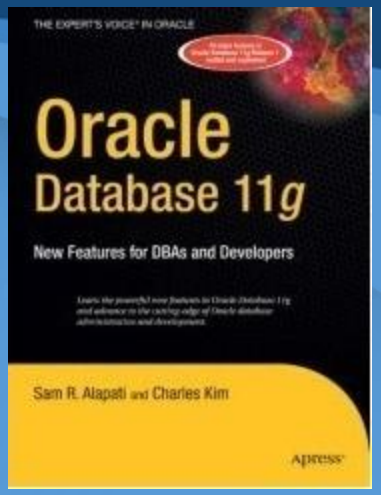
ORACLE DATABASE 11g

Oracle Database 11g New Features

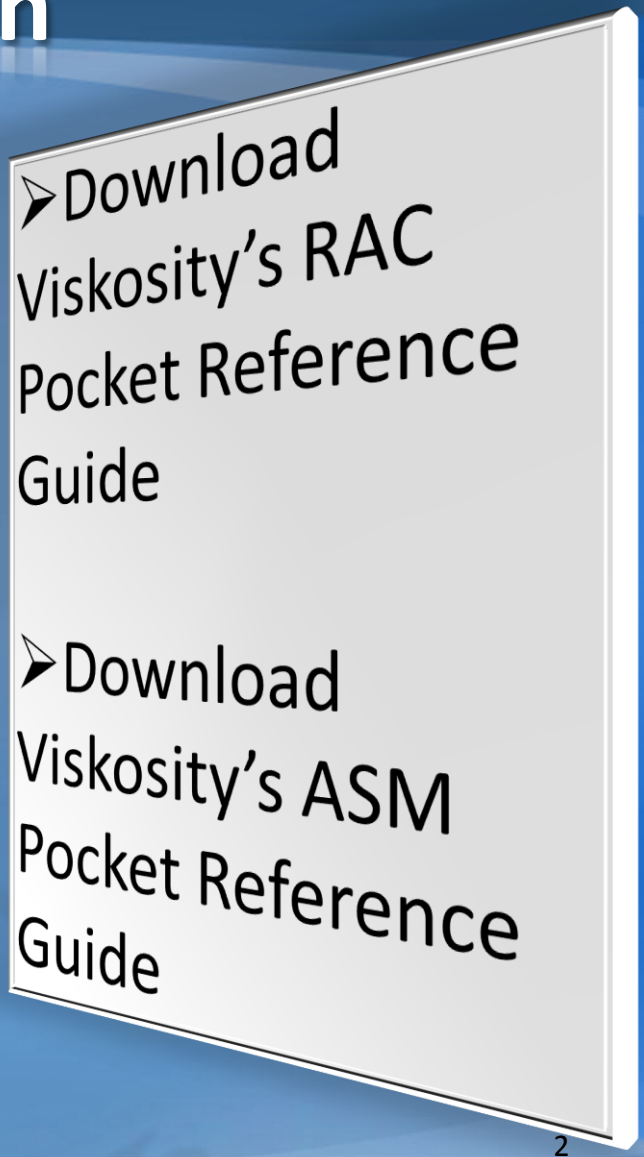
Charles Kim
Practice Manager
VISKosity Technologies, LLC
http://www.viskosity.com



Leaders in Oracle Vision and Knowledge

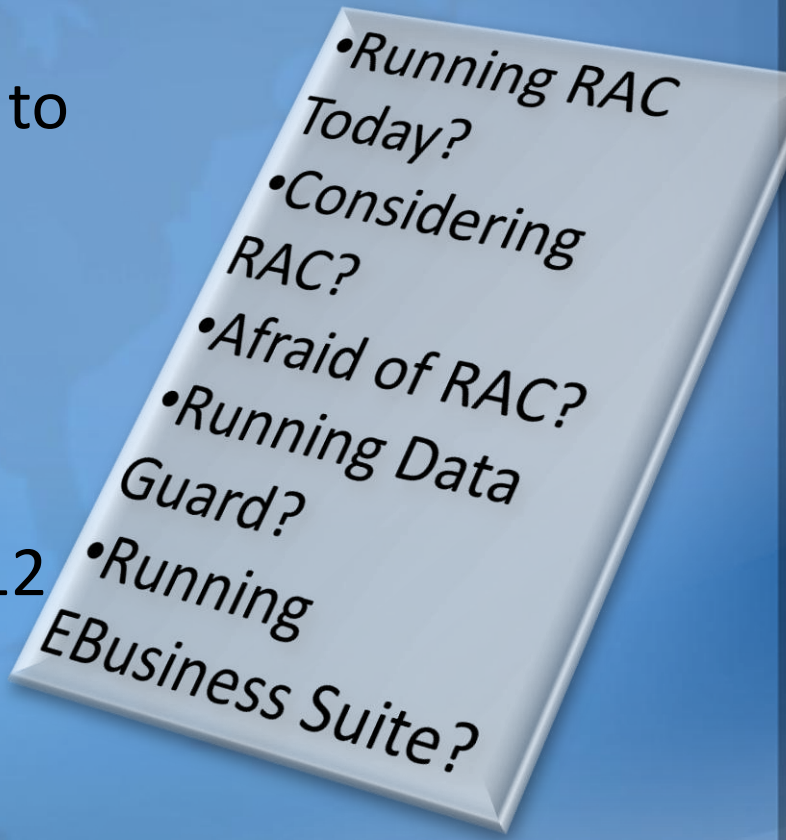
Updates and Additional Information

- Look for updates at http://www.viskosity.com
- Look for additional Oracle Database 11g New Features presentations from other local Oracle User Groups
- Look for RAC and ASM presentations
- Visit the DBAExpert Blog Site: http://blog.dbaexpert.com



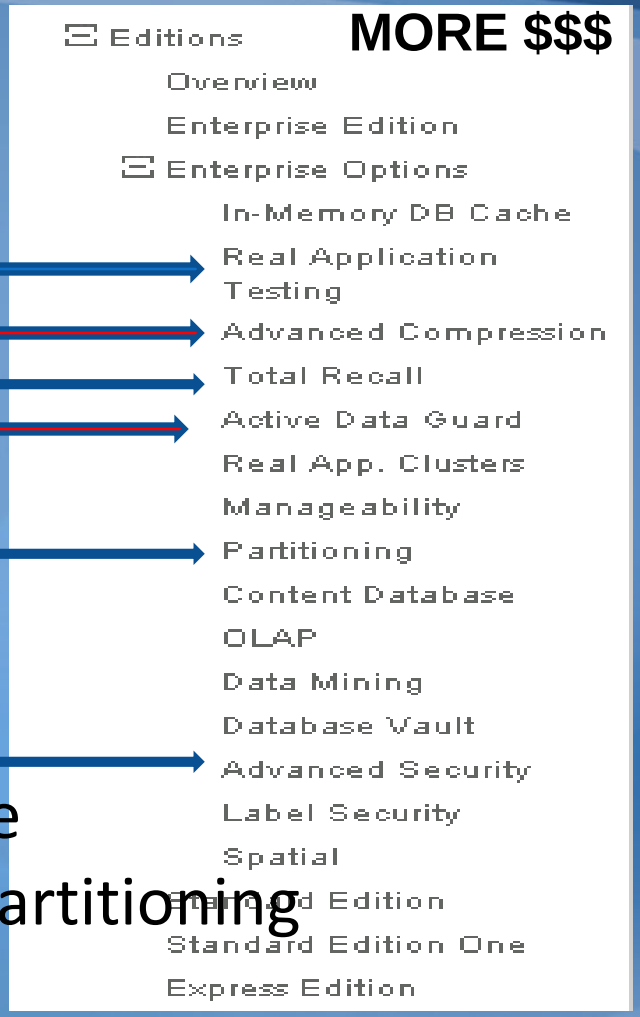
Audience Poll

- Who is running 11g today in Production? Development?
- Who goes from terminal release to terminal release of Oracle?
- Who is just upgrading to 10gR2 right now?
- Who is still running Oracle 9i?
- Who is considering upgrading to 11g within the next 6 months? 12 months?
- Who is waiting for 11gR2 before considering the upgrade?



Charles' 10 New Features

1. Real Applications Testing (RAT)
2. Enhanced Security out-of-the-box
3. Active Standby Database
4. Snapshot Standby
5. Direct NFS
6. SecureFiles
7. Result Cache
8. RMAN Recovery Advisor
9. Total Recall - Flashback Data Archive
10. Additions to Extended Composite Partitioning



Sam's Top 10 New Features

1. Database replay
2. SQL Performance Analyzer
3. Database Recovery Advisor
4. Flashback data archive and the flashback transaction feature
5. Partitioning enhancements such as interval, system, reference, virtual partitioning and the new composite partitioning schemes
6. Active database duplication
7. New Diagnostic Framework, ADR, Support Bench, Incident management and incident packaging etc..
8. SecureFiles
9. New security features, including the password and audit related features
10. SQL Plan Management

Oracle RACSIG - Officers of the Groups

- Erik Peterson – Oracle Liaison

- Rich Niemiec – Acting President & IOUG Liaison
- Carl Dudley - VP & EOUG Liaison
- Julian Dyke - VP & UKOUG Liaison
- TBD – VP & ASOUG Liaison
- TBD - VP & AIOUG Liaison
- Dan Norris – Events Chair New
- Sergio Del Rio – Secretary & Hosting

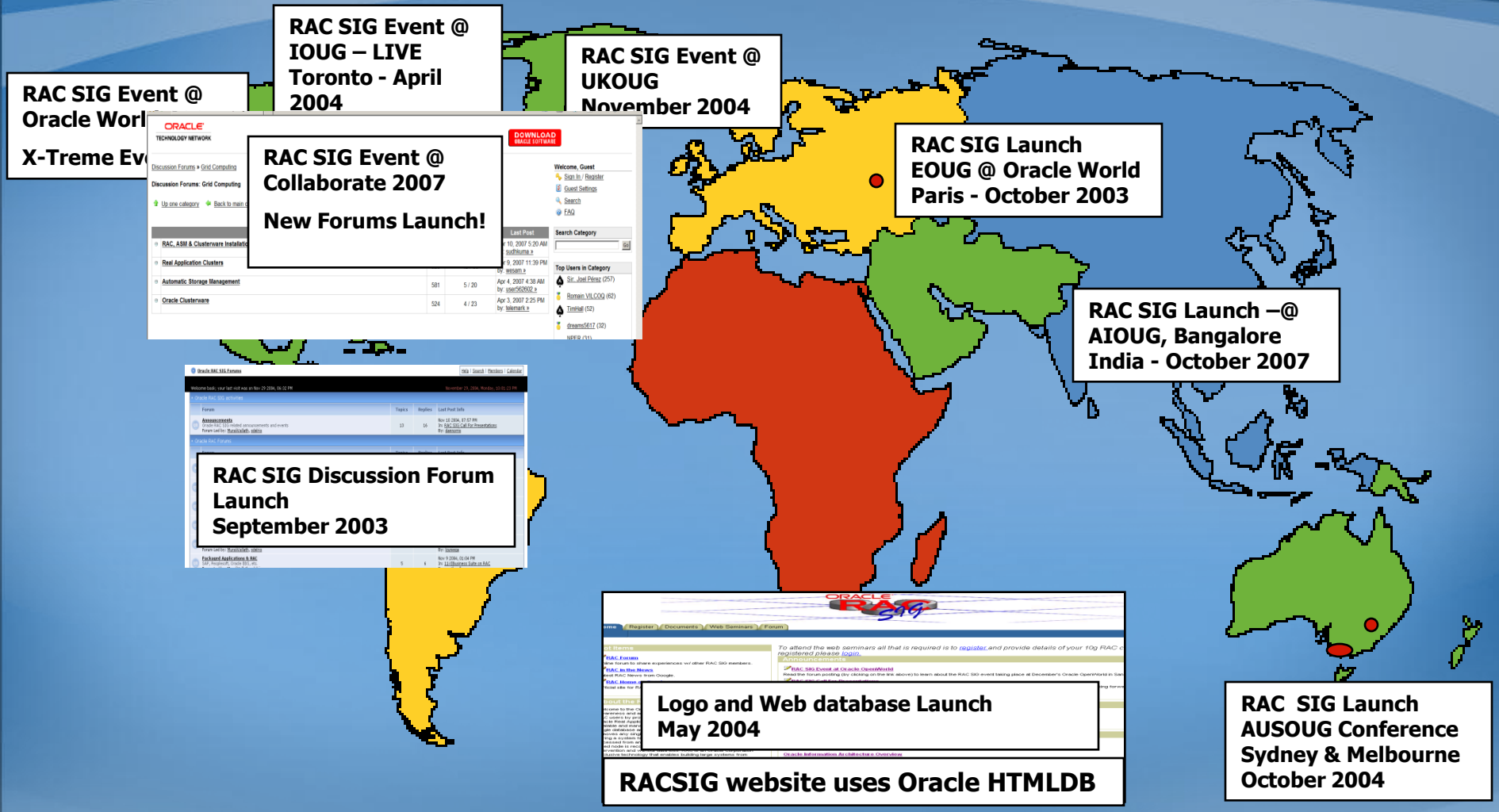
About the Group

- With the **popularity of RAC & Grid** its increasing use by the Oracle community, we introduced a by users, for users resource for Oracle RAC information in 2003.
- The Oracle Real Application Clusters Special Interest Group (RAC SIG) is comprised of people that want to **exchange knowledge** about Oracle RAC.
- We have arranged **panel discussions, technical presentations, and live web seminars** to provide answers to your technical questions about Oracle RAC.
- We maintain a **website** where you can find technical whitepapers, presentation materials, and best practices documentation in addition to a forum where anyone can read and post questions and answers.

About the Group

- Oracle Corporation and the RAC SIG work together to bring you **live webcasts** with a schedule that started in July 2004 and providing one to two technical sessions per month.
- The past web seminar sessions (which are excellent) were recorded and are **available for on-demand playback** any time. To view webcasts, register with our site and provide some basic information about your Oracle environment.
- To be included on the **list server**, you must be a **Member of IOUG** and subscribe to the RAC SIG mailing list. Your IOUG profile contains a section where you can indicate what SIGs you belong to.

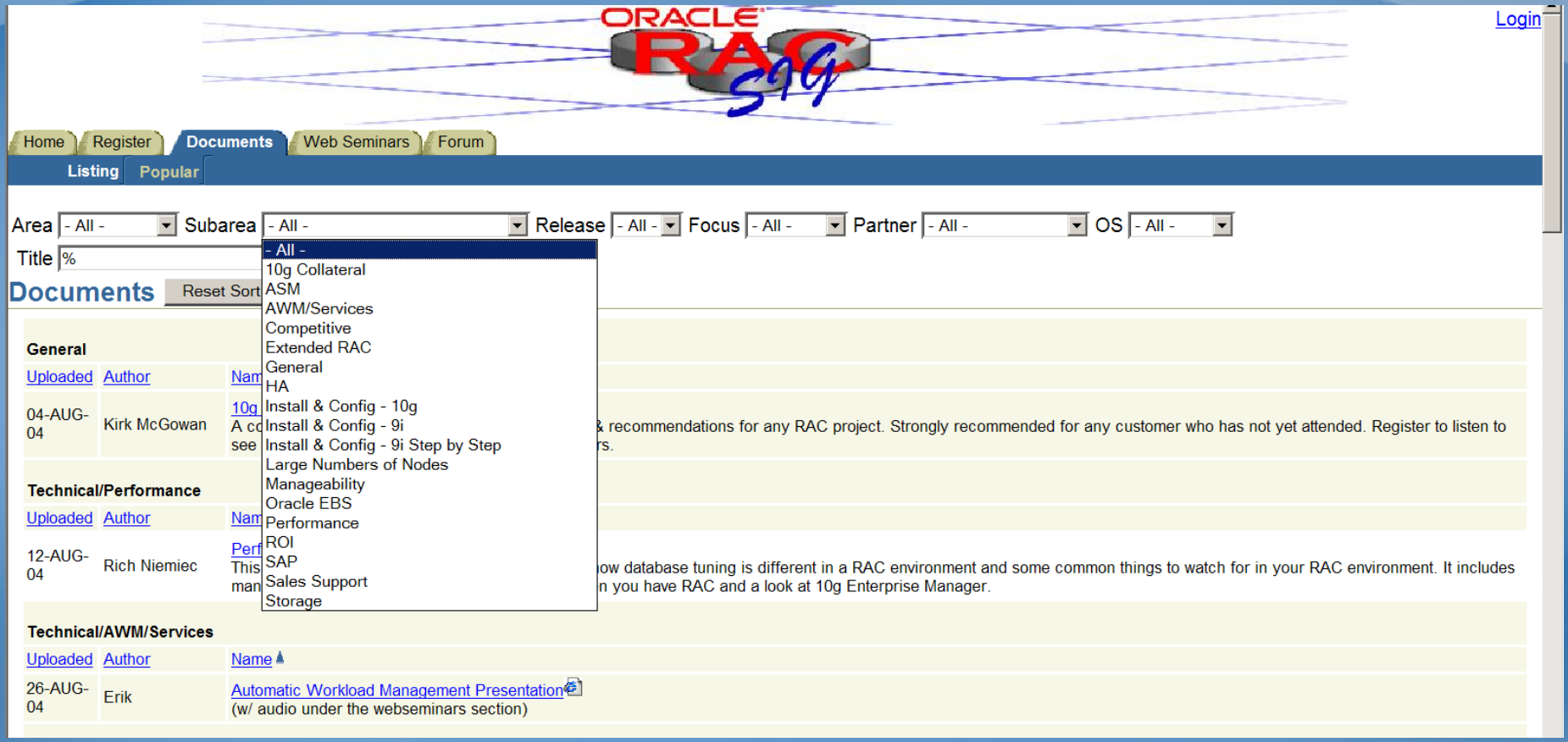
We are Global



Join the RAC SIG @ www.oracleracsig.org

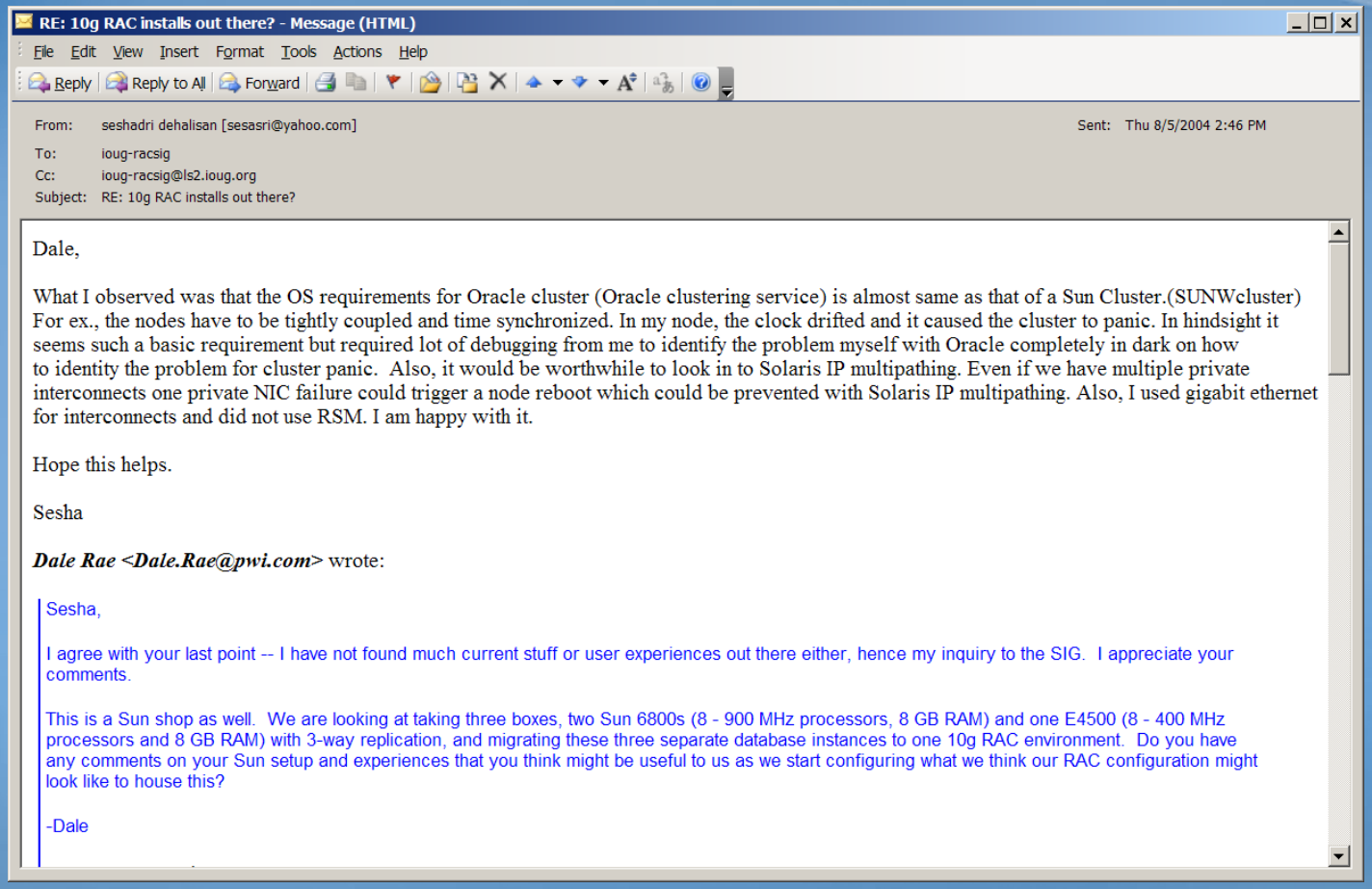
Website – www.oracleracsig.org

- Documents – Search for what you're looking for...



ListServe

- Great email exchange when you register:



RE: 10g RAC installs out there? - Message (HTML)

File Edit View Insert Format Tools Actions Help

Reply | Reply to All | Forward

From: seshadri dehalisan [sesasri@yahoo.com] Sent: Thu 8/5/2004 2:46 PM

To: ioug-racsig

Cc: ioug-racsig@ls2.ioug.org

Subject: RE: 10g RAC installs out there?

Dale,

What I observed was that the OS requirements for Oracle cluster (Oracle clustering service) is almost same as that of a Sun Cluster.(SUNWcluster) For ex., the nodes have to be tightly coupled and time synchronized. In my node, the clock drifted and it caused the cluster to panic. In hindsight it seems such a basic requirement but required lot of debugging from me to identify the problem myself with Oracle completely in dark on how to identity the problem for cluster panic. Also, it would be worthwhile to look in to Solaris IP multipathing. Even if we have multiple private interconnects one private NIC failure could trigger a node reboot which could be prevented with Solaris IP multipathing. Also, I used gigabit ethernet for interconnects and did not use RSM. I am happy with it.

Hope this helps.

Sesha

Dale Rae <Dale.Rae@pwi.com> wrote:

> Sesha,
>
> I agree with your last point -- I have not found much current stuff or user experiences out there either, hence my inquiry to the SIG. I appreciate your comments.
>
> This is a Sun shop as well. We are looking at taking three boxes, two Sun 6800s (8 - 900 MHz processors, 8 GB RAM) and one E4500 (8 - 400 MHz processors and 8 GB RAM) with 3-way replication, and migrating these three separate database instances to one 10g RAC environment. Do you have any comments on your Sun setup and experiences that you think might be useful to us as we start configuring what we think our RAC configuration might look like to house this?
>
> -Dale

We need your help!

- Tell everyone you know about the group!
- We need volunteers to help with our website
  - Application Express - APEX (Used to be HTML DB)
  - Website Administrators & Content Moderators
  - Document Librarians
  - Book Reviewers
  - Representatives in local & regional groups
  - Web Seminar Presenters
- Help us grow and share the knowledge in the forum
- We need your input to make us better (events/services)

Desupport

The following components are deprecated:

- iSQL*Plus
- Oracle Workflow
- Oracle Enterprise Manager Java Console
- Oracle Data Mining Scoring Engine
- Raw storage support (installer only)

Redhat / OEL Linux RPM Requirements

Additional RPMs from Oracle Database 10g R2

Can use up2date to install RPMs:

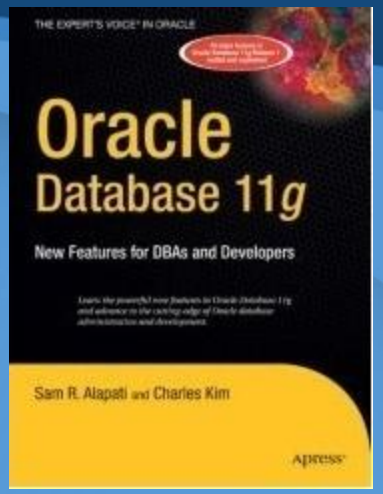
1. elfutils-libelf-devel

```
elfutils-libelf-0.97.1-5.i3 ########################### Done.
elfutils-libelf-devel-0.97. ########################### Done.
elfutils-0.97.1-5.i386.rpm: ########################### Done.
```

2. libaio-devel
3. unixODBC
4. unixODBC-devel

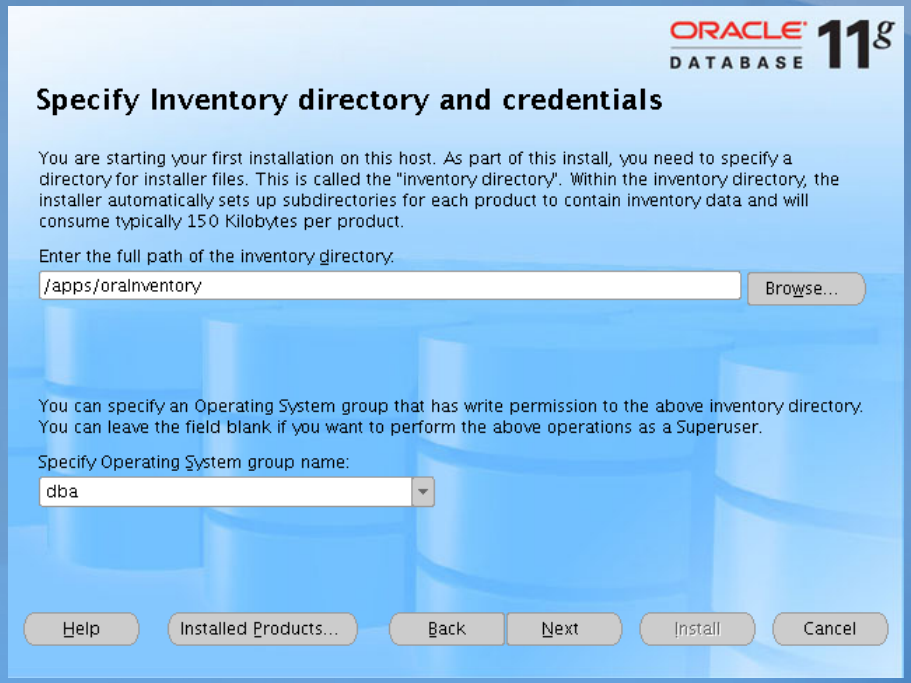
Linux Recipes for Oracle DBAs

Look for it at:
Collaborate 2009

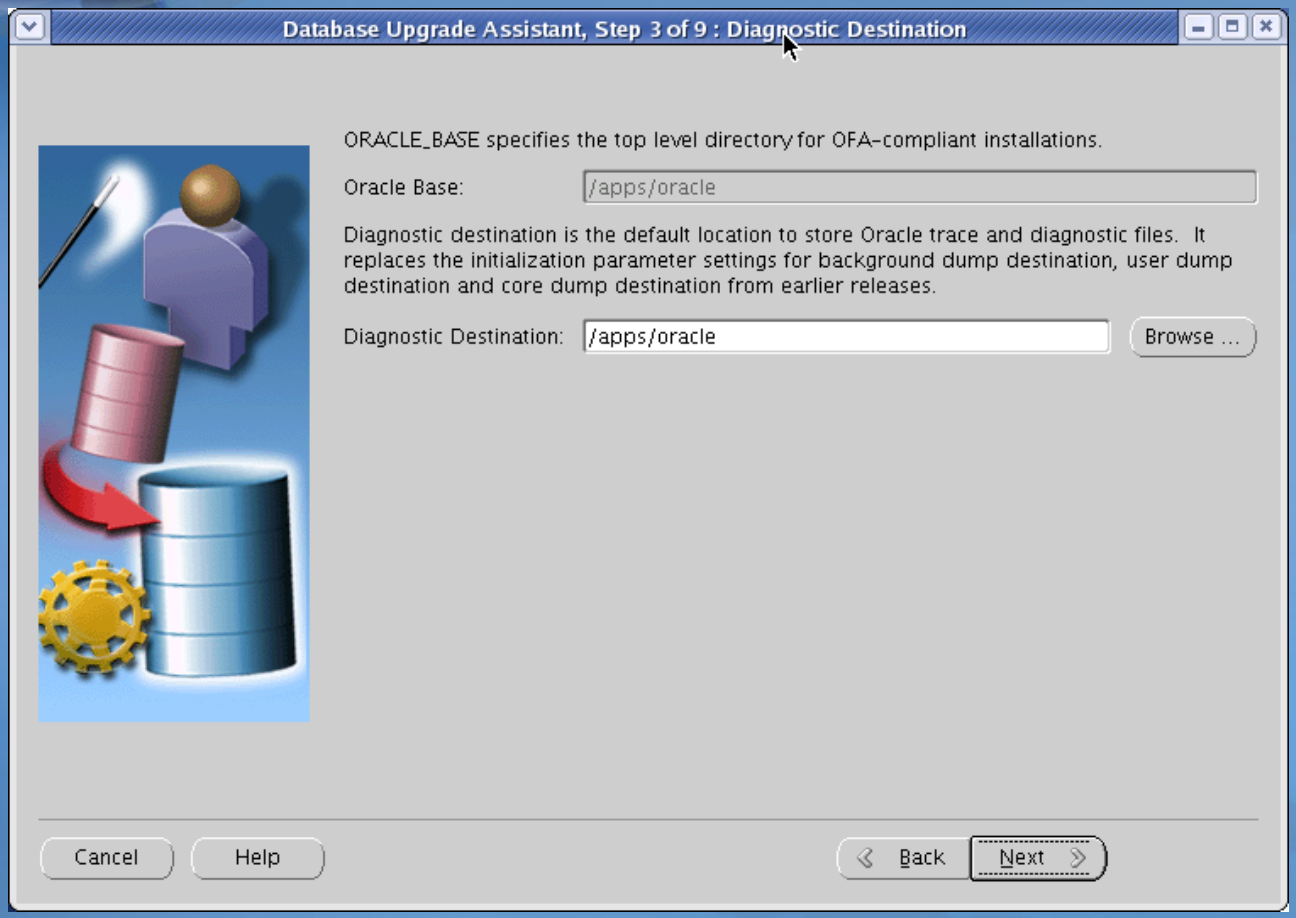


Installation

- Set ORACLE_BASE
  - Underscore Init Parameter
  - Default directory for DIAG_DEST
- Software installation – 3.3GB for base installation
- Change in default oraInventory location
- SQL*Developer as part of Oracle Database 11g
- APEX included
- OWB inlcuded



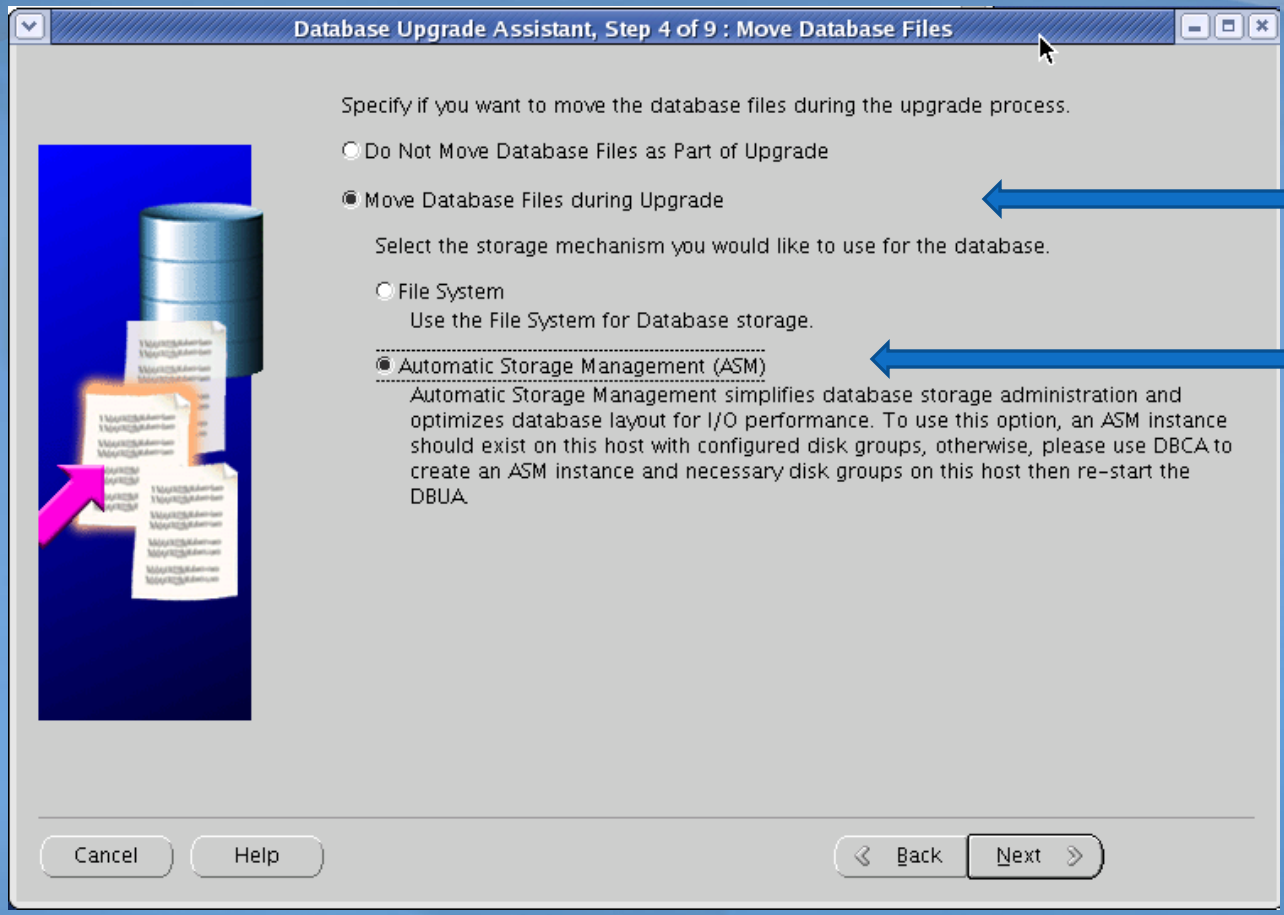
dbua - Upgrade



- Need to backup before upgrade
- Consider using dbua instead of the manual upgrade
- DBUA has been tried and tested thoroughly since 10gR1 by IOUG Beta Testers and Beta Program
- DBUA upgrade eBusiness Suite flawlessly without errors

How many of you are using DBUA for upgrades?

Upgrade


Database Upgrade Assistant, Step 4 of 9 : Move Database Files
Specify if you want to move the database files during the upgrade process.
Do Not Move Database Files as Part of Upgrade
Move Database Files during Upgrade
Select the storage mechanism you would like to use for the database.
File System
Use the File System for Database storage.
Automatic Storage Management (ASM)
Automatic Storage Management simplifies database storage administration and optimizes database layout for I/O performance. To use this option, an ASM instance should exist on this host with configured disk groups, otherwise, please use DBCA to create an ASM instance and necessary disk groups on this host then re-start the DBUA.
Cancel
Help
Back
Next

Recommended upgrade path

Databases newer than 9.2.0.4 can upgrade directly to 11g

Source Database	Target Database
9.2.0.4 or higher	11.1.0.6
10.1.0.2.0 or higher	11.1.0.6
10.2.0.1.0 or higher	11.1.0.6

1. 7.3.3 (or lower) ➤ 7.3.4 ➤ 9.2.0.8 ➤ 11.1
2. 8.0.5 (or lower) ➤ 8.0.6 ➤ 9.2.0.8 ➤ 11.1
3. 8.1.7 (or lower) ➤ 8.1.7.4 ➤ 9.2.0.8 ➤ 11.1
4. 9.0.1.3 (or lower) ➤ 9.0.1.4 ➤ 9.2.0.8 ➤ 11.1
5. 9.2.0.3 (or lower) ➤ 9.2.0.8 ➤ 11.1

Manual Upgrade Scripts

Three basic scripts:

1. utlu111i.sql: The pre-upgrade script.
2. catupgrd.sql: The actual upgrade script and is similar to the script in previous releases. The major change now is that it has been restructured to support parallel upgrades of the database.
3. utlu111s.sql: This is the upgrade status utility script, which you invoke after completing the database upgrade.

Clusterware Upgrade

Same process as upgrading from 10.2.0.1 to 10.2.0.3

- Shutdown CRS

  Modify /etc/inittab and comment out last three lines

  init q

  $ORA_CRS_HOME/bin/crsctl stop crs

- Execute pre-update script from the unzipped software/clusterware/upgrade directory

  ./preupdate.sh –crshome $ORA_CRS_HOME –crsuser oracrs

Best Practice for RAC: oracrs, oraasm and oradb

Complete CRS Upgrade

- Install new software binaries on all the RAC nodes
  - ./runInstaller
- From $ORA_CRS_HOME/install directory
  - ./rootupgrade
- Check upgrade status by querying activeversion of the CRS
  - crsctl query crs activeversion

For Rolling Upgrades
-updateNodeList
"CLUSTER_NODES=node1"
–local $ORA_CRS_HOME

Key RAC Improvements

No more need for raw devices

- Voting Disk and OCR can be on block devices

RAC Remote Kill

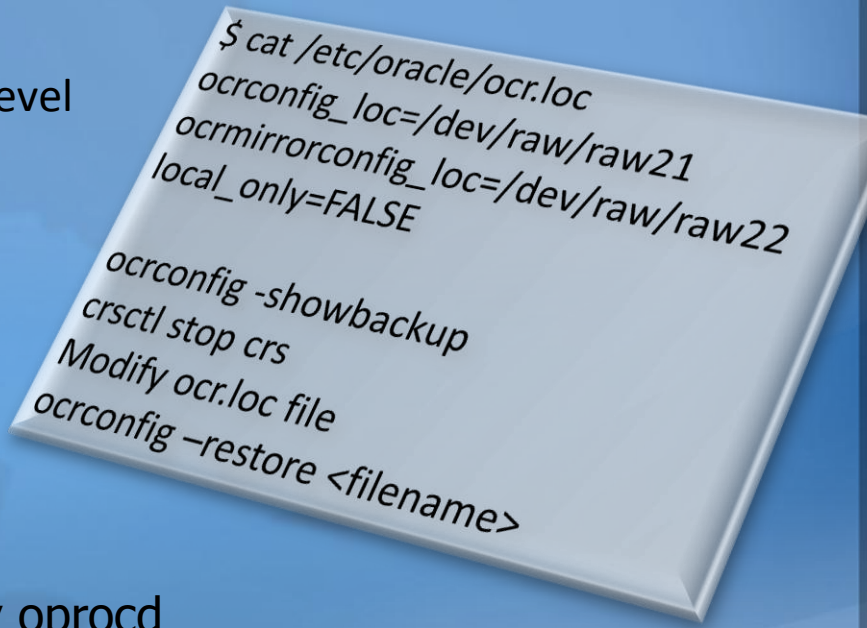
- alter system kill session 'sid, serial#', instance_id';

Global ADDM report

- See CRS health reports at the entire cluster level

Upgrade Concern

- OCR size doubles during the upgrade
- ocrconfig -replace ocr file_or_disk
- ocrconfig -replace ocrmirror file_or_disk

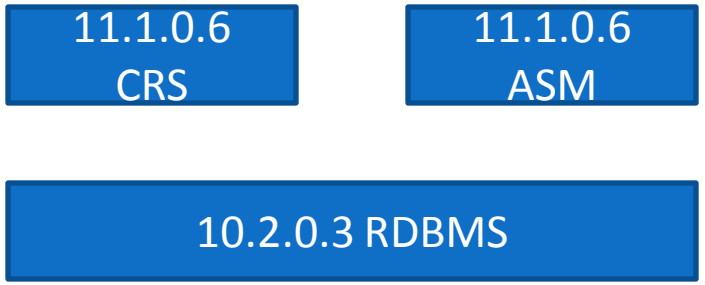


Linux

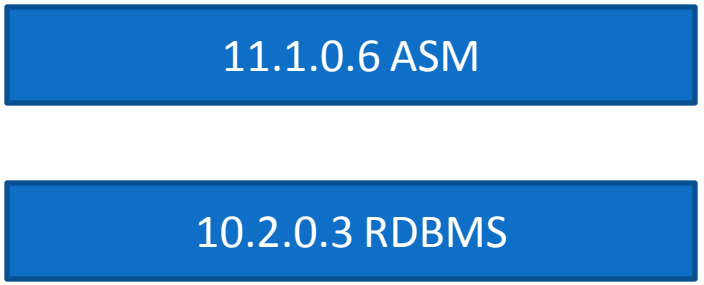
- No more hangcheck-timer → replaced by oprocd

Hybrid Technology Stack

Possible RAC Topology with Oracle Database 11g and 10g



Possible ASM Topology with Oracle Database 11g and 10g



Early Adopters

Where can you introduce Oracle Database 11g to your company?

You start at the DBA Sandbox then slowly promote it to:

1. Infrastructure databases
   - RMAN Repository
   - Grid Control Repository
2. Development
3. Internal databases that does not support external customers (i.e. the IT Web Portal Database, Openview Database, etc.)

Note: Consider participating in the Oracle 11g Release 2 Beta Program

Customer Case Study – Client standardized on ASM for non-RAC
11g ASM with 11g Grid Control / RMAN Repository

Client is not committed to 11.1.0.6 YET but wants to leverage the latest infrastructure technologies

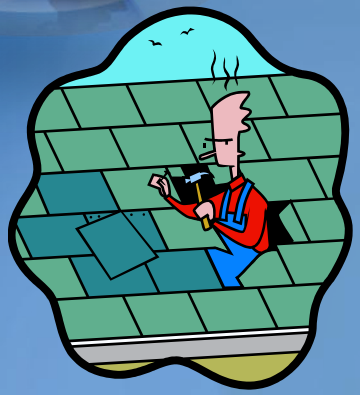
1. ASM 11.1.0.6
2. Grid Control 10gR4 (Certified with Oracle Database 11g)
   - Upgrade path is to install 10gR1 GC on 10.2.0.x database for OMS
   - Apply necessary DST patches
   - Upgrade the database to 11.1.0.6 using DBUA
   - Upgrade GC to 10gR4
3. Oracle Warehouse Builder from 11.1.0.6
4. Application Express from 11.1.0.6
5. Other production databases → 10.2.0.3 Database with 11.1.0.6 ASM

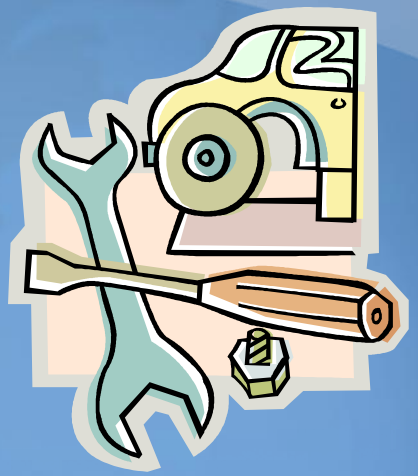
Basic Minor Thing you will notice

- Change ORACLE_SID using oraenv in 11g

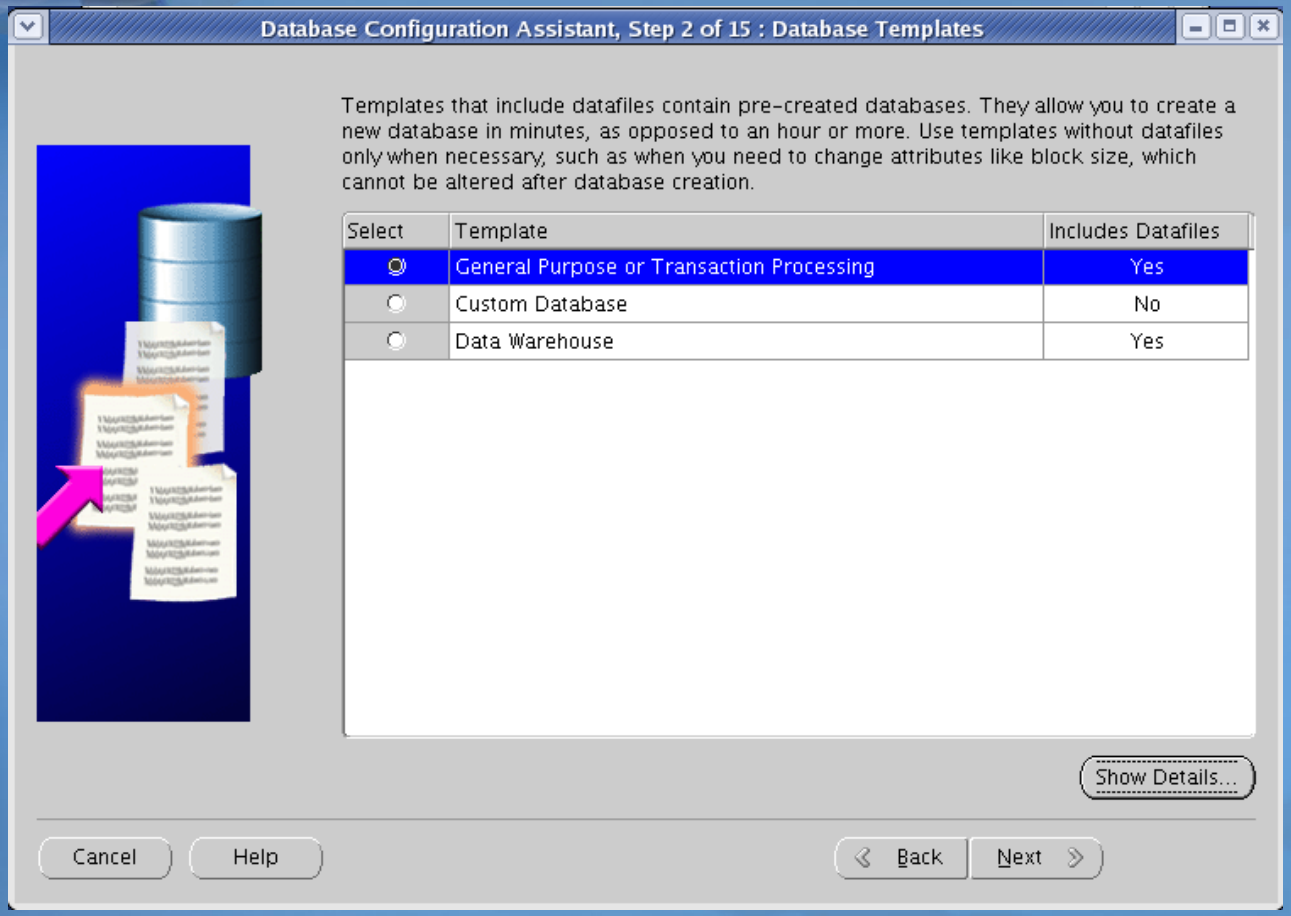
  [oracle@rac34 dbs]$. oraenv
  ORACLE_SID = [DUMMY] ? VISK4
  The Oracle base for
  ORACLE_HOME=/apps/oracle/product/11.1.0/
  DB is /apps/oracle

Database Maintenance





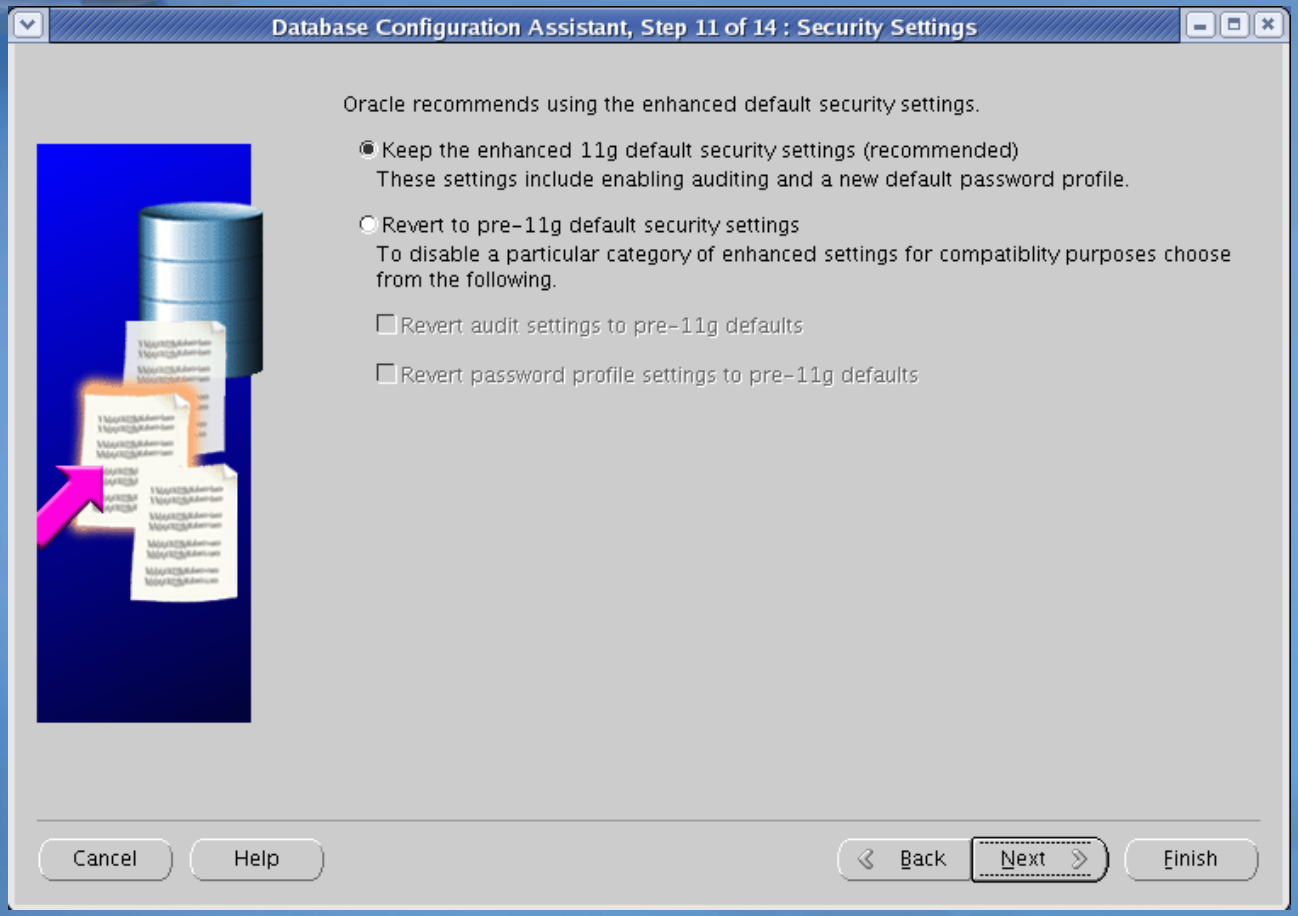
dbca



- XML DB is installed
- Data Mining schema is part of catproc.sql
- Data Mining does not appear in DBA_REGISTRY

How many people use DBCA? Scripts to create databases?

11g Enhanced Security



- Default is 11g Enhanced Security
- Can use DBCA to switch back to 10g based security

Create PFILE / SPFILE From Memory

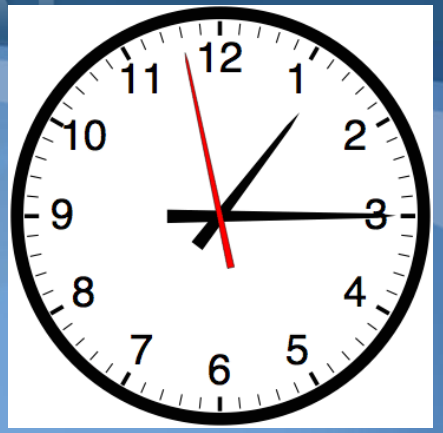
SQL> create spfile='/tmp/spfileVISK4' from memory;

File created.

SQL> create pfile='/tmp/initVISK4.ora' from memory;

File created.

DDL_LOCK_TIMEOUT



- **In one window:**

```
SQL> update emp set sal=sal*1.1 where empno=7934;
1 row updated.
```

BUT HE GOES OUT FOR LUNCH AND DOES NOT COMMIT

- In another window, we set the DDL_LOCKOUT_TIMEOUT parameter to 20 seconds:

```
SQL> alter session set ddl_lock_timeout=20;
Session altered.
```

  - **DDL_LOCK_TIMEOUT can be set at the system level:**

```
SQL> Alter system set ddl_lock_timeout = 120
scope = both;
System altered.
```

DDL_LOCK_TIMEOUT

Next, we will set time on and timing on to validate our tests:

```
SQL> set time on timing on
```

Now, we will finally perform our DDL:

```
14:45:41 SQL> alter table emp add column ssn;
alter table emp add column ssn
            *
ERROR at line 1:
ORA-00054: resource busy and acquire with NOWAIT specified or timeout
expired
```

Elapsed: 00:00:20.01

Locking of Tables

SQL> set time on timing on
00:14:23 SQL> lock table scott.emp2 in exclusive mode wait 10;
lock table scott.emp2 in exclusive mode wait 10
*
ERROR at line 1:
ORA-00054: resource busy and acquire with NOWAIT specified or timeout expired
Elapsed: 00:00:10.01

00:14:36 SQL> lock table scott.emp2 in exclusive mode nowait;
lock table scott.emp2 in exclusive mode nowait
*
ERROR at line 1:
ORA-00054: resource busy and acquire with NOWAIT specified or timeout expired
Elapsed: 00:00:00.01

In the other window,
We give A everyone a 10% raise

Update emp2 set salary

Default Value

```
1  select empno, phone_choice,
2         compute_choice
3  from emp2
4  * where rownum < 10
SQL> /

     EMPNO PHONE         COMPUTE
---------- ------------ -----------
     10001 iPhone       Mac Air
     10002 iPhone       Mac Air
     ..
     10007 iPhone       Mac Air
     10008 iPhone       Mac Air
     10009 iPhone       Mac Air

9 rows selected.
```

```
1* alter table emp2 add
   phone_choice varchar2(30)
   default 'iPhone' not null
SQL> /

Table altered.

Elapsed: 00:00:00.46

SQL> alter table emp2 add
     compute_choice
     varchar2(30)
     default 'Mac Air';

Table altered.

Elapsed: 00:00:33.60
```

Read-Only Tables

```
SQL> create table edba_alerts
        (alert_id number, description varchar2(1000));
    Table created.

SQL> alter table edba_alerts read only;
    Table altered.

SQL> alter table edba_alerts read write;
Table altered.
```

Oracle does allow you to drop a read only table:

```
SQL> drop table edba_alerts;
Table dropped.
```

Read-Only Tables

- **Oracle does not allow inserts/updates or deletes**

```
SQL> insert into edba_alerts values
     (1, 'Users are calling the helpdesk
     and reporting that their screens
     are hung.  Possibly the archive
     destination ran out of space
     again')
                *
     ERROR at line 1:
     ORA-12081: update operation not
     allowed on table
     "RODBA"."EDBA_ALERTS"
```

- **Oracle does not allow you to add another column:**

```
SQL> alter table edba_alerts add
     lasted_updated date;
     alter table edba_alerts add
     lasted_updated date
     *
     ERROR at line 1:
     ORA-12081: update operation
     not allowed on table
     "RODBA"."EDBA_ALERTS"
```

Temporary Tablespace - Create

1* create temporary tablespace temp2 tempfile '+data' size 1g, '+data' size 1g;
Tablespace created.

1* select file#,name,bytes/1024/1024 mb from v$tempfile;

```
FILE# NAME                                                    MB
----- ---------------------------------------- ----------
    1 +DATA/visk/tempfile/temp01.dbf                          34
    2 +DATA/visk/tempfile/temp2.269.650271065               1024
    3 +DATA/visk/tempfile/temp2.270.650271065               1024
```

Temporary Tablespace Management

SQL> alter tablespace temp2 shrink space keep 500m;

Tablespace altered.

SQL> select file#,name,bytes/1024/1024 mb from v$tempfile;

```
     FILE# NAME                                                 MB
---------- ---------------------------------------- ----------
         1 +DATA/visk/tempfile/temp01.dbf                     34
         2 +DATA/visk/tempfile/temp2.269.650271065          1.0625
         3 +DATA/visk/tempfile/temp2.270.650271065        499.9375
```

SQL> alter database tempfile '+DATA/visk/tempfile/temp2.270.650271065' resize 100m;

Database altered.

Restore Point Enhancements

```
SQL> select current_scn from v$database;

CURRENT_SCN
-----------
    1685790

SQL> create restore point rp_24MAR08 as of scn 1650000;

Restore point created.

 1  create restore point rp_24MAR08_2 as of timestamp
 2*  to_timestamp('24-MAR-08 12.51.51.500000')
SQL> /

Restore point created.
```

Restore Point #2

SQL> create restore point rp_25MAR08 preserve;

Restore point created.

1* select name, time, scn, preserved from v$restore_point;

```
NAME            TIME                              SCN PRE
--------------- ------------------- ---------- ---
RP_25MAR08      25-MAR-08 07.21.39.    1685942 YES
                000000000 AM
RP_24MAR08      25-MAR-08 07.15.19.    1650000 NO
                000000000 AM
RP_24MAR08_2    25-MAR-08 07.20.06.    1634672 NO
                000000000 AM
```

Automatic Memory Management (AMM)

Let Oracle do it for you

- Init parameter addresses SGA and PGA :
  - memory_target
  - memory_max_target

Additional Key Database Features

- Automatic Memory Management
  - memory_target
  - memory_max_target
- Database resident connection pooling
  - dbms_connection_pool.start_pool();
  - dbms_connection_pool.stop_pool();
- Minimum invalidation of dependent objects
- Automated database maintenance tasks
  - Default resource manger plan
  - New maintenance windows

Flashback Data Archive (FDA)

First, grant the flashback archive administrator:

```
1* grant flashback
   archive administer to scott;

Grant succeeded.
```

Connecting as Scott create flashback archive:

```
1  create flashback archive flash_archive_1
2  tablespace fa1
3  quota 100m
4* retention 1 year;

Flashback archive created.
```

FDA – Setup at Table Level

```
SQL> alter table emp flashback archive flash_archive_1;
  Table altered.

SQL> select  empno, ename, sal from emp where empno=7902;
       EMPNO ENAME                SAL
  ---------- ---------- ----------
        7902 FORD                3000

SQL> update emp set sal=3000*1.06 where  empno=7902;
  1 row updated.

SQL>  select  empno, ename, sal from emp where empno=7902;
       EMPNO ENAME                SAL
  ---------- ---------- ----------
        7902 FORD                3180
```

FDA – Query Back in Time

Check Ford's Salary as of 10 minutes ago:

```
1   select empno, ename, sal
2   from emp
3   as of timestamp
4   (systimestamp - interval
    '15' minute)
5* where empno=7902
SQL> /


EMPNO    ENAME                SAL
-------  ---------- ----------
   7902  FORD                3000
```

As of timestamp can be:

#1:
'50' SECOND
'50' DAY
'12' MONTH

#2:
as of timestamp
to_timestamp ('03/27/2008 18:30:00','mm/dd/yyyy hh24:mi:ss')

FDA – Don't Try To Go Too Far Back

```
  1  select empno, ename, sal
  2  from emp
  3  as of timestamp
  4  (systimestamp - interval '1' year)
  5* where empno=7902
SQL> /
where empno=7902
           *
ERROR at line 5:
ORA-08180: no snapshot found based on specified time
ORA-06512: at "SYS.TIMESTAMP_TO_SCN", line 1
```

FDA – Explain Plan

Perform an explain plan

```
1  explain plan for
2  select empno, ename, sal
3  from emp
4  as of timestamp
5  (systimestamp - interval '15' minute)
6* where empno=7902;
Explained.

1* select plan_table_output
   from table(dbms_xplan.display
  ('plan_table',null,'serial'));
```

FDA – Explain Plan Output

```
PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------
Plan hash value: 2886175892

------------------------------------------------------------------------------------------------
| Id  | Operation                          | Name                | Rows  | Bytes | Cost (%CPU)| Time
------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT                   |                     |     2 |    66 |     7   (0)| 00:00
|   1 |  VIEW                              |                     |     2 |    66 |     7   (0)| 00:00
|   2 |   UNION-ALL                        |                     |       |       |            |
|*  3 |    FILTER                          |                     |       |       |            |
|   4 |     PARTITION RANGE SINGLE         |                     |     1 |    59 |     3   (0)| 00:00
|*  5 |      TABLE ACCESS FULL             | SYS_FBA_HIST_69515  |     1 |    59 |     3   (0)| 00:00

PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------
|*  6 |    FILTER                          |                     |       |       |            |
|   7 |     NESTED LOOPS OUTER             |                     |     1 |  2060 |     4   (0)| 00:00
|*  8 |      TABLE ACCESS BY INDEX ROWID| EMP                    |     1 |    45 |     2   (0)| 00:00
|*  9 |       INDEX UNIQUE SCAN            | PK_EMP              |     1 |       |     1   (0)| 00:00
|* 10 |      VIEW                          |                     |     1 |  2015 |     2   (0)| 00:00
|* 11 |       TABLE ACCESS FULL            | SYS_FBA_TCRV_69515  |     1 |  2028 |     3   (0)| 00:00
------------------------------------------------------------------------------------------------
```

FDA - Put the data back as it was 15 minutes ago

```
  1  update emp
  2  set sal =
  3    (select sal from emp
  4     as of timestamp
       (systimestamp - interval '15' minute)
  5     where empno=7902)
  6* where empno=7902
SQL> /

1 row updated.
```

FDA Maintenance

```
  1  alter flashback archive flash_archive_1
  2  purge before timestamp
  3* (systimestamp - interval '10' minute)
SQL> /
Flashback archive altered.
```

Note: You can also purge

- **purge before scn scn#**
- purge all

```
  1  alter flashback archive flash_archive_1
  2  add tablespace trans_d
  3* quota 100m
SQL> /

Flashback archive altered.
```

```
  1  alter flashback archive flash_archive_1
  2* modify retention 15 month
SQL> /

Flashback archive altered.
```

```
SQL> alter table emp no flashback archive;

Table altered.
```

```
  1* drop flashback archive flash_archive_1
SQL> /

Flashback archive dropped.
```

FDA Default and History Table

SQL> alter flashback archive flash_archive_1 set default;

Flashback archive altered.

```
 1* select * from dba_flashback_archive_tables
SQL> /

TABLE_NA OWNER_NA FLASHBACK_ARCHIVE_NA ARCHIVE_TABLE_NAME
-------- -------- -------------------- ------------------
EMP      SCOTT    FLASH_ARCHIVE_1      SYS_FBA_HIST_69515
```

FDA Retention and Quota

```
SQL> select flashback_archive_name, retention_in_days
     from dba_flashback_archive;
FLASHBACK_ARCHIVE_NA RETENTION_IN_DAYS
-------------------- ----------------
FLASH_ARCHIVE_1                   365

SQL> select flashback_archive_name,
     tablespace_name, quota_in_mb
  2  from dba_flashback_archive_ts;
FLASHBACK_ARCHIVE_NA TABLESPACE_NAME  QUOTA_IN_MB
-------------------- ---------------- ------------
FLASH_ARCHIVE_1      FA1                       100
FBA_UNLIMITED        FA1
```

Gather Stats – Auto-Sampling

Accuracy is supposed to be comparable to COMPUTE

ESTIMATE_PERCENT parameter of GATHER_TABLE_STATS

```
  1  begin
  2   dbms_stats.gather_table_stats(null,
  3     'EMP2',
  4      estimate_percent => dbms_stats.auto_sample_size);
  5* end;
SQL> /

PL/SQL procedure successfully completed.

Elapsed: 00:00:02.64
```

Gather Stats - Pending

```
SQL> exec dbms_stats.set_table_prefs('SCOTT','EMP2','PUBLISH','FALSE');

PL/SQL procedure successfully completed.
```

```
select dbms_stats.get_prefs (
ownname=>'SCOTT',
tabname=>'EMP2',
pname=>'PUBLISH') PUBLISHED
from dual
SQL> /

PUBLISHED
---------------
FALSE
```

Gather Stats – Query Pending

```
SQL>  exec dbms_stats.gather_table_stats('SCOTT','EMP2');
PL/SQL procedure successfully completed.


1  select table_name, num_rows,
2         to_char(last_analyzed,'mm/dd/yy hh24:mi:ss')
3* from user_tab_pending_stats
SQL> /

TABLE_NAME                     NUM_ROW    TO_CHAR(LAST_ANAL
------------------------------ ---------- -----------------
EMP2                              269990   03/22/08 19:53:26
```

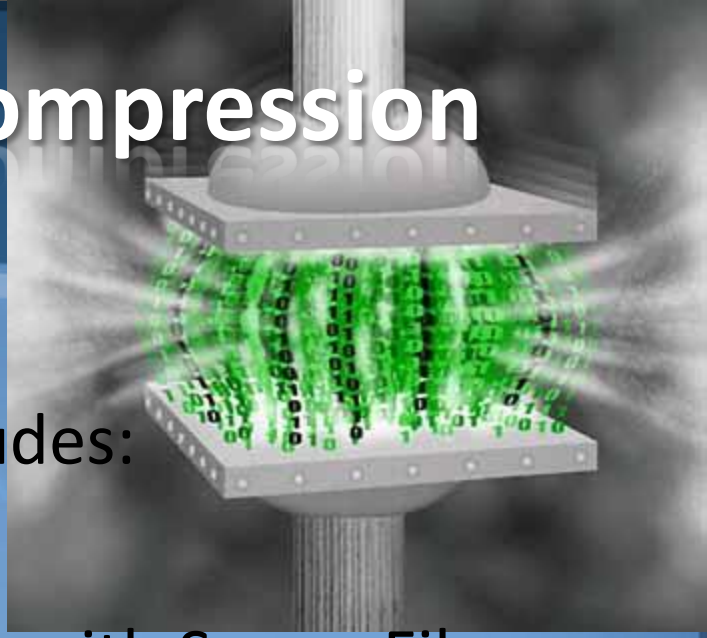
Gather Stats – Query Pending

```
SQL> select table_name, last_analyzed, num_rows, blocks
  2  from user_tables where table_name='EMP2';
TABLE_NAME                     LAST_ANAL   NUM_ROWS     BLOCKS
------------------------------ --------- ---------- ----------
EMP2

SQL> alter session set optimizer_use_pending_statistics=true;
Session altered.
SQL> exec dbms_stats.publish_pending_stats('SCOTT','EMP2');
PL/SQL procedure successfully completed.

SQL> select table_name, last_analyzed, num_rows, blocks
  2  from user_tables where table_name='EMP2';
TABLE_NAME                     LAST_ANAL   NUM_ROWS     BLOCKS
------------------------------ --------- ---------- ----------
EMP2                           22-MAR-08     269990       1759
```

Oracle Advanced Compression Option



Licensed as a separate option – includes:

- Compression of OLTP data
- Compression of unstructured data with SecureFiles
- Compression using the new RMAN backup compressed configuration (ZLIB)
- Compression of redo data during transmission to the physical standby database
- Compression of Datapump export data
- Oracle claims compression to be 3.5 to 1 ratio

Oracle Advanced Compression Option

```
 1  Create table compressed_emp2
 2  compress for all operations
 3* as select * from emp2
SQL> /
Table created.

SQL> alter table emp2 compress;
Table altered.

SQL> alter table emp2 nocompress;
Table altered.
```

Invisible Indexes

create table books (book_id number, name varchar2(255), author varchar2(255), isbn varchar2(255));

create index BOOK_ISBN_INVISIBLE_IDX on books(isbn) invisible;

insert into books (book_id, name, author, isbn) values (2,'RMAN Recipes','Darl Kuhn','1590598512');
insert into books (book_id, name, author, isbn) values (1,'Oracle ASM','Nitin Vengurlekar','0071496076');
insert into books (book_id, name, author, isbn) values (3,'Oracle 11g New Features','Charles Kim','1590599101');

```
  1* select index_name,VISIBILITY
from user_indexes
where index_name='BOOK_ISBN_INVISIBLE_IDX'
SQL> /

INDEX_NAME                     VISIBILIT
------------------------------ ---------
BOOK_ISBN_INVISIBLE_IDX        INVISIBLE
```

Invisible Indexes – optimizer_use_invisible_indexes = TRUE

SQL> explain plan for select /*+ index(books BOOK_ISBN_INVISIBLE_IDX) */ name, author from books where isbn='0071496076';

Explained.

```
SQL> select * from table(dbms_xplan.display);
PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------
   -
Plan hash value: 3295519971
--------------------------------------------------------------------------------
| Id  | Operation                    | Name                 | Rows  | Bytes | Cost (%
--------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |                      |     1 |   387 |   276
|   1 |  TABLE ACCESS BY INDEX ROWID| BOOKS                |     1 |   387 |   276
|*  2 |   INDEX RANGE SCAN           | BOOK_ISBN_INVISIBLE_IDX |     1 |       |
   00:00:01 |
--------------------------------------------------------------------------------
```

Invisible Indexes – optimizer_use_invisible_indexes=FALSE;

SQL> explain plan for select /*+ index(books BOOK_ISBN_INVISIBLE_IDX) */ name, author from books where isbn='0071496076';
Explained.

```
SQL> select * from table(dbms_xplan.display);
PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------
Plan hash value: 2688610195
--------------------------------------------------------------------------------
| Id  | Operation          | Name  | Rows  | Bytes | Cost (%CPU)| Time
--------------------------------------------------------------------------------
|   0 | SELECT STATEMENT   |       |     1 |   387 |     3   (0)| 00:00
|*  1 |  TABLE ACCESS FULL| BOOKS |     1 |   387 |     3   (0)| 00:00
--------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------
```

Invisible Indexes

SQL> alter index BOOK_ISBN_INVISIBLE_IDX visible;
Index altered.

```
SQL> select index_name,VISIBILITY
from user_indexes
where index_name='BOOK_ISBN_INVISIBLE_IDX';

INDEX_NAME                     VISIBILIT
------------------------------ ---------
BOOK_ISBN_INVISIBLE_IDX        VISIBLE
```

Note:

- If you rebuild an invisible index, it will become visible. You will need to manually set it to invisible.

Invisible Indexes

```
SQL> exec dbms_stats.gather_index_stats(user,'BOOK_ISBN_INVISIBLE_IDX');
BEGIN dbms_stats.gather_index_stats(user,'BOOK_ISBN_INVISIBLE_IDX'); END;
*
ERROR at line 1:
ORA-00904: : invalid identifier
ORA-06512: at "SYS.DBMS_STATS", line 14037
ORA-06512: at "SYS.DBMS_STATS", line 14060
ORA-06512: at line 1
-- Bug No.          6344547

SQL> alter session set optimizer_use_invisible_indexes=TRUE;
Session altered.

SQL> exec dbms_stats.gather_index_stats(user,'BOOK_ISBN_INVISIBLE_IDX');
PL/SQL procedure successfully completed.
```

Virtual Columns

```
create table tech_books
(book_id number,
 author varchar2(255),
 price number,
discounted_price generated always as(price*.75),
 isbn number)
/
```

Can be written using the optional VIRTUAL keyword:

- tech_price generated always as(price*.75) virtual

```
SQL> desc tech_books
 Name                                      Null?    Type
 ----------------------------------------- -------- --------
 BOOK_ID                                            NUMBER
 AUTHOR                                             VARCHAR2(255)
 PRICE                                              NUMBER
 DISCOUNTED_PRICE                                   NUMBER
 ISBN                                               NUMBER
```

Virtual Columns

```
SQL> select * from tech_books;

   BOOK_ID AUTHOR                         PRICE    DISCOUNT         ISBN
                                                     PRICE
---------- -------------------- ---------- ----------  ----------
         2 Darl Kuhn                      49.99     37.4925  1590598512
         1 Nitin Vengurlekar              39.99     29.9925    71496076
         3 Charles Kim                    39.99     29.9925  1590599101
```

Rules:

1. Virtual column is a derived expression
2. Can't create a virtual column as a LOB, RAW or User-fined TYPE
3. Can be derived from columns of the same table
4. Can be derived from constants
5. Can use SQL or user-defined PL/SQL functions
6. Can create an index or partition on a virtual column
7. Can not be on Index Organized and External Tables
8. Indexes against virtual columns are equivalent to function-based indexes

Cannot apply DML Against Virtual Column

Cannot attempt to insert into a virtual column:

```
SQL> insert into tech_books (book_id, author, price,
    discounted_price)
  2  values
  3  (4,'Sam Alapati',69.99,55);
insert into tech_books (book_id, author, price,
    discounted_price)
            *
ERROR at line 1:
ORA-54013: INSERT operation disallowed on virtual columns
```

Cannot have virtual columns on virtual colum

Cannot have virtual columns based on other virtual columns:

```
  1  create table discounted_books
  2  (book_id number,
  3   author varchar2(255),
  4   price number,
  5   tech_price generated always as(price*.75),
  6   discounted_price as (tech_price*.5)
  7* )
SQL> /
 tech_price generated always as(price*.75),
 *
ERROR at line 5:
ORA-54012: virtual column is referenced in a column expression
```

Check Virtual Column

```
SQL> COLUMN data_default FORMAT A50
SQL> SELECT column_name, data_default
  2  FROM   user_tab_columns
  3  WHERE table_name='TECH_BOOKS';

COLUMN_NAME                    DATA_DEFAULT
------------------------------ --------------------
BOOK_ID
AUTHOR
PRICE
DISCOUNTED_PRICE               "PRICE"*.75
ISBN
```

DBMS_COMPARISON

- SharePlex Compare and Repair
- Intended for Streams

Can compare data between:

1. Tables
2. Single table views
3. MV
4. Synonyms that point to tables, single-table views, and MVs
5. Local and remote database

Requirements

1. Local Database has to be 11.1
2. Remote database has to be 10.1
3. At least one index must be available on the objects being compared
4. Preference is NUMBER datatype
5. Same database character set

DBMS_COMPARISON

Restrictions - Does not support:

1. LONG
2. LONG RAW
3. CLOB
4. NCLOB
5. BLOB
6. BFILE
7. User-Defined Types
8. Oracle Supplied Types such as XMLTypesTables

```
As SYS:
SQL> grant execute on dbms_comparison to scott;
Grant succeeded.

SQL> create table emp_visk as select * from emp;
Table created.

  1  alter table emp_visk
  2* add constraint emp_visk_pk primary key (empno)
SQL> /
Table altered.

SQL> update emp_visk set sal=sal*1.1;
14 rows updated.

SQL> commit;
Commit complete.
```

DBMS_COMPARISON.CREATE_COMPARION

```
BEGIN
 DBMS_COMPARISON.CREATE_COMPARISON
 ( comparison_name => 'compare_emp_to_emp_visk'
 , schema_name     => 'scott'
 , object_name     => 'emp'
 , dblink_name     => null
 , remote_schema_name=>'scott'
 , remote_object_name=>'EMP_VISK'
 );
END;
/

PL/SQL procedure successfully completed.
```

DBMS_COMPARISON.COMPARE

```
DECLARE
  consistent   BOOLEAN;
  scan_info    DBMS_COMPARISON.COMPARISON_TYPE;
BEGIN
  consistent := DBMS_COMPARISON.COMPARE
   (comparison_name => 'compare_emp_to_emp_visk'
   ,scan_info       => scan_info
   ,perform_row_dif => TRUE);
DBMS_OUTPUT.PUT_LINE('Scan ID: '||scan_info.scan_id);
IF consistent=TRUE THEN
  DBMS_OUTPUT.PUT_LINE('No differences were found.');
ELSE
  DBMS_OUTPUT.PUT_LINE('Differences were found.');
END IF;
END;
SQL> /
```

```
Scan ID: 1
Differences were found.

PL/SQL procedure successfully completed.
```

Do Some Inserts and Create Another Comparison

```
 1  insert into emp (empno, ename, job, mgr,
      hiredate, sal, deptno)
 2  values
 3* (8000, 'CKIM', 'SR. DBA', 7902, sysdate,
      90000, 20)
SQL> /
1 row created.

 1  insert into emp (empno, ename, job, mgr,
      hiredate, sal, deptno)
 2  values
 3* (8001, 'SALAPATI', 'SR. DBA', 7902, sysdate,
      90000, 20)
SQL> /
1 row created.

SQL> commit;
Commit complete.
```

```
DECLARE
 consistent   BOOLEAN;
 scan_info    DBMS_COMPARISON.COMPARISON_TYPE;
BEGIN
 consistent := DBMS_COMPARISON.COMPARE
            ( comparison_name => 'compare_emp_to_emp_visk2'
            , scan_info       => scan_info
            , perform_row_dif => TRUE
            );
DBMS_OUTPUT.PUT_LINE('Scan ID: '||scan_info.scan_id);
IF consistent=TRUE THEN
 DBMS_OUTPUT.PUT_LINE('No differences were found.');
ELSE
 DBMS_OUTPUT.PUT_LINE('Differences were found.');
END IF;
END;
SQL> /
Scan ID: 4
Differences were found.

PL/SQL procedure successfully completed.
```

Comparison Scan Summary

```
SELECT c.owner, s.scan_id ,c.comparison_name
      ,c.schema_name ,c.object_name
      ,s.current_dif_count DIFF_COUNT
FROM   dba_comparison c
      ,dba_comparison_scan_summary s
WHERE  c.comparison_name = s.comparison_name
AND    s.scan_id in (1,4)
SQL> /

OWNER    SCAN_ID COMPARISON_NAME           SCHEMA OBJECT DIFF_COUNT
----- ---------- ------------------------ ------ ------ ----------
SCOTT           4 COMPARE_EMP_TO_EMP_VISK2 SCOTT  EMP    16
SYS             1 COMPARE_EMP_TO_EMP_VISK  SCOTT  EMP    14
```

Local and Remote Index Values

```
SELECT s.comparison_name,
     c.column_name
    ,r.index_value
,case when r.local_rowid is null
    then 'No'
    else 'Yes'
 end local_rowid
,case when r.remote_rowid is null
    then 'No'
    else 'Yes'
 end remote_rowid
FROM dba_comparison_columns c,
       dba_comparison_row_dif r
   ,dba_comparison_scan s
WHERE c.comparison_name in
       ('COMPARE_EMP_TO_EMP_VISK',
       'COMPARE_EMP_TO_EMP_VISK2')
AND r.scan_id = s.scan_id
AND s.last_update_time > sysdate - 1
AND r.status= 'DIF'
AND c.index_column= 'Y'
AND c.comparison_name = r.comparison_name
order by s.comparison_name, r.index_value
SQL> /
```

```
COMPARISON_NAME           COLUMN_NAME   INDEX_VAL   LOC REM
------------------------- ------------ --------- --- ---
COMPARE_EMP_TO_EMP_VISK   EMPNO         7369       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7499       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7521       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7566       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7654       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7698       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7782       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7788       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7839       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7844       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7876       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7900       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7902       Yes Yes
COMPARE_EMP_TO_EMP_VISK   EMPNO         7934       Yes Yes
COMPARE_EMP_TO_EMP_VISK2  EMPNO         7369       Yes Yes
[..]
COMPARE_EMP_TO_EMP_VISK2  EMPNO         7934       Yes Yes
COMPARE_EMP_TO_EMP_VISK2  EMPNO         8000       Yes No
COMPARE_EMP_TO_EMP_VISK2  EMPNO         8001       Yes No

30 rows selected.
```

Converge – Synchronize the Tables

```
DECLARE
 scan_info    DBMS_COMPARISON.COMPARISON_TYPE;
BEGIN
 DBMS_COMPARISON.CONVERGE
 ( comparison_name  => 'COMPARE_EMP_TO_EMP_VISK'
 , scan_id         => 1
 , scan_info       => scan_info
 , converge_options => DBMS_COMPARISON.CMP_CONVERGE_LOCAL_WINS);
DBMS_OUTPUT.PUT_LINE('Local Rows Merged: '||scan_info.loc_rows_merged);
DBMS_OUTPUT.PUT_LINE('Remote Rows Merged: '||scan_info.rmt_rows_merged);
DBMS_OUTPUT.PUT_LINE('Local Rows Deleted: '||scan_info.loc_rows_deleted);
DBMS_OUTPUT.PUT_LINE('Remote Rows Deleted: '||scan_info.rmt_rows_deleted);
END;
SQL> /
Local Rows Merged: 0
Remote Rows Merged: 14
Local Rows Deleted: 0
Remote Rows Deleted: 0
PL/SQL procedure successfully completed.
```

Recheck

```
DECLARE
v_comp BOOLEAN;
BEGIN
v_comp := DBMS_COMPARISON.RECHECK
       (comparison_name=>'COMPARE_EMP_TO_EMP_VISK2',
        scan_id=>4);
IF v_comp = TRUE then
 DBMS_OUTPUT.PUT_LINE('No Deltas Found During Recheck');
ELSE
 DBMS_OUTPUT.PUT_LINE('Deltas Found During Recheck');
END IF;
END;
SQL> /
Deltas Found During Recheck


PL/SQL procedure successfully completed.
```

Rows are inserted after the last comparison

```
1  insert into emp_visk (empno, ename,
job, mgr, hiredate, sal, deptno)
  2  values
  3* (8002, 'DKUHN', 'SR. DBA', 7902,
sysdate, 95000, 20)
SQL> /
1 row created.

SQL> update emp_visk set sal=99000
where empno=8000;
1 row updated.

SQL> commit;
Commit complete.
```

Maintenance

```
BEGIN
DBMS_COMPARISON.PURGE_COMPARISON(comparison_name=>'COMPARE_EMP_TO_EMP_VISK');
END;
/
PL/SQL procedure successfully completed.

SQL> exec dbms_comparison.drop_comparison('COMPARE_EMP_TO_EMP_VISK');
PL/SQL procedure successfully completed.

SQL> exec dbms_comparison.drop_comparison('COMPARE_EMP_TO_EMP_VISK2');
PL/SQL procedure successfully completed.
```

ADR (Automatic Diagnostic Repository) Key Directories

gc.dbaexpert.com:/apps/oracle/diag
VISK > ls -ltr
total 72
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 ofm
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 netcman
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 lsnrctl
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 diagtool
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 crs
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 clients
drwxrwxr-x 2 oracle oinstall 4096 Mar 3 16:36 asm
drwxrwxr-x 3 oracle oinstall 4096 Mar 4 18:15 rdbms
drwxrwxr-x 3 oracle oinstall 4096 Mar 6 19:16 tnslsnr

Useful cd command:

cd $ORACLE_BASE/diag/rdbms/`echo $ORACLE_SID| tr '[A-Z]' '[a-z]'`/$ORACLE_SID/rdbms
alias rdbms='cd $ORACLE_BASE/diag/rdbms/`echo $ORACLE_SID| tr '[A-Z]' '[a-z]'`/$ORACLE_SID'

Diag RDBMS

```
gc.dbaexpert.com:/apps/oracle/diag/rdbms/visk/VISK
+ASM > ls -ltr
total 104
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 sweep
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 stage
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 incpkg
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 incident
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 hm
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 cdump
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 metadata
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 lck
drwxr-x---  2 oracle oinstall  4096 Mar  4 18:15 alert
drwxr-x---  2 oracle oinstall  4096 Mar  6 19:14 ir
drwxr-x---  2 oracle oinstall 20480 Mar  8 15:40 trace
```

v$diag_info

```
 1* select * from v$diag_info
SQL> /

INST_   NAME                      VALUE
------  ------------------------ ----------------------------------------
     1  Diag Enabled              TRUE
     1  ADR Base                  /apps/oracle
     1  ADR Home                  /apps/oracle/diag/rdbms/visk/VISK
     1  Diag Trace                /apps/oracle/diag/rdbms/visk/VISK/trace
     1  Diag Alert                /apps/oracle/diag/rdbms/visk/VISK/alert
     1  Diag Incident             /apps/oracle/diag/rdbms/visk/VISK/incident
     1  Diag Cdump                /apps/oracle/diag/rdbms/visk/VISK/cdump
     1  Health Monitor            /apps/oracle/diag/rdbms/visk/VISK/hm
     1  Default Trace File        /apps/oracle/diag/rdbms/visk/VISK/trace/VISK_
                                  ora_23558.trc
     1  Active Problem Count      0
     1  Active Incident Count     0

11 rows selected.
```

Old and New Mapping

Let's start with a new initialization parameter:

```
SQL> show parameter diag

NAME                 TYPE        VALUE
-------------------- ------------ ----------------
diagnostic_dest      string      /apps/oracle
```

Data	Deprecated Init.ora Parameter	ADR location as of 11g
ADR_HOME		${diagnotic_dest}/diag/rdbms/lowerSID/upperSID
Core Dump	CORE_DUMP_DEST	$ADR_HOME/cdump
Alert log data	BACKGROUND_DUMP_DEST	$ADR_HOME/trace/alert_upperSID.log
Alert Log XML file		$ADR_HOME/alert/log.xml
Background process trace	BACKGROUND_DUMP_DEST	$ADR_HOME/trace
User process trace	USER_DUMP_DEST	$ADR_HOME/trace

log.xml

This is how the log.xml file looks like:

```
rac34:/apps/oracle/diag/rdbms/visk4/VISK4/alert
   VISK4 > tail -10 log.xml
    module='' pid='6596'>
    <txt>Thread 1 advanced to log sequence 15
    </txt>
   </msg>
   <msg time='2008-03-19T10:20:26.128-05:00'
   org_id='oracle' comp_id='rdbms'
    client_id='' type='UNKNOWN' level='16'
    module='' pid='6596'>
    <txt>  Current log# 3 seq# 15 mem# 0:
   +FRA/visk4/onlinelog/group_3.259.649601669
    </txt>
   </msg>
```

Key ADR Directories

- alert – For the alert log in XML format
- cdump – For core dump files. This is equivalent of the core_dump_dest from the previous versions
- hm - For Health Monitor runs checks to store many components and output
- incident – For all incidents dumps. Each incident is stored in a separate subdirectory.
- incpkg – For package incidents support files
- metadata – For metadata about problems, incidents, packages, etc.
- trace – For user traces and background traces + the traditional text version of the alert log

adrci

```
VISK > adrci
ADRCI: Release 11.1.0.6.0 - Beta on Tue Mar 18 08:40:51 2008
Copyright (c) 1982, 2007, Oracle.  All rights reserved.
ADR base = "/apps/oracle"
```

adrci command help

```
VISK > adrci -help
Syntax:
   adrci [-help] [script=script_filename]
         [exec = "one_command [;one_command;...]"]

Options      Description                          (Default)
-------------------------------------------------------------
--
script       script file name                     (None)
help         help on the command options          (None)
exec         exec a set of commands               (None)
-------------------------------------------------------------
```

adrci -Base and Home

```
adrci> show base
   ADR base is "/apps/oracle"

adrci> show homes
   ADR Homes:
   diag/rdbms/visk4/VISK4
   diag/clients/user_unknown/host_411310321_11
   diag/clients/user_oracle/host_1204296188_11
   diag/asm/+asm/+ASM
   diag/tnslsnr/rac34/listener
```

Set Home to the database:

```
   adrci> set home diag/rdbms/visk4/VISK4
```

adrci – Retention Policy

Show retention policy:

```
adrci> show control

ADR Home = /apps/oracle/diag/rdbms/visk4/VISK4:
*************************************************************************
ADRID           SHORTP_POLICY      LONGP_POLICY      LAST_MOD_TIME                    LAST_AUTOPRG_TI
ME                LAST_MANUPRG_TIME                ADRDIR_VERSION     ADRSCHM_VERSION     ADRSCH
MV_SUMMARY    ADRALERT_VERSION    CREATE_TIME
------------------- ------------------- ------------------- ------------------------------------ ------------------------------------
2813981488        720              8760              2008-03-17 12:51:39.378653 -
05:00                1              2              0       1              2008-03-17 12:51:39.378653 -05:00
1 rows fetched
```

- Basically, the short policy=720 (1 month - The incident files and dumps retention policy - (Default is one month))
- And the long policy=8760 (1 Year - The incident metadata retention policy (default is 1 year))
- Specified in hours

Now, let's change the short and long retention policies:

- adrci> set control (shortp_policy=336) ← 2 Weeks
- adrci> set control (longp_policy=4380)

adrci – show alert

Show alert (no arguments) - shows the alert log in the default editor:

adrci> show alert

```
ADR Home = /apps/oracle/diag/rdbms/visk4/VISK4:
********************************************************************************
Output the results to file: /tmp/alert_6731_30868_VISK4_1.ado
```

Show alert without setting your home - Prompts for a number that represents your home:

adrci> show alert

```
Choose the alert log from the following homes to view:
1: diag/rdbms/visk4/VISK4
2: diag/clients/user_unknown/host_411310321_11
3: diag/clients/user_oracle/host_1204296188_11
4: diag/asm/+asm/+ASM
5: diag/tnslsnr/rac34/listener
Q: to quit

Please select option: 1
Output the results to file: /tmp/alert_7068_30865_VISK4_1.ado
Please select option: Q
```

adrci – show alert #2

Show last 30 lines of the alert log:

adrci> show alert -tail 30

Do an equvialent of a tail -f alert$SID.log file:

adrci> show alert -tail -f

Control-c to break

Show just ORA- messages:

adrci> set home diag/rdbms/visk4/VISK4

adrci> show alert -p "message_text like '%ORA-%'"

ADR Home = /apps/oracle/diag/rdbms/visk4/VISK4:

****

Something cool –

display your alert in IE or Firefox:

adrci> set editor mozilla

adrci> show alert

Put it back:

adrci> set editor vi

adrci – Script

Scripting it:

adrci exec="show homes; set home diag/rdbms/visk4/VISK4; show alert -tail 100“

alias tail100='adrci exec="show homes; set home diag/rdbms/visk4/VISK4; show alert -tail 100"'

Now put it in an ADR script file:

adrci script=adr_tail100.txt

VISK4 > cat adr_tail100.txt
show homes; set home diag/rdbms/visk4/VISK4; show alert -tail 100

adrci with here documents

```
VISK > cat adrci.ksh
adrci << EOF
set homepath diag/rdbms/visk/VISK
show alert -tail 1000
exit
EOF
```

adrci – show tracefile

adrci> show tracefile

diag/rdbms/visk4/VISK4/trace/VISK4_vktm_6578.trc
diag/rdbms/visk4/VISK4/trace/VISK4_arc2_16052.trc
..
diag/rdbms/visk4/VISK4/trace/VISK4_vktm_15450.trc
diag/rdbms/visk4/VISK4/trace/VISK4_m000_6814.trc

Equivalent to ls -lt:

adrci> show tracefile -rt

19-MAR-08 09:20:26 diag/rdbms/visk4/VISK4/trace/VISK4_arc1_6634.trc
19-MAR-08 09:20:26 diag/rdbms/visk4/VISK4/trace/alert_VISK4.log
..
19-MAR-08 09:09:28 diag/rdbms/visk4/VISK4/trace/VISK4_lgwr_6596.trc
19-MAR-08 09:09:20 diag/rdbms/visk4/VISK4/trace/VISK4_vktm_6578.trc
19-MAR-08 09:09:19 diag/rdbms/visk4/VISK4/trace/VISK4_ora_6558.trc
18-MAR-08 12:47:27 diag/rdbms/visk4/VISK4/trace/VISK4_ora_7242.trc
18-MAR-08 12:47:27 diag/rdbms/visk4/VISK4/trace/VISK4_vktm_6860.trc

adrci – Problem vs. Incident

Problem:

- A critical error in the database.
- ADR records a problem with a problem key
- There is a one to many relationship between a problem and incidents.

Incidents:

- An incident is a single occurance of a problem.
- ADR identifies incidents by a incident ID.
- Not all incidents are captured.
- Oracle, by default, performs flood control by limiting the number of dumps per hour to 5.

Adrci – show problem for all homes

Show problem without setting your home - get single report for all homes:

adrci> show problem

ADR Home = /apps/oracle/diag/rdbms/visk4/VISK4:
****
0 rows fetched

ADR Home = /apps/oracle/diag/clients/user_unknown/host_411310321_11:
****
0 rows fetched

ADR Home = /apps/oracle/diag/clients/user_oracle/host_1204296188_11:
****
0 rows fetched

ADR Home = /apps/oracle/diag/asm/+asm/+ASM:
****
0 rows fetched

ADR Home = /apps/oracle/diag/tnslsnr/rac34/listener:
****
0 rows fetched

Show Problem / Incident

adrci> show problem

```
ADR Home = /apps/oracle/diag/clients/user_oracle/host_282291381_11:
*************************************************************************
PROBLEM_ID       PROBLEM_KEY                                 LAST_INCIDENT      LASTINC_TIME
---------- ---------------------------------------- ---------- ----------------------------------------
1                oci 24550 [3]                                 1              2008-02-27 15:34:18.974522 -06:00
1 rows fetched
```

adrci> show incident

```
ADR Home = /apps/oracle/diag/clients/user_oracle/host_282291381_11:
*************************************************************************
INCIDENT_ID      PROBLEM_KEY                                 CREATE_TIME
---------- ---------------------------------------- ----------------------------------------
1                oci 24550 [3]                               2008-02-27 15:34:18.974522 -06:00
1 rows fetched
```

adrci - IPS

adrci> show incident

```
ADR Home = /apps/oracle/diag/clients/user_oracle/host_282291381_11:
*************************************************************************
INCIDENT_ID        PROBLEM_KEY                                 CREATE_TIME
------------------ ------------------------------------------- ---------------------------------------
1                  oci 24550 [3]                               2008-02-27 15:34:18.974522 -06:00
1 rows fetched
```

```
adrci> set home diag/clients/user_oracle/host_282291381_11
adrci> ips create package incident 1
Created package 1 based on incident id 1, correlation level typical
adrci> ips add incident 1 package 1
Added incident 1 to package 1
adrci> ips generate package 1 in /tmp
Generated package 1 in file /tmp/oci245503_20080319153442_COM_2.zip,
mode complete
```

Contents of Package

```
/tmp > unzip -l oci245503_20080319153442_COM_2.zip
Archive:  oci245503_20080319153442_COM_2.zip
  Length      Date    Time    Name
 --------    ----    ----    ----
        0  02-27-08 15:34   diag/clients/user_oracle/host_282291381_11/
   106736  02-27-08
15:34   diag/clients/user_oracle/host_282291381_11/incident/incdir_1/ora_24864
_3086436032_i1.trc
      308  02-27-08
15:34   diag/clients/user_oracle/host_282291381_11/trace/ora_24864_3086436032.
trc
      206  02-27-08
15:34   diag/clients/user_oracle/host_282291381_11/trace/ora_24864_3086436032.
trm
     8040  03-19-08
15:35   diag/clients/user_oracle/host_282291381_11/alert/log.xml
      465  02-27-08
15:34   diag/clients/user_oracle/host_282291381_11/trace/sqlnet.log
…
        0  02-27-08 15:34   diag/clients/user_oracle/host_282291381_11/trace/
      539  03-19-08 15:39   metadata.xml
 --------                   -------
   232206                   67 files
```

Health Monitor Check

Two kinds:

1. Reactive - Automatically executed by the diagnostic infrastructure
2. Manually by the DBA

```
1* select name
   from V$HM_CHECK;
```

```
NAME
----------------------------
HM Test Check
DB Structure Integrity Check
Data Block Integrity Check
Redo Integrity Check
Logical Block Check
Transaction Integrity Check
Undo Segment Integrity Check
All Control Files Check
CF Member Check
All Datafiles Check
Single Datafile Check
Log Group Check
Log Group Member Check
Archived Log Check
Redo Revalidation Check
IO Revalidation Check
Block IO Revalidation Check
Txn Revalidation Check
Failure Simulation Check
Dictionary Integrity Check
21 rows selected.
```

Health Monitor Check – Manual Run

Health Monitor Run:

adrci> show hm_run -p "run_id=1"

```
**************************************
HM RUN RECORD 1
**************************************
   RUN_ID                        1
   RUN_NAME                      HM_RUN_1
   CHECK_NAME                    DB Structure Integrity Check
   NAME_ID                       2
   MODE                          2
   START_TIME                    2008-03-17 12:54:17.240082 -05:00
   RESUME_TIME                   <NULL>
   END_TIME                      2008-03-17 12:54:43.528348 -05:00
   MODIFIED_TIME                 2008-03-17 12:54:43.528348 -05:00
   TIMEOUT                       0
   FLAGS                         0
   STATUS                        5
   SRC_INCIDENT_ID               0
   NUM_INCIDENTS                 0
   ERR_NUMBER                    0
   REPORT_FILE                   <NULL>
1 rows fetched
```

Manually execute a health monitor run:

```
SQL> exec dbms_HM.RUN_CHECK
     ('Dictionary Integrity Check');

PL/SQL procedure successfully completed.
```

Run Report

adrci> create report hm_run hm_run_1

SQL> set long 1000000

```
1* select dbms_hm.get_run_report('HM_RUN_1') from dual;
   DBMS_HM.GET_RUN_REPORT('HM_RUN_1')
   ----------------------------------------------------------------
   Basic Run Information
    Run Name                      : HM_RUN_1
    Run Id                        : 1
    Check Name                    : DB Structure Integrity Check
    Mode                          : REACTIVE
    Status                        : COMPLETED
    Start Time                    : 2008-03-17 12:54:17.240082 -05:00
    End Time                      : 2008-03-17 12:54:43.528348 -05:00
    Error Encountered             : 0
     ..
     Message         : System datafile 1:
                       '+DATA/visk4/datafile/system.256.649601515'needs media
     ..
```

adrci Report in XML Format

adrci> show report hm_run HM_RUN_1

```
<?xml version="1.0" encoding="US-ASCII"?>
<HM-REPORT REPORT_ID="HM_RUN_1">
   <TITLE>HM Report: HM_RUN_1</TITLE>
   <RUN_INFO>
      <CHECK_NAME>DB Structure Integrity
Check</CHECK_NAME>
 <RUN_ID>1</RUN_ID>
 <RUN_NAME>HM_RUN_1</RUN_NAME>
 <RUN_MODE>REACTIVE</RUN_MODE>
 <RUN_STATUS>COMPLETED</RUN_STATUS>
 <RUN_ERROR_NUM>0</RUN_ERROR_NUM>
<SOURCE_INCIDENT_ID>0</SOURCE_INCIDENT_ID>
 ...
 ...
 ...
<NUM_INCIDENTS_CREATED>0</NUM_INCIDENTS_CREATED>
      <RUN_START_TIME>2008-03-17 12:54:17.240082 -
05:00</RUN_START_TIME>
      <RUN_END_TIME>2008-03-17 12:54:43.528348 -
05:00</RUN_END_TIME>
   </RUN_INFO>
   <RUN_PARAMETERS/>
   <RUN-FINDINGS>
      <FINDING>
         <FINDING_NAME>System datafile is old</FINDING_NAME>
         <FINDING_ID>2</FINDING_ID>
         <FINDING_TYPE>FAILURE</FINDING_TYPE>
         <FINDING_STATUS>OPEN</FINDING_STATUS>
         <FINDING_PRIORITY>CRITICAL</FINDING_PRIORITY>
         <FINDING_CHILD_COUNT>0</FINDING_CHILD_COUNT>
         <FINDING_CREATION_TIME>2008-03-17 12:54:42.631861 -
05:00</FINDING_CREATION_TIME>
         <FINDING_MESSAGE>System datafile 1:
'+DATA/visk4/datafile/system.256.649601515' needs media
recovery</FINDING_MESSAGE>
         <FINDING_MESSAGE>Database cannot be
opened</FINDING_MESSAGE>
      </FINDING>
```

Real Application Testing – a.k.a RAT (Database Replay)

- Capture production workload including concurrency, transaction characteristics, and performance overhead
- Replay workload in another environment that is a copy of production
- Replay simulates production timing, concurrency, and think time
- Oracle Enterprise Manager or Command Line Option

Real Application Testing - RAT

Mitigate as much risk as possible for testing:

1. Database upgrades or patches
2. Database initialization changes
3. Schema changes
4. Application upgrades
5. Operating System upgrades
6. Storage changes
7. Configuration changes such as changing to RAC or migrating to ASM
8. Interconnect changes

RAT Presetup

Consider creating this directory as part of OFA setup

Create Oracle Directory:

```
CREATE OR REPLACE DIRECTORY RAT_DIR AS
     '/apps/oracle/admin/DBATOOLS/replay';
```

Set Filters to capture only a subset of database workload or to exclude user sessions:

```
SQL> BEGIN
  2  DBMS_WORKLOAD_CAPTURE.ADD_FILTER (fname => 'SCOTT_FILTER',
  3                                    fattribute => 'USER',
  4                                    fvalue => 'SCOTT');
  5  END;
  6  /

PL/SQL procedure successfully completed.
```

RAT – Capture Workload

- Captures all requests by external clients
- Captured in binary format

Capture Workload

```
  1   BEGIN
  2   DBMS_WORKLOAD_CAPTURE.start_capture
  3   (name => 'PROD_CAPTURE',
  4    dir=>'RAT_DIR',
  5    duration => NULL);
  6* END;
SQL> /
PL/SQL procedure successfully completed.
```

Note:

1. Duration is in seconds
2. A null duration indicates that a capture will continue until stopped
3. Duration is optional (default of NULL)

RAT – Finish Capture

Export AWR data if planning to run AWR Compare Period report

Finish Capture

```
BEGIN
    DBMS_WORKLOAD_CAPTURE.finish_capture();
END;
```

Note:

- Database Capture is back ported to 10.2.0.4
- As of today, databases have to be upgraded to 10.2.0.4 to take advantage of Database Capture

RAT – Process Capture

Workload Processing

```
BEGIN
    DBMS_WORKLOAD_REPLAY.process_capture('RAT_DIR');
END;
```

Note:

- The process_capture has a single parameter for the directory name of the captured workload
- Processing converts data and metadata into replay files
- Processing database must be on the same version as the capture database
- Resource intensive process

Database Replay - Initialize

```
BEGIN
  DBMS_WORKLOAD_REPLAY.initialize_replay
  (replay_name => 'PROD_REPLAY',
   replay_dir  => 'RAT_DIR');
END;
```

Note:

Loads the metadata into tables to be used for replay

Database Replay - Prepare

```
 1   BEGIN
 2       DBMS_WORKLOAD_REPLAY.prepare_replay(
 3       synchronization => TRUE);
 4* END;
SQL> /

PL/SQL procedure successfully completed.
```

Note:

- Synchronization of TRUE (required), the COMMIT order will be preserved during the replay

Database Replay – Start Clients

wrc mode=calibrate replaydir=/apps/oracle/admin/DBATOOLS/replay

wrc system/<SYSTEM_PW> mode=replay replaydir=/apps/oracle/admin/DBATOOLS/replay

Workload Replay Client: Release 11.1.0.6.0 - Production on Wed Mar 02 00:31:41 2008
Copyright (c) 1982, 2007, Oracle. All rights reserved.
Report for Workload in: /apps/oracle/admin/DBATOOLS/replay

Recommendation:
Consider using at least 1 clients divided among 1 CPU(s).
Workload Characteristics:
- max concurrency: 1 sessions
- total number of sessions: 7
Assumptions:
- 1 client process per 50 concurrent sessions
- 4 client process per CPU
- think time scale = 100
- connect time scale = 100
- synchronization = TRUE

Database Replay – Start Replay

```
BEGIN
    DBMS_WORKLOAD_REPLAY.start_replay;
END;
/
```

Note:

To Cancel the replay:

```
BEGIN
    DBMS_WORKLOAD_REPLAY.cancel_replay;
END;
```

Database Replay – Views

Views:

- DBA_WORKLOAD_CAPTURES
- DBA_WORKLOAD_REPLAYS
- DBA_WORKLOAD_CONNECTION_MAP
- DBA_WORKLOAD_FILTERS
- DBA_WORKLOAD_REPLAY_DIVERGENCE
- V$WORKLOAD_REPLAY_THREAD

Backup and Recovery

- RMAN recover … block
- RMAN substitution variables
- RMAN compression
- Multi-section Backups
- Backup Shredding
- Data Repair Advisor

RMAN – recover … block

New Syntax and Enhancements

- recover … block
- Searches flashback logs first for good version of corrupt block

New Syntax Example:

- recover datafile 13 block 10 datafile 20 block 11;

Previous Blockrecover command:

- BLOCKRECOVER DATAFILE 13 BLOCK 10 DATAFILE 20 BLOCK 11 from backupset;

Example of how we did RMAN substitution prior to 11g

```
export RMAN_BACKUP_LEVEL=$SH/rman_backup.sql

cat $RMAN_BACKUP_LEVEL |sed
-e "s/###_DATE_###/$ORADATE/g" \
-e "s/###_ORACLE_SID_###/$ORACLE_SID/g" \
-e "s/###_BACKUP_LEVEL_###/$BACKUP_LEVEL/g" \
-e "s/###_sqlspfile_###/$SPFILE_BACKUP_SYNTAX/g"  \
> $RMAN_SCRIPT
```

RMAN Substitution - Simple

```
CONNECT TARGET /
BACKUP DATABASE TAG '&1';
BACKUP ARCHIVELOG ALL TAG '&2';
EXIT;
```

```
rman @/tmp/backup.sql USING DB_27MAR08
   ARCH_25MAR08
```

RMAN Substitution Variables

```
cat back.ksh
export param1=$1
export param2=$2
rman target / cmdfile=/tmp/back2.sql using $param1 $param2
```

VISK > ./back.ksh db_27mar arch_27mar

```
Recovery Manager: Release 11.1.0.6.0 - Production on Wed Mar 26 23:38:25 2008
Copyright (c) 1982, 2007, Oracle.  All rights reserved.
connected to target database: VISK (DBID=354790782)

RMAN> BACKUP DATABASE TAG 'db_27mar';
2> BACKUP ARCHIVELOG ALL TAG 'arch_27mar';
3> EXIT;
Starting backup at 26-MAR-08
using target database control file instead of recovery catalog
allocated hannel: ORA_DISK_1
```

```
cat back2.sql
BACKUP DATABASE TAG '&1';
BACKUP ARCHIVELOG ALL TAG '&2';
EXIT;
```

Execute RMAN script

Within RMAN:

rman target /

RMAN> @back2.sql db_27mar arch_27mar

RMAN> BACKUP DATABASE TAG 'db_27mar';

Starting backup at 26-MAR-08

using target database control file instead of recovery catalog

allocated channel: ORA_DISK_1

channel ORA_DISK_1: SID=105 device type=DISK

RMAN Script with Variable Substitution

```
create script backup_db
{
backup tag &1
format '/apps/oracle/admin/&2/bkups /%d.%s.%p.%t.DB' (database)
     plus archivelog;
}

RMAN> run
 {
 execute script backup_db
 using db_mar27 VISK;
}
```

RMAN Compression

- RMAN> show all;

  RMAN configuration parameters for database with db_unique_name VISK4 are:
  CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
  CONFIGURE BACKUP OPTIMIZATION OFF; # default
  CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
  CONFIGURE CONTROLFILE AUTOBACKUP OFF; # default
  CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
  CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default
  CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
  CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
  CONFIGURE MAXSETSIZE TO UNLIMITED; # default
  CONFIGURE ENCRYPTION FOR DATABASE OFF; # default
  CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
  CONFIGURE COMPRESSION ALGORITHM 'BZIP2'; # default
  CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default
  CONFIGURE SNAPSHOT CONTROLFILE NAME TO
  '/apps/oracle/product/11.1.0/DB/dbs/snapcf_VISK4.f'; # default

RMAN Compression

```
1  select algorithm_name, algorithm_description,
2         database_compatibility Compatibility, is_default
3* from v$rman_compression_algorithm;

ALGORITHM_NAME ALGORITHM_DESCRIPTION                COMPATIBILITY IS_
-------------- ------------------------------------ ------------- --
ZLIB           optimized for speed                  11.1.0.0.0    NO
BZIP2          optimized for maximum compression    11.1.0.0.0    YES
```

ZLIB

1. Part of Oracle Advanced Compression Option
2. Optimized for CPU efficiency
3. Larger ZIP files than BZIP2 – sacrifice compression for better performance
4. COMPATIBILITY must be set to 11.1.0 to use ZLIB

RMAN Compression

Set compression back to the new 11g compression:

```
RMAN> configure compression algorithm 'zlib';

   using target database control file instead of recovery
   catalog
   new RMAN configuration parameters:
   CONFIGURE COMPRESSION ALGORITHM 'zlib';
   new RMAN configuration parameters are successfully
   stored
```

RMAN Multisection Backups

RMAN> backup section size 500m tablespace trans_d;

```
Starting backup at 18-MAR-08
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=124 device type=DISK
channel ORA_DISK_1: starting full datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00006
name=+DATA/visk4/datafile/trans_d.275.649684237
backing up blocks 1 through 64000

...
backing up blocks 64001 through 128000
backing up blocks 128001 through 192000
backing up blocks 256001 through 262144
...
```

RMAN Multisection Backups

RMAN> backup as compressed backupset section size 500m tablespace trans_d;

```
Starting backup at 18-MAR-08
using channel ORA_DISK_1
channel ORA_DISK_1: starting compressed full datafile backup
set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00006
name=+DATA/visk4/datafile/trans_d.275.649684237
backing up blocks 1 through 64000
channel ORA_DISK_1: starting piece 1 at 18-MAR-08
channel ORA_DISK_1: finished piece 1 at 18-MAR-08
```

RMAN Multisection Backups

```
SQL> select file#, section_size
     from v$backup_datafile;

     FILE# SECTION_SIZE
---------- ------------
         1            0
         2            0
         3            0
         5            0
         4            0
         0            0
         0            0
         6        64000
         6        64000

9 rows selected.
```

```
SQL> select pieces,multi_section
     from v$backup_set;

    PIECES MUL
---------- ---
         1 NO
         1 NO
         1 NO
         1 NO
         5 YES
         5 YES

6 rows selected.
```

RMAN Backup Shredding

Delete the encryption key of a backup to render the encrypted backup inaccessible

To enable it:

RMAN> configure encryption external key storage on;

To use backup shredding:

RMAN> delete force backup;

RMAN Network-Based Database Duplication

Also called Active Database Duplication

- Both source and target must be of same OS
- Oracle Net has to be setup for both target and duplicate database (even if the source and target is on the same host)
- Must have the same sysdba password enforced through the password file
- Source database can be open or in mounted state
- If the source database is open, it must be in archivelog mode
- If the source database is in mounted mode, it must have been shutdown clean before it was mounted
- By default, the password file will not be copied so you must specify the password file clause inside the duplicate command

Merge Recovery Catalogs

Connect to the destination recovery catalog

$ rman

RMAN> connect catalog rman/rman@rmanprod

RMAN> import catalog rman1/rman1@rmantest;

```
Starting import catalog at 08-APR-07
connected to source recovery catalog database
import validation complete
database unregistered from the source recovery
   catalog
Finished import catalog at 08-APR-07
RMAN>
```

Merge Recovery Catalogs

Automatically unregisters the databases in the source catalog

- `RMAN> import catalog rman1/rman1@rmantest no unregister;`

Merge specific DBID or DB_NAME

- `RMAN> import catalog rman1/rman1@rmantest dbid=354790782;`
- `RMAN> import catalog rman1/rman1@rmantest db_name=VISK1;`

Virtual Private Catalogs - Grant

```
RMAN> grant register database to vrman1;
Grant succeeded.

RMAN> grant catalog for database visk1 to vrman2;
Grant succeeded.

RMAN> grant catalog for database visk to vrman2;
Grant succeeded.
```

Note:

- "Grant Register Database" implicitly grants "grant catalog for database" databases registered by the user

Virtual Private Catalogs

```
RMANP > rman catalog vrman2/vrman123@rmanp
Recovery Manager: Release 11.1.0.6.0 - Production on Sat
   May 3 10:27:06 2008
Copyright (c) 1982, 2007, Oracle.  All rights reserved.
connected to recovery catalog database

RMAN> create virtual catalog;

found eligible base catalog owned by RMAN
created virtual catalog against base catalog owned by RMAN
```

Manage Virtual Catalogs

RMANP > rman catalog rman/rman123@rmanp target /

RMAN> revoke register database from vrman1;

Revoke succeeded.

RMAN> revoke catalog for database visk from vrman2;

Revoke succeeded.

RMAN> revoke catalog for database visk1 from vrman2;

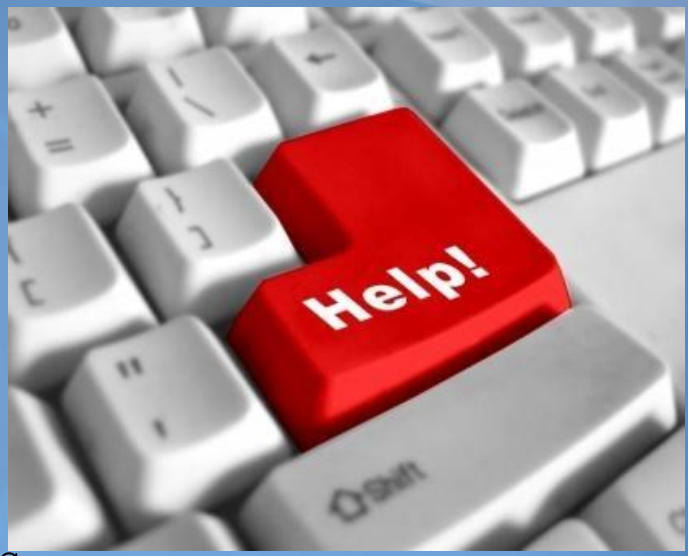
Revoke succeeded.

RMAN> revoke all privileges from vrman1;

Revoke succeeded.

DRA - List Failure

RMAN> list failure;




```
using target database control file instead of
List of Database Failures
=========================

Failure ID Priority Status    Time Detected  Summary

---------- -------- --------- -------------  -------

182        HIGH     OPEN      20-MAR-08      One or more non-system
                                             datafiles are missing
```

DRA – List Failure Detail

```
RMAN> list failure 182 detail;

List of Database Failures
=========================

Failure ID Priority Status    Time Detected Summary
---------- -------- --------- ------------- -------
182        HIGH     OPEN      20-MAR-08     One or more non-system datafiles are
missing
  Impact: See impact for individual child failures
  List of child failures for parent failure ID 182
  Failure ID Priority Status    Time Detected Summary
  ---------- -------- --------- ------------- -------
  210        HIGH     OPEN      20-MAR-08     Datafile 8:
'/u30/oradata/VISK/transd_01.dbf' is missing
    Impact: Some objects in tablespace TRANS_D might be unavailable
```

DRA - Getting Failure Advise

RMAN> advise failure;

```
List of Database Failures
=========================

Failure ID Priority Status    Time Detected Summary
---------- -------- --------- ------------- -------
182        HIGH     OPEN      20-MAR-08     One or more non-system datafiles are missing

analyzing automatic repair options; this may take some time
..
analyzing automatic repair options complete

Mandatory Manual Actions
========================
no manual actions available

Optional Manual Actions
=======================
1. If file /u30/oradata/VISK/transd_01.dbf was unintentionally renamed or moved, restore it

Automated Repair Options
========================
Option Repair Description
------ ------------------
1      Restore and recover datafile 8
  Strategy: The repair includes complete media recovery with no data loss
  Repair script: /apps/oracle/diag/rdbms/visk/VISK/hm/reco_3536057071.hm
```

DRA – Repairing the Failure

RMAN> repair failure;

Strategy: The repair includes complete media recovery with no data loss
Repair script: /apps/oracle/diag/rdbms/visk/VISK/hm/reco_3536057071.hm

contents of repair script:
```
  # restore and recover datafile
  sql 'alter database datafile 8 offline';
  restore datafile 8;
  recover datafile 8;
  sql 'alter database datafile 8 online';
```

Do you really want to execute the above repair (enter YES or NO)? yes
executing repair script

sql statement: alter database datafile 8 offline

Starting restore at 20-MAR-08
using channel ORA_DISK_1

creating datafile file number=8 name=/u30/oradata/VISK/transd_01.dbf
restore not done; all files read only, offline, or already restored
Finished restore at 20-MAR-08
..
..
sql statement: alter database datafile 8 online
repair failure complete

DRA – List Failure

The failure is no longer listed after the repair action:

RMAN> list failure;

no failures found that match specification

List Closed Failures:

RMAN> list failure closed;

List of Database Failures
==========
Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------- -------
105 CRITICAL CLOSED 08-MAR-08 System datafile 1: '+DATA/visk/datafile/system.257.648832243' needs media recovery
102 CRITICAL CLOSED 08-MAR-08 Control file needs media recovery
185 HIGH CLOSED 20-MAR-08 Datafile 8: '/u30/oradata/VISK/transd_01.dbf' is missing
Impact: Some objects in tablespace TRANS_D might be unavailable
123 HIGH CLOSED 08-MAR-08 Datafile 4: '+DATA/visk/datafile/users.260.648832243' needs media recovery
Impact: Some objects in tablespace USERS might be unavailable
117 HIGH CLOSED 08-MAR-08 Datafile 3: '+DATA/visk/datafile/undotbs1.259.648832243' needs media recovery
Impact: Some objects in tablespace UNDOTBS1 might be unavailable
111 HIGH CLOSED 08-MAR-08 Datafile 2: '+DATA/visk/datafile/sysaux.258.648832243' needs media recovery
Impact: Some objects in tablespace SYSAUX might be unavailable
108 HIGH CLOSED 08-MAR-08 One or more non-system datafiles need media recovery

List and Change High Priority Failures

RMAN> list failure high;

List of Database Failures
==========

Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------- -------
182 HIGH OPEN 20-MAR-08 One or more non-system datafiles are missing

Change failure priority from High to Low

RMAN> change failure 182 priority low;

List of Database Failures
==========

Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------- -------
182 HIGH OPEN 20-MAR-08 One or more non-system datafiles are missing

Do you really want to change the above failures (enter YES or NO)? yes
changed 1 failures to LOW priority

List Low Priority Failures

RMAN> list failure low;

List of Database Failures
==========

Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------ -------
182 LOW OPEN 20-MAR-08 One or more non-system datafiles are missing

Note:

Once the priority is changed to a low priority, the failure will no longer show up on the list failure command.

Dynamic View to list failure advise

```
1  select advise_id, rank, message
2* from v$ir_manual_checklist
SQL> /

 ADVISE_ID       RANK MESSAGE
---------- ---------- ----------------------------------------
       201          0 If file /u30/oradata/VISK/transd_01.dbf was u
                      nintentionally renamed or moved, restore it
```

Advise Before Repair

```
RMAN> repair failure preview;

using target database control file instead of recovery catalog
RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: failure of repair command at 03/20/2008 07:47:52
RMAN-06954: REPAIR command must be preceded by ADVISE command in same session
```

Repair Failure Preview

Execute the repair in PREVIEW mode to see what DATA Recovery Advisor will do:

RMAN> repair failure preview;
Strategy: The repair includes complete media recovery with no data loss
Repair script:
/apps/oracle/diag/rdbms/visk/VISK/hm/reco_395520741.hm

contents of repair script:

```
# restore and recover datafile
sql 'alter database datafile 8 offline';
restore datafile 8;
recover datafile 8;
sql 'alter database datafile 8 online';
```

V$IR_REPAIR

The results of the repair failure command are captured in the V$IR_REPAIR view:

```
  1  select repair_id, advise_id, summary, rank
  2* from v$ir_repair

SQL> /

 REPAIR_ID  ADVISE_ID SUMMARY                  RANK
---------- ---------- ---------------------- ----
       202        201 NO DATA LOSS              1
       267        266 NO DATA LOSS              1
```

Validate Database – dbverify

RMAN> validate database;

```
Starting validate at 21-MAR-08
using channel ORA_DISK_1
channel ORA_DISK_1: starting validation of datafile
channel ORA_DISK_1: specifying datafile(s) for validation
input datafile file number=00008 name=/u30/oradata/VISK/transd_01.dbf
..
input datafile file number=00007 name=+DATA/visk/datafile/visk_aes256.268.649637901
channel ORA_DISK_1: validation complete, elapsed time: 00:00:15
List of Datafiles
=================
File Status Marked Corrupt Empty Blocks Blocks Examined High SCN
---- ------ -------------- ------------ --------------- ----------
3    OK     0              15           3840            1379409
  File Name: +DATA/visk/datafile/undotbs1.259.648863163
  Block Type Blocks Failing Blocks Processed
  ---------- -------------- ----------------
  Data       0              0
  Index      0              0
  Other      0              3825
..
Control File OK     0              594
Finished validate at 21-MAR-08
```

Validate at a Granular Level

```
RMAN> validate tablespace VISK_AES256;
RMAN> validate datafile 7;
RMAN> validate datafile 7 block 100;
```

Validate options:

1. Recovery area
2. Recovery files
3. Spfile
4. Tablespace
5. Controlfilecopy
6. Backupset

Archivelog Retention Policy

10g

- delete noprompt archivelog until time 'sysdate -2' backed up 2 times to device type disk;
- backup … delete input;

11g

- Configure archivelog deletion policy to backuped 2 times to disk;
- Configure archivelog delete policy to none;

sqlplus

Errorlogging:

- set errorlogging on
- show errorlogging
- select username, statement, message from sperrorlog;

sqlplus/admin/glogin.sql

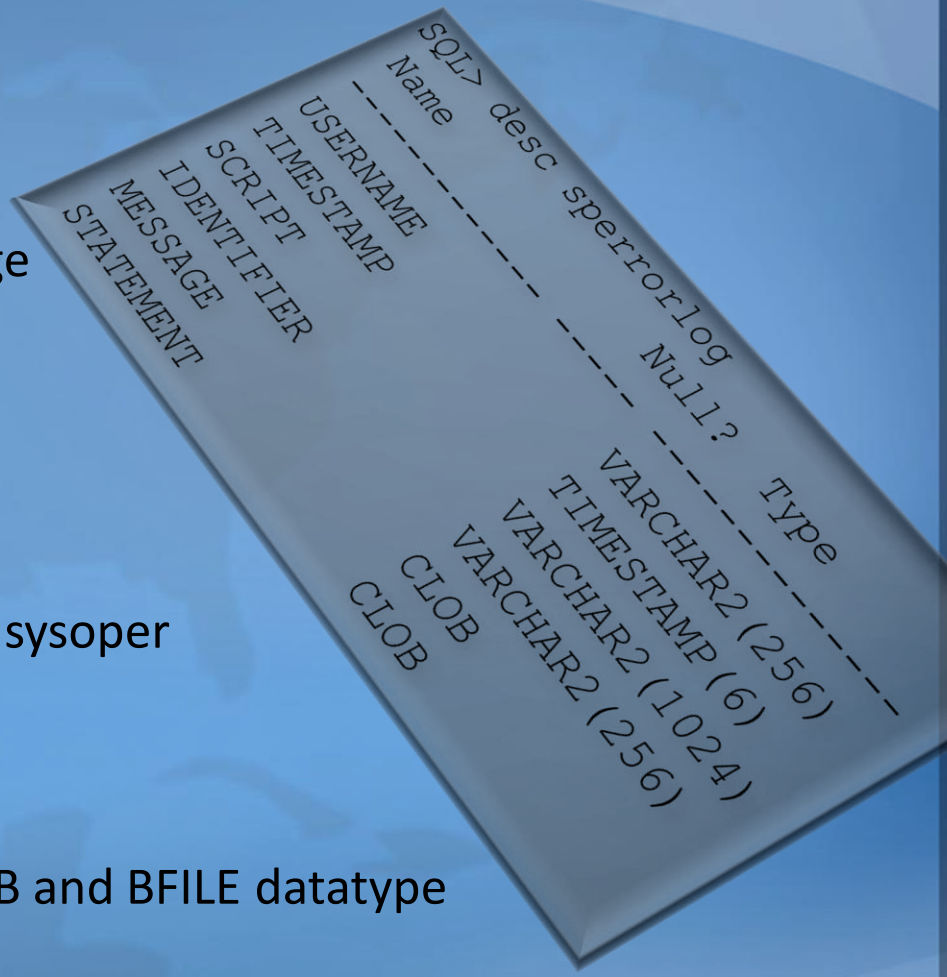
- Is blank now

Previously: sqlplus / as sysdba And / as sysoper

- sqlplus / as sysasm

Enhanced BLOB support

- Can query and print tables with BLOB and BFILE datatype



PL/SQL

PL/SQL

PL/SQL

PL/SQL

PL/SQL

Dynamic SQL

- Native dynamic SQL supports CLOB > 32K characters
- DBMS_SQL.PARSE() gains a CLOB overload
- REF CURSOR can be converted to a DBMS_SQL cursor
- DBMS_SQL cursor can be converted to a REF CURSOR
- DBMS_SQL supports collections and object types
- DBMS_SQL allows bulk binds using user-defined collection types

Finer Grained Dependency Tracking

Significantly less invalidations

- Create or replace synonym
- Create or replace view
- Add or drop or modify a column to a table
- Add to a specification

PL/SQL Continue

Can skip to the next iteration in a loop

```
BEGIN
 FOR I in 1..10 LOOP
  dbms_output.put_line('I='||to_char(I));
  IF ( I in (5,7) ) THEN
   continue;
  END IF;
  dbms_output.put_line('Number
   is:'||to_char(I));
 END LOOP;
END;
/
```

```
SQL> /
I=1
Number is:1
I=2
Number is:2
I=3
Number is:3
I=4
Number is:4
I=5
I=6
Number is:6
I=7
I=8
Number is:8
I=9
Number is:9
I=10
Number is:10
```

PL/SQL Continue

Written in another way:

```
BEGIN
  FOR I in 1..10 LOOP
    dbms_output.put_line('I='||to_char(I));
    continue when ( I in (5,7) );
    dbms_output.put_line('Number is:'||to_char(I));
  END LOOP;
END;
/
```

PL/SQL Sequences Without Dual

Old Convention

```
SQL> create sequence trans_seq;
Sequence created.

SQL> declare
2  cursor c1 is
3  select trans_seq.nextval
4  from dual;
5  v_seq NUMBER;
6  begin
7  open c1; fetch c1 into v_seq;
   close c1;
8  dbms_output.put_line('Sequence:
   '||to_char(v_seq));
9  end;
10  /
Sequence: 1
```

New Convention

```
1  declare
2  v_seq NUMBER;
3  begin
4  v_seq := trans_seq.nextval;
5  dbms_output.put_line('Sequence:
   '||to_char(v_seq));
6* end;
SQL> /
Sequence: 2

PL/SQL procedure successfully
   completed.
```

SIMPLE_INTEGER

- Range of –2,147,483,648 to 2,147,483,647
- Variables of this datatype wrap from smallest to largest and from largest to smallest
- Cannot be NULL

- SIMPLE_INTEGER elapsed time(seconds): 1.60
- PLS_INTEGER elapsed time(seconds): 1.75
- NUMBER elapsed time(seconds): 3.84

```
alter package si_demo compile plsql_code_type=native;
```

- SIMPLE_INTEGER elapsed time(seconds): 0.10
- PLS_INTEGER elapsed time(seconds): 0.80
- NUMBER elapsed time(seconds): 3.22

PL/SQL Native Compilation

Compile at database level:
plsql_code_type=native
plsql_optimize_level=3
startup upgrade;
@dbsupgnv.sql -- dbmsupgin.sql to go back
@utlrp.sql

No more C-Compilers

Faster and easier to implement

```
SQL> alter session set plsql_code_type=native;
   Session altered.

SQL> alter procedure edba_write_alert compile;
   Procedure altered.
```

How to check if it is really natively compiled:

```
1  select name, type, plsql_code_type, plsql_optimize_level
2  from dba_plsql_object_settings
3* where plsql_code_type ='NATIVE';

NAME                           TYPE         PLSQL_CODE_T PLSQL_OPTIMIZE_LEVEL
------------------------------ ------------ ------------ --------------------
EDBA_WRITE_ALERT               PROCEDURE    NATIVE                          2
```

Regular Expression Enhancements

- The REGEXP_INSTR and REGEXP_SUBSTR functions include a new SUBEXPR parameter to select the *nth subexpression* in the regular expression being evaluated.

```
SELECT REGEXP_INSTR('All Good Dogs Go Go To Heaven...' -- source
,'(go) (go)' -- regular expression with two subexpressions
,1 -- starting position to begin evaluation
,1 -- match occurrence
,0 -- 0 = return position of start, 1 = position after end
,'i' -- case insensitive search
,2 -- which subexpression to return position
) Dup_position from dual;

DUP_POSITION
------------
          18
```

REGEXP_COUNT

- Count the number of matches a regular expression
- In this example: Count the numbers in the source text

```
SELECT REGEXP_COUNT('We have plans to hire 2 of 9 DBAs', --
   source text
'[0-9]' -- regular expression
,1 -- starting position
,'i' -- ignore case
) NUMBER_COUNT
FROM dual
/

NUMBER_COUNT
------------
           2
```

REGEXP_COUNT

- In this example: Count the CAPITAL Letters in the source text
- Ignore case option is NOT used

```
SELECT REGEXP_COUNT('We have plans to hire 2 of 9 DBAs', --
   source text
'[A-Z]' -- regular expression
,1 -- starting position
) CAPS_COUNT
FROM dual
/

CAPS_COUNT
----------
         4
```

SQL Arguments for Function Calls

Name => value is now supported

```
SELECT
  VENDORS_PKG.vendor_Id(vendor_name,organization_id)
FROM VENDORS;

SELECT
  VENDORS_PKG.vendor_Id(vendor_name,pOrgId=>organiza
  tion_id)
FROM VENDORS;

SELECT
  VENDORS_PKG.vendor_Id(pVendorName=>vendor_name,pOr
  gId=>organization_id)
FROM VENDORS;
```

RESULT_CACHE Initialization Parameters

SQL> show parameter result_cache

NAME	TYPE	VALUE
client_result_cache_lag	big integer	3000
client_result_cache_size	big integer	0
result_cache_max_result	integer	5
result_cache_max_size	big integer	1536K
result_cache_mode	string	MANUAL
result_cache_remote_expiration	integer	0

Note:

- Exercise caution setting the result_cache_remote_expiration parameter
- Result_cache_remote_expiration is in minutes

Result Cache Example

SQL> alter system set result_cache_max_size=200m;

System altered.

```
1   set autot traceonly
2   set timing on
3   select /*+ result_cache */
      empno,
      ename,
      job
    from emp2
4* order by empno;
```

You can add the result_cache hint to:
1. SQL Queries
2. Subqueries
3. Inline Views

Result Cache Example

Execution Plan

```
----------------------------------------------------------

Plan hash value: 2441141433


-------------------------------------------------------------------------------------------------------------
| Id  | Operation           | Name                       | Rows  | Bytes |TempSpc| Cost (%CPU)| Time
    |
-------------------------------------------------------------------------------------------------------------
    --
|   0 | SELECT STATEMENT    |                            | 48554 |  1232K|       |   739   (1)| 00:00:09
    |
|   1 |  RESULT CACHE       | 4skzh0m6swvmv4xxgm3cdh643g |       |       |       |
    |          |
|   2 |   SORT ORDER BY     |                            | 48554 |  1232K|  3448K|   739   (1)| 00:00:09
    |
|   3 |    TABLE ACCESS FULL| EMP2                       | 48554 |  1232K|       |   377   (1)| 00:00:05
    |
-------------------------------------------------------------------------------------------------------------

Result Cache Information (identified by operation id):
------------------------------------------------------

   1 - column-count=3; dependencies=(SCOTT.EMP2); name="select /*+ result_cache */ empno, ename, job
    from emp2 order by empno"
```

Result Cache – Execution #1

```
Statistics
----------------------------------------------------------
          4  recursive calls
          0  db block gets
       1435  consistent gets
       1379  physical reads
          0  redo size
    2566705  bytes sent via SQL*Net to client
      66409  bytes received via SQL*Net from client
       6001  SQL*Net roundtrips to/from client
          1  sorts (memory)
          0  sorts (disk)
      90000  rows processed
```

Result Cache – Execution #2

```
Statistics
----------------------------------------------------------
          0  recursive calls
          0  db block gets
          0  consistent gets
          0  physical reads
          0  redo size
    2566705  bytes sent via SQL*Net to client
      66409  bytes received via SQL*Net from client
       6001  SQL*Net roundtrips to/from client
          0  sorts (memory)
          0  sorts (disk)
      90000  rows processed
```

PL/SQL Function Result Cache

Notes:

- Results from function calls can be cached in the SGA
- Future invocation of the function call with the same arguments will return values from the cache
- Keyword RESULT_CACHE is used as part of the function/package specification
- Keyword RELIES_ON() can be utilized to cause cache entries to become invalid if table or view is updated
- Cached values are available to all sessions that have execute privileges on the function

PL/SQL Function Result Cache – Example #1

```
 1  create or replace function count_job
 2   (p_job in varchar2)
 3   return number
 4   result_cache
 5   as
 6   cursor c1 is
 7   select count(*)
 8   from emp2
 9   where job=p_job;
10   v_count simple_integer := 0;
11   begin
12   open c1; fetch c1 into v_count; close c1;
13    -- Pause for 1 second to slow the function down.
14   dbms_lock.sleep(1);
15   return v_count;
16* end;
SQL> /

Function created.
```

PL/SQL Function Result Cache – Example #1 Result

```
SQL> select count_job('SALESMAN') from dual;
COUNT_JOB('SALESMAN')
---------------------
               205698
Elapsed: 00:00:01.50

SQL> insert into emp2 (empno, ename, job)
     values (9999, 'SANCHEZ', 'SALESMAN');
1 row created.
Elapsed: 00:00:00.10
SQL> commit;
```

AFTER THE INSERT

```
SQL> select count_job('SALESMAN')
     from dual;

COUNT_JOB('SALESMAN')
---------------------
               205698
Elapsed: 00:00:00.00
```

PL/SQL Function Result Cache – Example #2

```
 1  create or replace function count_job
 2   (p_job in varchar2)
 3   return number
 4   result_cache
 5   relies_on (emp2)
 6   as
 7   cursor c1 is
 8   select count(*)
 9   from emp2
10   where job=p_job;
11   v_count simple_integer := 0;
12   begin
13   open c1; fetch c1 into v_count; close c1;
14   return v_count;
15* end;
SQL> /
Function created.
```

PL/SQL Function Result Cache – Example #2 Result

```
SQL> select count_job('SALESMAN') from dual;
COUNT_JOB('SALESMAN')
---------------------
               205698
Elapsed: 00:00:01.09
SQL> /

COUNT_JOB('SALESMAN')
---------------------
               205698
Elapsed: 00:00:00.00

SQL> insert into emp2 (empno, ename, job)
     values (9999, 'SANCHEZ', 'SALESMAN');
1 row created.
Elapsed: 00:00:00.00
SQL> commit;
```

AFTER THE INSERT

```
SQL> select count_job('SALESMAN')
     from dual;

COUNT_JOB('SALESMAN')
---------------------
               205699

Elapsed: 00:00:01.09
```

Result Cache Memory Report

```
SQL> set serveroutput on
SQL> exec dbms_result_cache.memory_report
R e s u l t C a c h e M e m o r y R e p o r t
[Parameters]
Block Size = 1024 bytes
Maximum Cache Size = 393216 bytes (384 blocks)
Maximum Result Size = 19456 bytes (19 blocks)
[Memory]
Total Memory = 13412 bytes [0.017% of the Shared Pool]
... Fixed Memory = 10560 bytes [0.013% of the Shared Pool]
... State Object Pool = 2852 bytes [0.004% of the Shared Pool]
... Cache Memory = 0 bytes (0 blocks) [0.000% of the Shared Pool]
PL/SQL procedure successfully completed.
```

Disable Result Cache

SQL> exec dbms_result_cache.memory_report;

R e s u l t C a c h e M e m o r y R e p o r t

Cache is disabled.

PL/SQL procedure successfully completed.

Toggle Result Cache parameters at the system level:

SQL> alter system set result_cache_mode = **manual**;

Force Result Cache at the Database Level:

SQL> alter system set result_cache_mode = **force**;

Last Option - **Auto**:

Based on frequency of executuon, cost of execution and how much underlying objects are changing

Result Cache

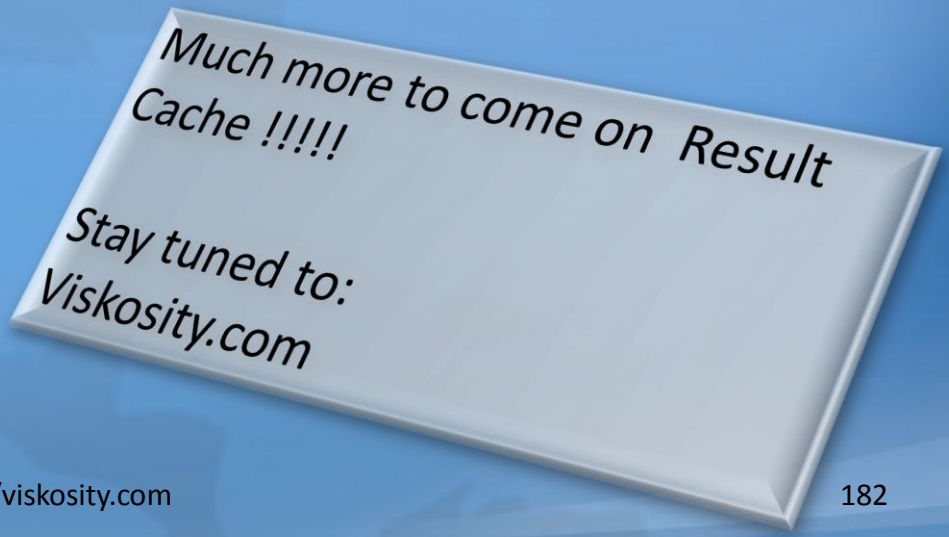
Out of the box settings:

- .25% of memory_target
- .5% of sga_target
- 1% of shared_pool_size
- Max allocation cannot be > 75% of shared_pool

Override Hints:

/*+ result_cache +/

/*+ no_result_cache +/



Triggers – Ordering and Disabled

Use the follows clause for Trigger Ordering

```
CREATE TRIGGER B4I_EMP2_AUD
BEFORE INSERT ON EMP2
FOLLOWS B4I_EMP2_SAL,B4I_EMP2_SEC
WHEN ...
```

Use the ENABLED or DISABLED clause to create triggers

```
CREATE TRIGGER B4I_EMP2_AUD
BEFORE INSERT ON EMP2
FOLLOWS B4I_EMP2_SAL,B4I_EMP2_SEC
DISABLED
WHEN ...
```

Compound Triggers

```
CREATE OR REPLACE TRIGGER
   emp2_compound_trigger
FOR INSERT ON emp2
COMPOUND TRIGGER

v_num NUMBER;
v_char VARCHAR2(30);

-- Before Statement Level
BEFORE STATEMENT IS
BEGIN
  dbms_output.put_line('BEFORE
   STATEMENT');
END BEFORE STATEMENT;
```

```
-- Before Row Level
BEFORE EACH ROW IS
BEGIN
  dbms_output.put_line('BEFORE ROW');
END BEFORE EACH ROW;
-- After Statement Level
AFTER STATEMENT IS
BEGIN
  dbms_output.put_line('AFTER
   STATEMENT');
END AFTER STATEMENT;
-- After Row Level
AFTER EACH ROW IS
BEGIN
  dbms_output.put_line('AFTER ROW');
END AFTER EACH ROW;
END emp2_compound_trigger;
/

Trigger created.
```

Datapump Compression

```
VISK > expdp full=yes userid="'/ as sysdba'" \
> dumpfile=data_pump_dir:full.dmp.compress compression=all

Export: Release 11.1.0.6.0 - Production on Monday, 24 March, 2008 6:43:01

Copyright (c) 2003, 2007, Oracle.  All rights reserved.

Connected to: Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
Starting "SYS"."SYS_EXPORT_FULL_02":  full=yes userid='/******** AS SYSDBA'
     dumpfile=data_pump_dir:full.dmp.compress compression=all
Estimate in progress using BLOCKS method...
Processing object type DATABASE_EXPORT/SCHEMA/TABLE/TABLE_DATA
```

Datapump Compression

```
expdp userid=scott/tiger dumpfile=emp2.dmp tables=emp2
    directory=data_pump_dir
```

```
-rw-r-----  1 oracle oinstall 16158720 Mar 24 07:06 emp2.dmp
-rw-r-----  1 oracle oinstall  1009386 Mar 24 07:06 emp2.dmp.gz
```

```
expdp userid=scott/tiger dumpfile=emp2.compress.dmp tables=emp2 \
 directory=data_pump_dir compression=all
```

```
-rw-r-----  1 oracle oinstall  1437696 Mar 24 07:08 emp2.compress.dmp
```

Datapump Encryption

- encryption = {all | data_only | encrypted_columns_only |metadata_only | none}

Note:

Encrypted_columns_only → only the encrypted columns are written to the dump file

- Oracle supports three algorithms:
  1. AES128 - Default
  2. AES192
  3. AES256

Three ENCRYPTION_MODE options:

1. dual
2. password
3. transparent

Datapump Encryption

- expdp userid=scott/tiger dumpfile=tde.dmp tables=emp2 directory=data_pump_dir parallel=2 encryption_mode=transparent encryption=all
- expdp userid=scott/tiger dumpfile=emp2.enc.dmp tables=emp2 directory=data_pump_dir parallel=2 encryption_mode=password encryption_password=oracle123
- expdp userid=scott/tiger dumpfile=emp2.aes256.dmp tables=emp2 directory=data_pump_dir parallel=2 encryption_mode=password encryption_password=oracle123 encryption_algorithm=aes256
- expdp userid=scott/tiger dumpfile=emp2.dual.dmp tables=emp2 directory=data_pump_dir parallel=2 encryption_mode=dual encryption=all encryption_password=oracle123 encryption_algorithm=aes256

NOTE: The password parameter is required for dual or password mode

Trying to import a password protected dumpfile without the password

VISK > impdp userid=scott/tiger dumpfile=emp2.enc.dmp tables=emp2 directory=data_pump_dir

Import: Release 11.1.0.6.0 - Production on Monday, 24 March, 2008 7:23:49

Connected to: Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production

With the Partitioning, OLAP, Data Mining and Real Application Testing options

ORA-39002: invalid operation

ORA-39174: Encryption password must be supplied.

Successful Import With the Password

```
SQL> drop table emp2;
Table dropped.

VISK > impdp userid=scott/tiger dumpfile=emp2.enc.dmp tables=emp2
       directory=data_pump_dir encryption_password=oracle123

Starting "SCOTT"."SYS_IMPORT_TABLE_01":  userid=scott/********
       dumpfile=emp2.enc.dmp tables=emp2 directory=data_pump_dir
       encryption_password=********
Processing object type TABLE_EXPORT/TABLE/TABLE
Processing object type TABLE_EXPORT/TABLE/TABLE_DATA
. . imported "SCOTT"."EMP2"                          15.33 MB  269990 rows
Processing object type TABLE_EXPORT/TABLE/STATISTICS/USER_PREF_STATISTICS
Job "SCOTT"."SYS_IMPORT_TABLE_01" successfully completed at 07:25:18
```

Reuse a Dump File

ORA-39001: invalid argument value

ORA-39000: bad dump file specification

ORA-31641: unable to create dump file "/apps/oracle/admin/VISK/dpdump/emp2.dual.dmp"

ORA-27038: created file already exists

Additional information:

What can you do now? Use the REUSE_DUMPFILES parameter

expdp userid=scott/tiger dumpfile=emp2.dual.dmp tables=emp2 directory=data_pump_dir parallel=2 encryption_mode=dual encryption=all encryption_password=oracle123 encryption_algorithm=aes256 **reuse_dumpfiles=y**

Datapump to Remap Data

First create a package

```
create or replace package emp_sal
is
function remap_sal (p_sal number) return
      number;
end;
/
create or replace package body emp_sal
is
function remap_sal
(p_sal number) return number
as
v_sal number := 75000;
begin
return v_sal;
end;
end;
/
```

Export with the remap_data option:

```
expdp userid=scott/tiger dumpfile=emp2.dual.dmp
tables=emp2 directory=data_pump_dir parallel=2
encryption_mode=dual encryption=all
encryption_password=oracle123
encryption_algorithm=aes256
remap_data=scott.emp2.sal:emp_sal.remap_sal
reuse_dumpfiles=y
```

After the import:

```
SQL> select ename, sal from emp2
where rownum<10;
ENAME                SAL
---------- ----------
SMITH             75000
ALLEN             75000
WARD              75000
JONES             75000
[…]
```

Datapump External Tables

```
create directory dbadir as '/tmp/dba';
create directory tmpdir as '/tmp';

create table emp2_external
organization external
(
  type oracle_datapump
  default directory dbadir
  access parameters
 (logfile tmpdir:emp2 compression enabled encryption enabled)
location ('emp2_external.dmp')
)
as select * from emp2;

Table created.
```

Application Express

V3.0 is shipped with Oracle Database 11g

V3.1 is available on OTN as of Feb 2008

Apex configuration is simple:

SQL> @?/apex/apxconf.sql

PORT

8080

Application Express Setup Output

```
Enter values below for the XDB HTTP listener port and
the password for the ApplicatiDefault values are in
   brackets [ ].
Press Enter to accept the default value.
Enter a password for the ADMIN user [] oracle123
Enter a port for the XDB HTTP listener [ 8080] 8080
...changing HTTP Port
PL/SQL procedure successfully completed.
PL/SQL procedure successfully completed.
Session altered.
...changing password for ADMIN
PL/SQL procedure successfully completed.
Now you can unlock the anonymous user:
SQL> alter user anonymous account unlock;
User altered.
```

Application Express

Access APEX:

- http://rac11.dbaexpert.com:8080/apex/apex_admin

- Application Express does not need HTTP Server
- Runs with the Embedded PL/SQL Gateway (EPG)
- If upgrading the database from 10g to 11g, you must manually install and configure APEX

APEX Enhancements

- Provides the ability to print a PDF for report regions.
- Renders up to 18 different flash charts and converts scalable vector graphics to flash.
- Migrate Access applications to Application Express using the Application Migration Workshop.
- Provides drag-and-drop layout pages for development productivity.
- Provides new item types such as date picker, pop-up list of values, shuttle, and new HTML text editor areas.
- Renders calendars by providing built-in wizards for daily, weekly, and monthly views.

APEX Enhancements #2

- It compares database objects in two separate schemas.
- It compares differences between two different applications.
- It facilitates bookmark pages within the application.
- It performs page and region caching for application performance.
- Find items for CSS and images.
- Defines rules for password expiration, forces strong passwords, locks accounts, and forces password changes upon first login.
- Manage workspace effectively by configuring sizes for new workspace and schema requests and additional space for existing workspace.

Copyright Information

- Neither Viskosity Technologies nor the authors guarantee this document to be error-free. Please provide comments and feedback to Charles@viskosity.com
- Apress Copyright 2007. This document or any portions of this document may not be reproduced without the expressed written consent from the authors of the Oracle Database 11g New Features for DBAs and Developers book.
- Contact Information:
  - Charles Kim – charles@viskosity.com

Visosity Technology Service Offerings

VISKosity professionals provide end-to-end consulting services in the following areas:

- Real Application Clusters (RAC) - 9i, 10g, 10gR2 and 11g
  - RAC Assessment
  - Infrastructure Readiness
- EBusiness Suite Administration (11i and 12i)
- Data Warehousing
- Business Intelligence
- Database Security
- Enterprise Systems Management (ITIL and ITSM)
- Remote Database Administration

Contact us:
Email: info@Viskosity.com
Phone: 214.502.1231
URL: http://viskosity.com

Partners and Associations

TRIORA Group

http://www trioragroup.com

Specialists in EBusiness Suite Implementations

Contact: rob.mcmillan@trioragroup.com

Novara Solutions

Oracle EBusiness Suite

Contact: Vic Roselli