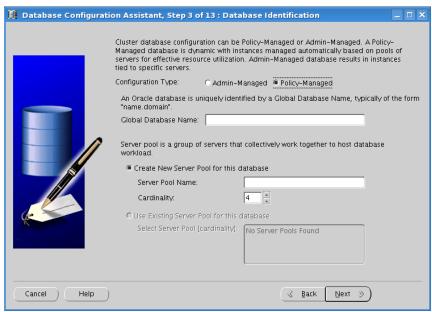
# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

### **Decide on a Management Style**

#### - At Database Creation Time





#### Creating an Administrator-Managed DB

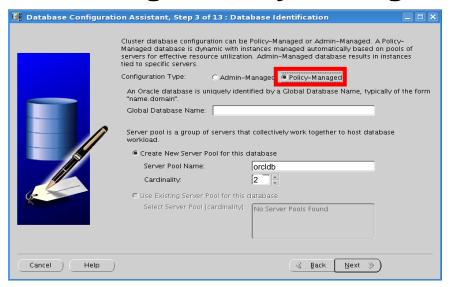


#### [GRID]> srvctl status srvpool

Server pool name: Free Active servers count: 0 Server pool name: Generic Active servers count: 2

#### [RAC]> srvctl status database -d orcl Instance ORCL1 is running on node rac1 Instance ORCL2 is running on node rac2 [RAC]> srvctl config database -d orcl Database unique name: orcl Database name: Oracle home: /u01/app/oracle/product/11.2.0/dbhome 1 Oracle user: oracle Spfile: +DATA/ORCL/spfileORCL.ora Domain: Start options: open Stop options: immediate Database role: PRIMARY Management policy: AUTOMATIC Server pools: orcl Database instances: ORCL1,ORCL2 Disk Groups: DATA Services: MyConvSrvc Database is administrator managed

#### **Creating a Policy-Managed DB**

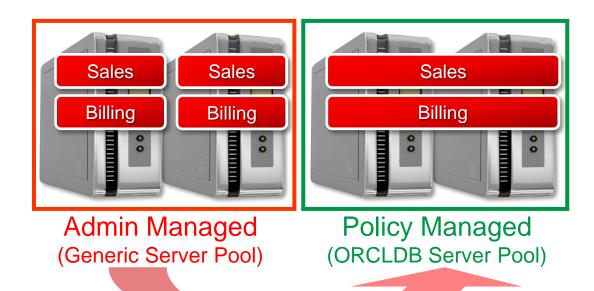


# [GRID]> srvctl status srvpool Server pool name: Free Active servers count: 0 Server pool name: Generic Active servers count: 0 Server pool name: orcldb Active servers count: 2

```
[RAC]> srvctl status database -d orcl
Instance ORCL 1 is running on node rac1
Instance ORCL 2 is running on node rac2
[RAC]> srvctl config database -d orcl
Database unique name: ORCL
Database name: ORCL
Oracle home:
/u01/app/oracle/product/11.2.0/dbhome 1
Oracle user: oracle
Spfile: +DATA/ORCL/spfileORCL.ora
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: orcldb
Database instances: ORCL 1 ORCL 2
Disk Groups: DATA
Services: MyConvSrv
Database is policy managed
```

#### **Decide on a Management Style**

- Convert Existing Databases – In Place



#### **Converting to a Policy Managed Database**

#### - Step-by-Step

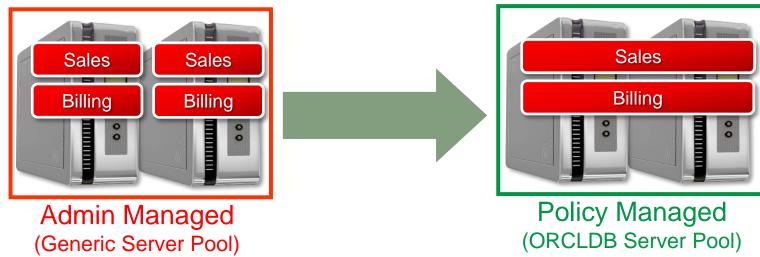
- Check the current configuration
  - srvctl status database -d <db name>
  - srvctl status service -d <db name>
- Create a new Database Server Pool
  - srvctl add serverpool -g <pool name> -l <min> -u <max> -i <imp>
- Modify the database to use the new server pool
  - srvctl modify database -d <db\_name> -g <pool\_name>
- Update the remote password file for database access
  - Copy the existing password file orapw\$ORACLE SID to orapw<db unique name> on the node where the administrator-managed database was running
  - Copy this file orapw<db unique name>, to the same location on every cluster node.
- Confirm Service Placement Relocate services as needed 5.
  - srvctl relocate service -d <db name> -s <svc name> -c <current node> -n <target node>

# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

#### **Converting to Policy-Managed – Single DB**

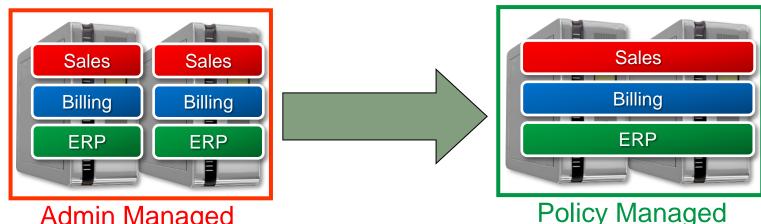
- No Impact on Uniform Service Placement



- Services with preferred servers > 1 will be converted to Uniform.
- Uniform services run on ALL database instances in a server pool
- Use RM or QoS to manage resources between services.

#### **Converting to Policy-Managed – Multiple DBs**

- No Impact on Uniform Service Placement

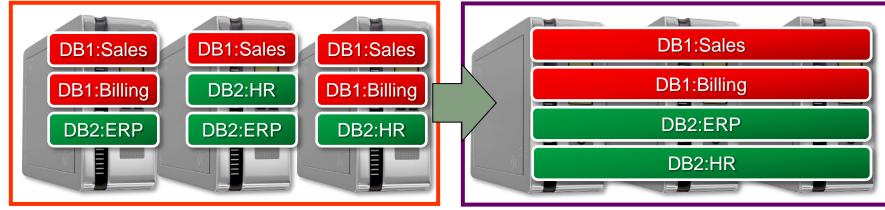


**Admin Managed** 

- Services with preferred servers > 1 will be converted to Uniform.
- Uniform services run on ALL database instances in a server pool
- Use RM or QoS to manage resources between services
- Use Instance Caging or QoS to manage resources between databases.

#### **Converting to Policy-Managed – Multiple DBs**

- Overlapping Services to Uniform Service Placement



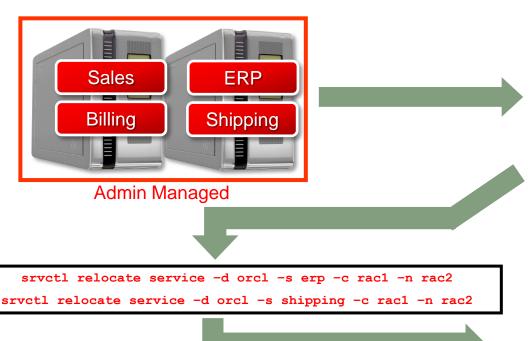
#### **Admin Managed**

**Policy Managed** 

- Services with preferred servers > 1 will be converted to Uniform.
- Uniform services run on ALL database instances in a server pool
- Use RM or QoS to manage resources between services
- Use Instance Caging or QoS to manage resources between databases.

### **Converting to Policy-Managed – Singleton Services**

- Potential Impact to Service Placement





Policy Managed

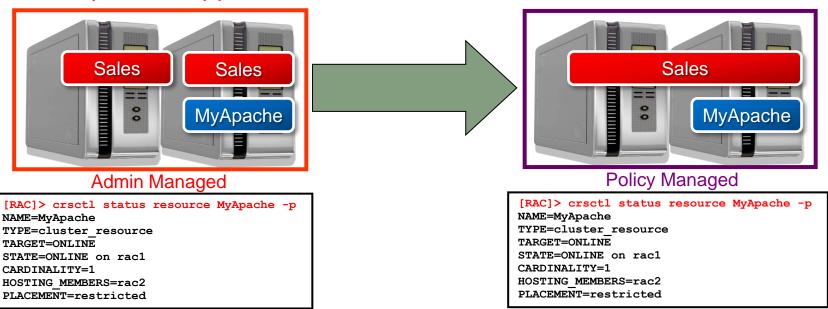
Sales ERP

Billing Shipping

Policy Managed

#### **Converting to Policy-Managed – Applications**

- No Impact on Application Placement



- Hosting Members list honored across conversion
- Server Pool list can be substituted to support anonymous nodes
  - SERVER\_POOLS=orcidb versus HOSTING\_MEMBERS=rac1 rac2



# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

#### The Upgrade – Simple But No Shortcuts

- When upgrading from:
  - Oracle pre-11gR2 Oracle RAC Database(s) hosted on
  - Oracle pre-11gR2 Grid Infrastructure
- Upgrade step 1:
  - Upgrade to Grid Infrastructure 11gR2
  - All pre-11gR2 Databases will be administrator-managed databases hosted in Generic
- Upgrade step 2:
  - Upgrade pre-11gR2 Oracle RAC Database(s)
  - Upgraded databases remain as admin-managed DBs in Generic
  - A conversion to a policy-managed database can be performed at any time following the procedure described in the documentation.

# Tip:1 Consider Policy-Managed Database's New Fail-Over and Placement Protocol

- Node failures move servers between pools transactionally versus moving db instances/services
- Ensure Min value is sufficient to run workload
- Ensure Max value is only as large as necessary
- Consider Importance governs both initial placement and donor pools following a failure
- Consider changing Min, Max, and Imp as a group based upon business needs and events.

# Tip 2: Understand impact of New Database Instance Names and Relocation

- Databases instances are started and stopped transactionally when:
  - Servers are moved between pools
  - srvctl relocate server -n <node name> -g <server pool>
  - Pools grow or shrink
  - srvctl modify srvpool -g <server pool> -l <min> -u<max>
- Instances can be reported legitimately as DOWN.
- Database instance reports, log and trace files are no longer nodespecific

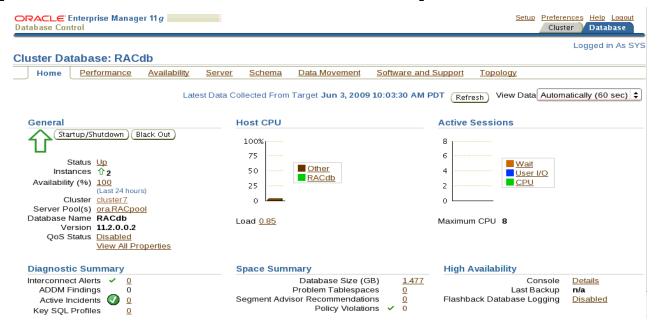
#### **Tip 3: Consider Database Internals**

The documentation (Oracle® RAC Administration and Deployment Guide 11g Rel. 2

http://docs.oracle.com/cd/E11882 01/rac.112/e16795/admin.htm#RACAD803 states:

If you are using Oracle Automatic Storage Management (Oracle ASM) with Oracle Managed Files (OMF) for your [policy-managed database] database storage, then, when an instance starts and there is no redo thread available, **Oracle RAC automatically enables one and creates the required redo log files and undo tablespace.** 

#### Tip 4: Consider External Components - EM



Oracle® Real Application Clusters Installation Guide 11g Release 2 (11.2) http://docs.oracle.com/cd/E11882 01/install.112/e24660/srvpool.htm#BHBJIIDC Configuring Database Control After Installation Using EMCA

NOTE: Instances will have new names and need to be registered.

ORACLE

#### **Tip 4: Consider External Components - HA**

#### Data Guard

- New instance not mapped to Standby Redo Log thread
- Service to instance mapping is statically registered thus all possible combinations of node name and instance need to be configured.

#### RMAN

Do not use Instance Specified Load Balancing CONFIGURE CHANNEL DEVICE TYPE sbt CONNECT '@racinst\_1'
 CONFIGURE CHANNEL DEVICE TYPE sbt CONNECT '@racinst\_2'

#### Golden Gate

- Extract Process requires manual intervention
  - Upon additional Redo thread Extract group must be dropped and re-added manually
- GG Extract and Replicate does not failover if server is moved
  - Solved on Linux with new Clusterware Bundled Agents available on OTN.

# **Agenda**

- Introduction
- Server Pools and Database Management
- Policy-managed Database Use Cases
- Converting to a Policy-Managed Database
- Impact upon CRS-Managed Database Services
- Considerations and Tips
- Further Information

#### For Further Information

- http://www.oracle.com/technology/documentation/database.html
  - To convert to a policy-managed database, see:
    <a href="http://docs.oracle.com/cd/E11882\_01/rac.112/e16795/admin.htm#RACAD803">http://docs.oracle.com/cd/E11882\_01/rac.112/e16795/admin.htm#RACAD803</a>
  - For using EMCA after conversions, see:
    <a href="http://docs.oracle.com/cd/E11882\_01/install.112/e24660/srvpool.htm#BHBJIIDC">http://docs.oracle.com/cd/E11882\_01/install.112/e24660/srvpool.htm#BHBJIIDC</a>
- http://www.oracle.com/goto/rac
- http://www.oracle.com/goto/clusterware

# Q/A

# ORACLE®