

PR Newswire

United Business Media

ORACLE 10g A's: AWR, ADDM, ASH, ASM...

Sept. 21th, 2006

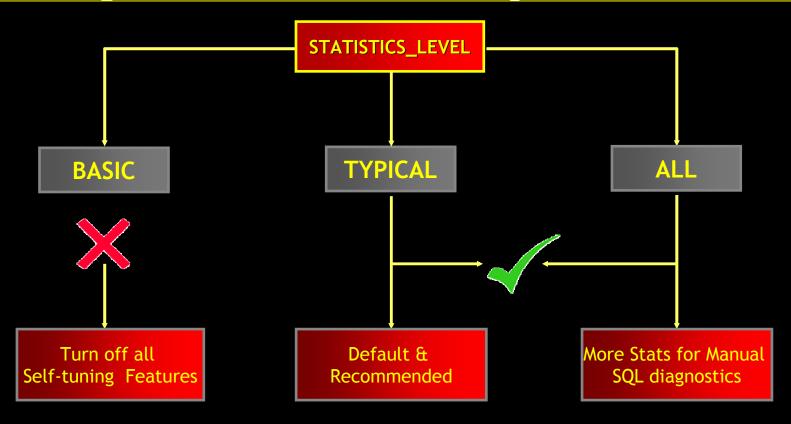


Inderpal S. Johal Manager, DBA Group

Agenda

- AWR Automatic Workload Repository
- ASH Active Session History
- ADDM Automatic database Diagnostic Monitor
- ADVISORY
- ASMM Automatic Shared Memory Management
- ASM Automatic Storage Management
- Q&A

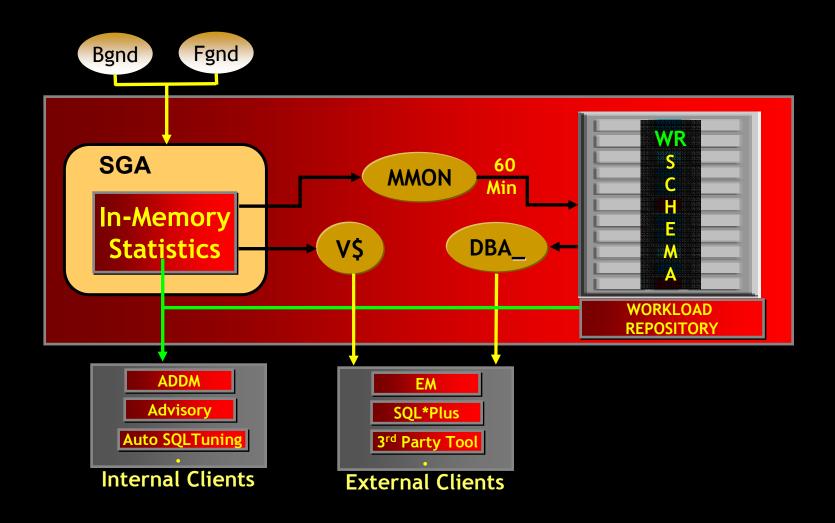
Pre-Requisite for Self Tuning Features



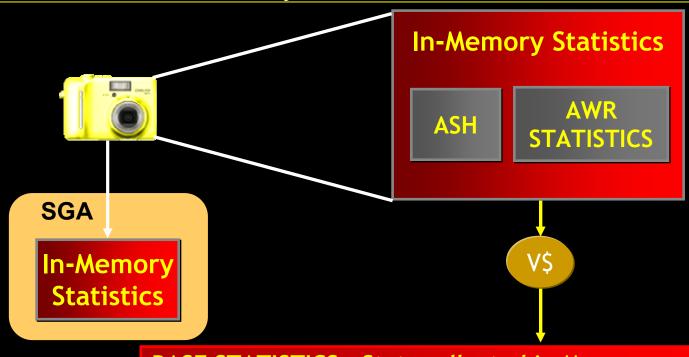
Self Tuning Features

```
SELECT
          statistics_name, activation_level
          v$statistics_level
FROM
ORDER BY 2;
                          PGA Advice
                                                                          TYPICAL
                          Shared Pool Advice
                                                                          TYPICAL
                          Active Session History
                                                                          TYPICAL
                          Undo Advisor, Alerts and Fast Ramp up
                                                                          TYPICAL
                          Streams Pool Advice
                                                                          TYPICAL
                          Buffer Cache Advice
                                                                          TYPICAL
                          Timed OS Statistics
                                                                          ALL
                          Plan Execution Statistics
                                                                          ALL
```

AWR - Automatic Workload Repository



AWR – In Memory Statistics



V\$OSSTAT

BASE STATISTICS - Stats collected in Memory

V\$SEGMENT_STATISTICS Object Statistics showing access & Usage

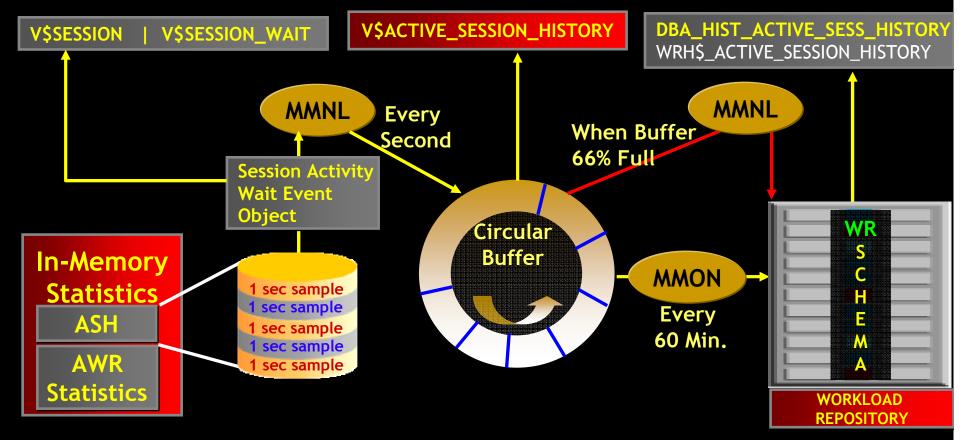
V\$SYS_TIME_MODEL Showing time spend by Activities

V\$SYSSTAT SYSTEM Statistics

OS Statistics showing CPU and Memory

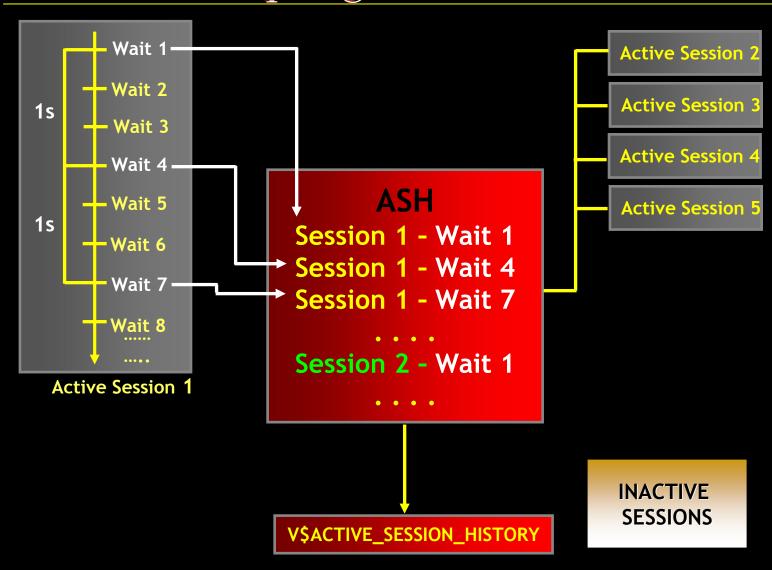
V\$ACTIVE_SESSION_HISTORY - Recent Session Activities

ASH – Active Session History



- Only Records ACTIVE Sessions means NON-IDLE Sessions
- Rolling buffer and previous information is overwritten when required
- Writes 1 out of 10 Samples to AWR

ASH – Sampling



ASH Buffers facts

ASH Buffer Size

- Min 1M and Max 30M
- Max(Min (No. of CPU * 2 M, 5% of SHARED_POOL_SIZE, 2% of SGA_TARGET), 1M)
- Hidden parameter "_ASH_SIZE" → Please Don't change it
- ASH Buffers Data is flushed to AWR when buffers are 66% filled by MMNL process
 - Hidden parameter "_ASH_EFLUSH_TRIGGER" → Please Don't change it
- ASH Buffers are filled with 1 Sec Samples from Active Session-state information
 - Hidden parameter "_ASH_SAMPLING_INTERVAL" → Please Don't change it
 - Hidden parameter "_ASH_SAMPLE_ALL" → Please Don't change it

ASH Buffers facts

- One out of 10 ASH sampled Record of each Session is pushed to AWR
 - Hidden parameter "_ASH_DISK_FILTER_RATIO=10" → Please Don't change it
- ASH can be disabled by the following methods
 - Hidden parameter "_ASH_ENABLE=FALSE" → Please Don't change it
 - Use STATISTICS_LEVEL=BASIC → Recommended option
- Check the Size in your Database

```
SELECT * FROM v$sgastat WHERE name = 'ASH buffers';
```

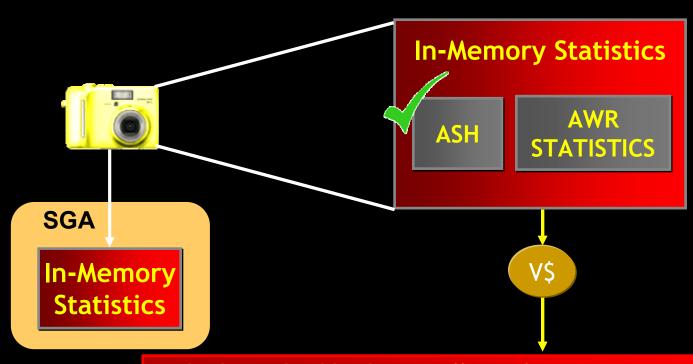
ASH – Automatic Shell History

```
ASH Report in Text or HTML format using $ORACLE_HOME/rdbms/admin/ashrpt.sql -- Report for Specified Duration $ORACLE_HOME/rdbms/admin/ashrpti.sql -- Report for Specified duration and for Specified DB and Instance
```

ASH Report

- Top Events
- Load Profile
- Top SQL
- Top Sessions
- Top Objects/Files/Latches
- Activity Over Time
- You can Dump ASH content to File
 SQL> oradebug setmypid
 SQL> oradebug dump ashdump 5
- -- This will dump last 5 minute content

AWR — In Memory Statistics



V\$SYSSTAT

V\$OSSTAT

BASE STATISTICS - Stats collected in Memory

V\$SEGMENT_STATISTICS
Object Statistics showing access & Usage

V\$SYS_TIME_MODEL Showing time spend by Activities

SYSTEM Statistics

OS Statistics showing CPU and Memory

V\$ACTIVE_SESSION_HISTORY - Recent Session Activities

Base Statistics and Metrics

Base Statistics

- It is raw data collected in Oracle Database
 - E.g Number of any Waits or Physical Read since system startup

<u>Metrics</u>

- It is the statistics derived from Base Statistics
 - E.g Number of any specific waits or Physical Read in last one hour
- Oracle support Metrics for following statistics
 - System
 - Sessions
 - Files
 - Wait events
- MMON periodically updates the Metrics data from corresponding Base Statistics

Metrics Views

METRICS GENERAL INFORMATION

V\$METRICNAME
V\$METRICGROUP
V\$METRIC
V\$METRIC_HISTORY
DBA_HIST_METRIC_NAME

SYSTEM METRICS

V\$SYSMETRIC V\$SYSMETRIC_HISTORY V\$SYSMETRIC_SUMMARY DBA_HIST_SYSMETRIC_HISTORY DBA_HIST_SYSMETRIC_SUMMARY

SESSIONS METRICS

V\$SESSMETRIC
DBA_HIST_SESSMETRIC_HISTORY

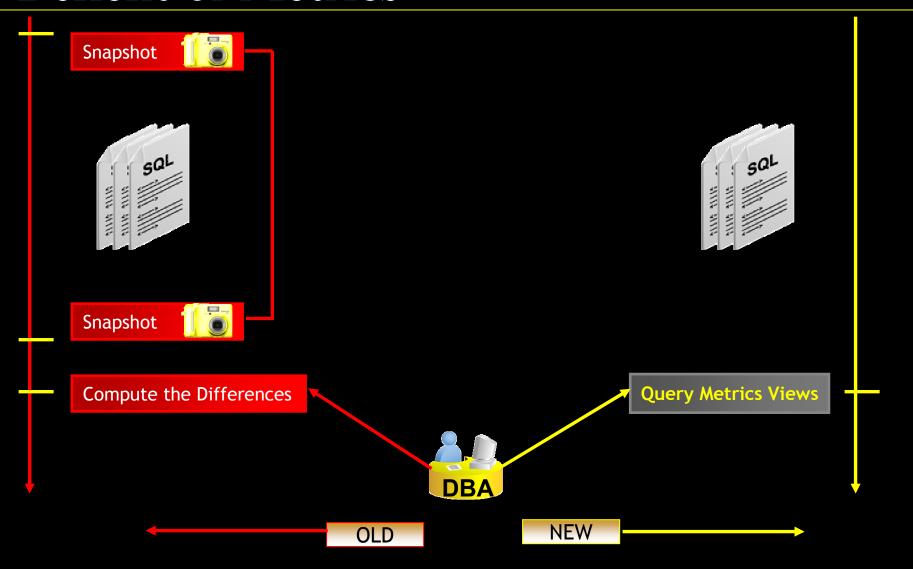
FILES METRICS

V\$FILEMETRIC V\$FILEMETRIC_HISTORY DBA_HIST_FILEMETRIC_HISTORY

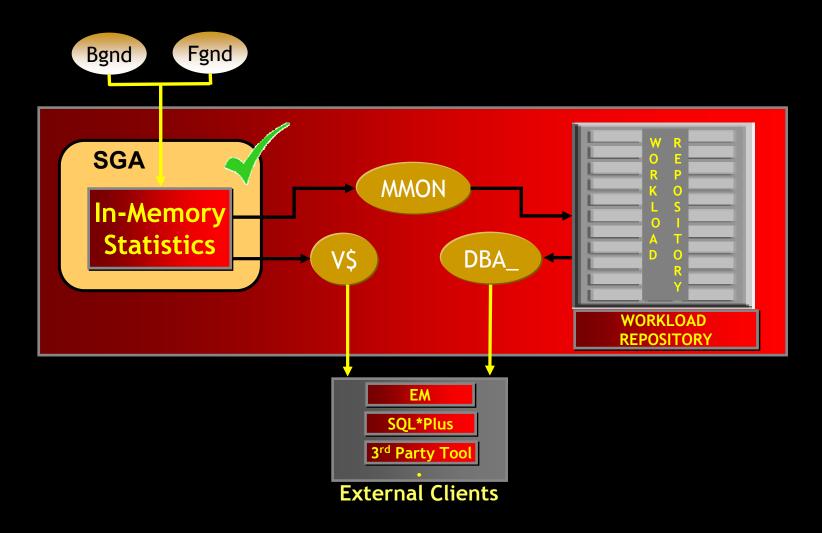
WAIT EVENTS
METRICS

V\$EVENTMETRIC V\$WAITCLASSMETRIC V\$WAITCLASSMETRIC_HISTORY

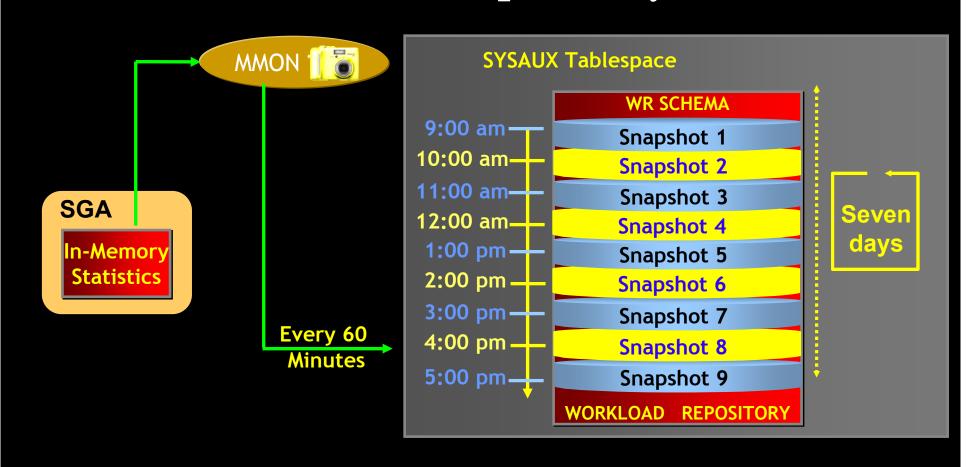
Benefit of Metrics



AWR - Automatic Workload Repository



AWR – Workload Repository

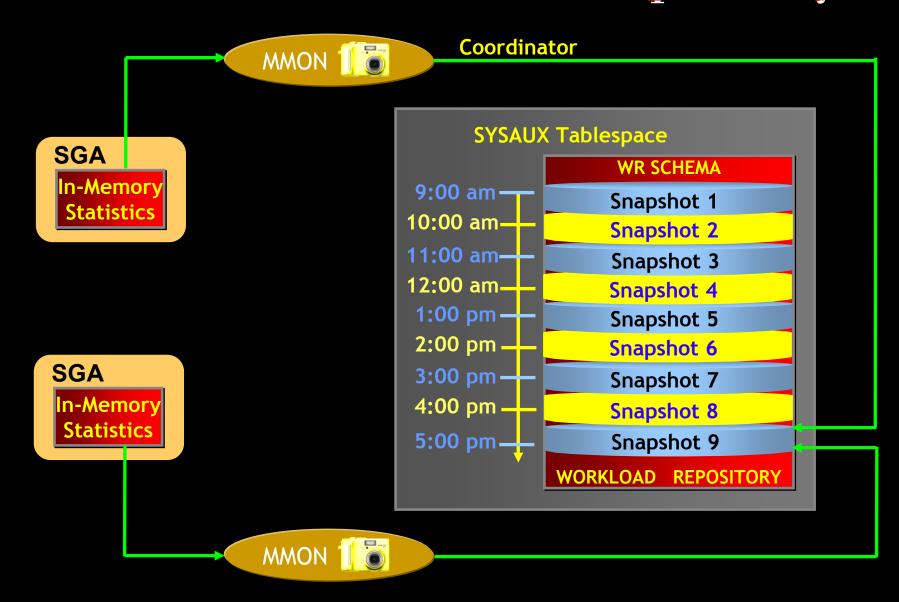


AWR – Workload Repository

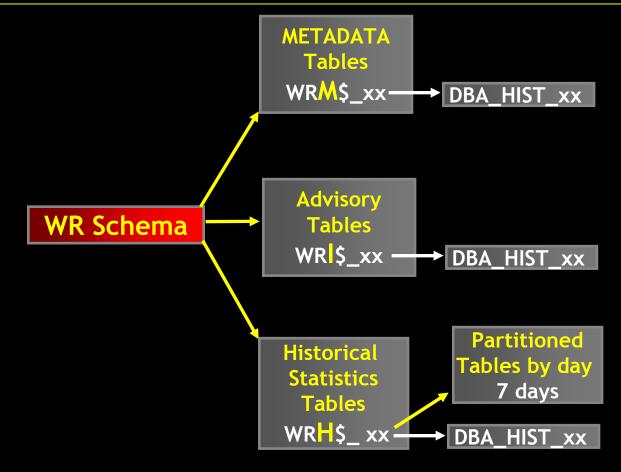
```
dbms_workload_repository.modify_snapshot_settings
( interval => 60,
    retention => 43200); --30 days=43200
```

SELECT snap_interval, retention FROM dba_hist_wr_control;

AWR - RAC Workload Repository



AWR – WR Schema



AWR- Reports

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awrrpt.sql - AWR Workload Report

awrddrpt.sql - Side by Side AWR comparision

awrinfo.sql - AWR Information like current Usage and

Data Distribution

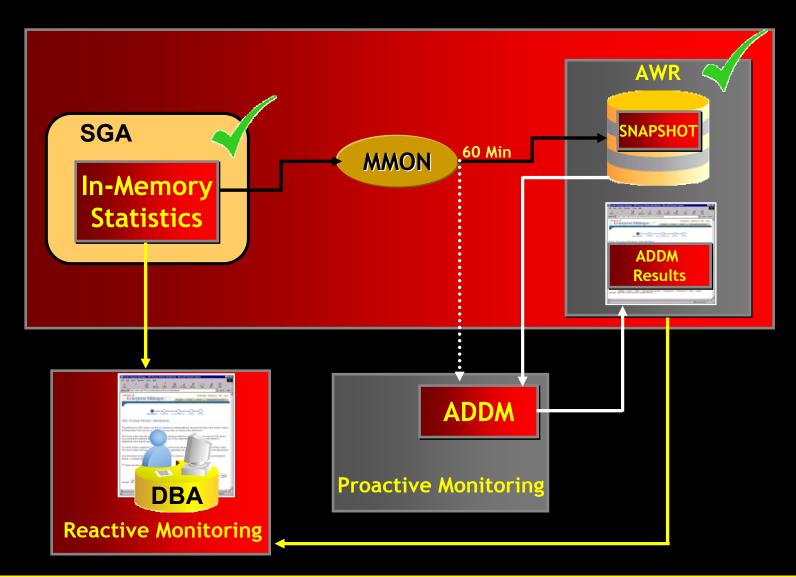
awrload.sql - Load AWR Dump from one DB to another

awrsqrpt.sql - Create AWR report for specific SQL

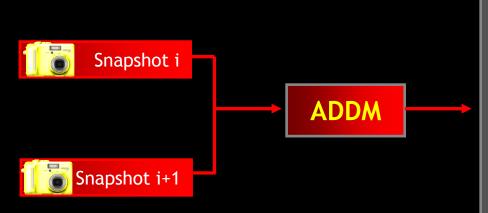
statement

ADDM

Automatic Database Diagnostic Monitor



ADDM



1. Report and Advise on

- High Load SQL and PL/SQL statements
- System Resources like CPU bottleneck
- Space Management
- Storage Management
- Backup and Recovery Management
- 2. Create on-demand report using script
 Named addmrpt.sql present in
 \$ORACLE_HOME/rdbms/admin directory
- 3. Use EM for analysis

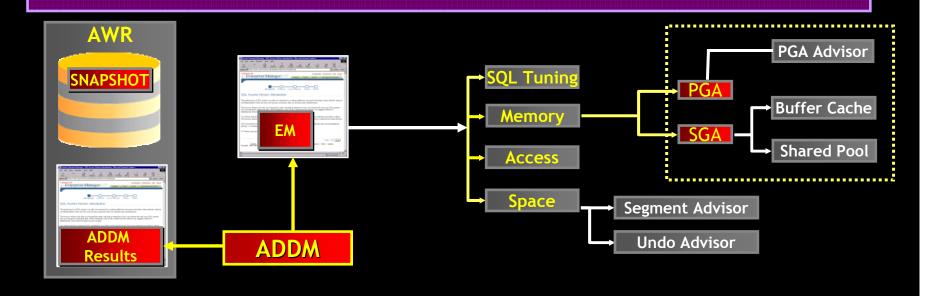
▶Related Alerts		
Performance Analysis		
Period Start Time Sep 5, 2006 7	:00:56 PM Period Duration (minutes) 59.18	
Impact (%) ▽	Finding	Recommendations
89.2	SQL statements consuming significant database time were found.	3 SQL Tuning

ADDM

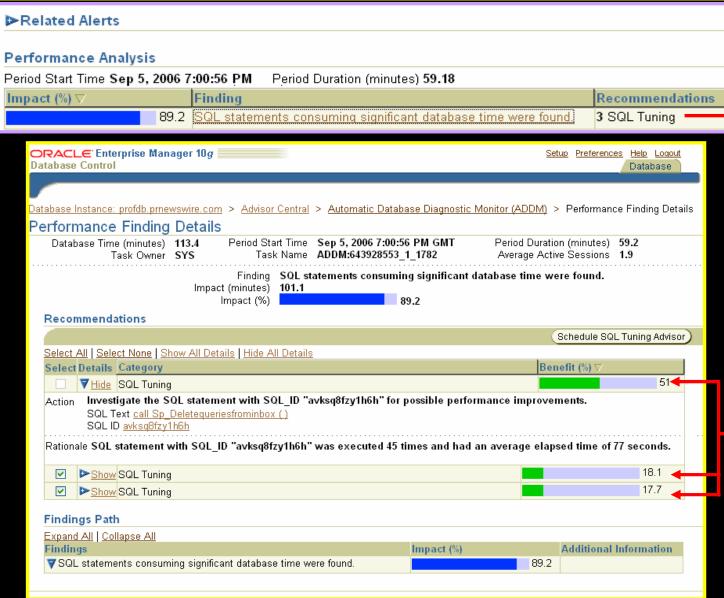
- It is also called Advisor for the Database Instance
- It helps in identifying the problem and their causes
- It also provides recommendation for each problem
- It can potentially call all other 10g new advisors

In Short ADDM main objective is

- 1. Reduce Bottlenecks
- 2. Improve Performance







Oracle 10g Advisor

Home

Performance Administration Maintenance

Related Links

Advisor Central

All Metrics

Jobs

Metric Collection Errors

SQL History

Alert History

Blackouts

Manage Metrics

Monitoring Configuration

<u>User-Defined Metrics</u>

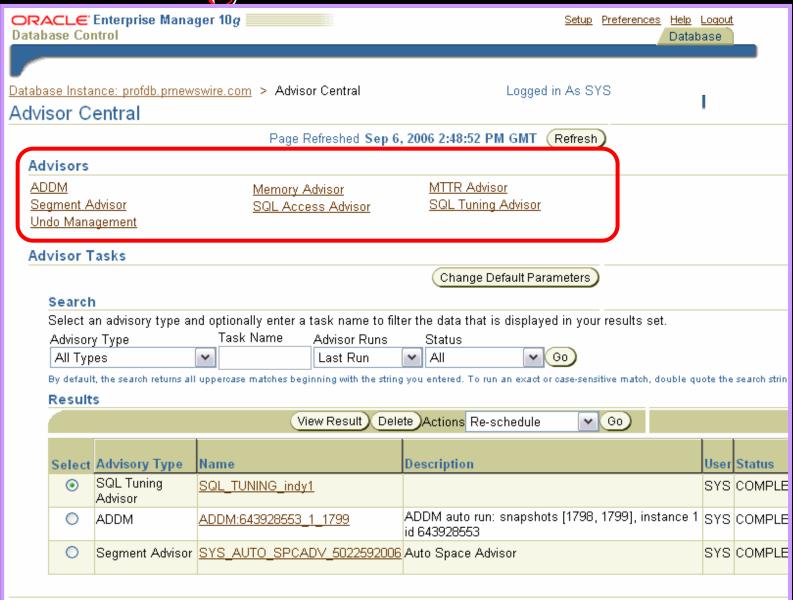
Alert Log Content

iSQL*Plus

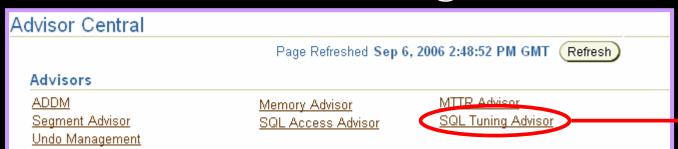
Metric Baselines

Monitor in Memory Access Mode

Oracle 10g Advisor



Advisor — SQL Tuning Advisor



ORACLE Enterprise Manager 10g

Database Control

<u>Database Instance: profdb.prnewswire.com</u> > <u>Advisor Central</u> > SQL Tuning Advisor Links

SQL Tuning Advisor Links

The SQL Tuning Advisor analyzes individual SQL statements and makes recommendations for improving their performance. sources, which will lead you to a data source where you can tune SQL statements using the SQL Tuning Advisor.

Top Activity

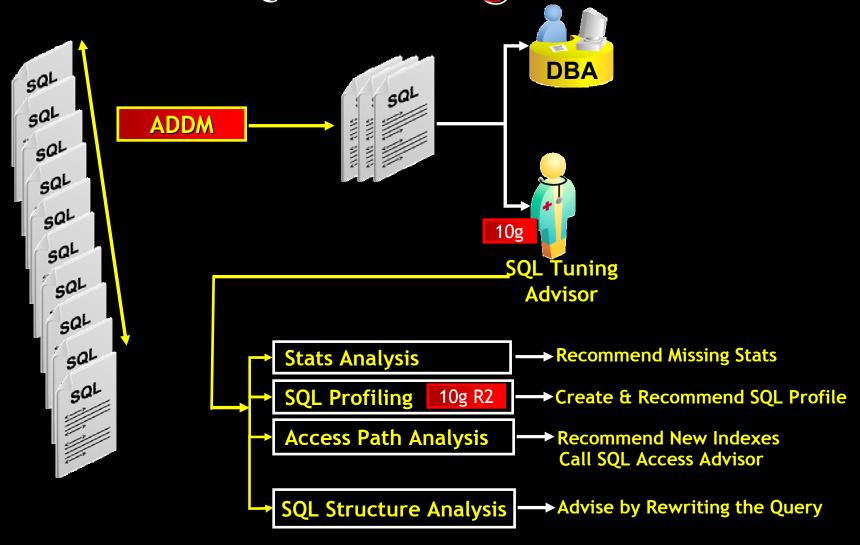
Period SQL

SQL Tuning Sets

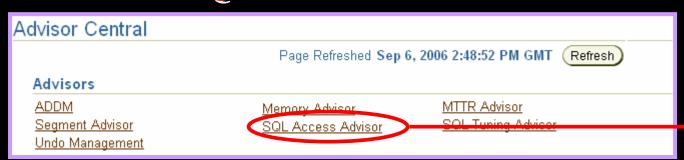
<u>Snapshots</u>

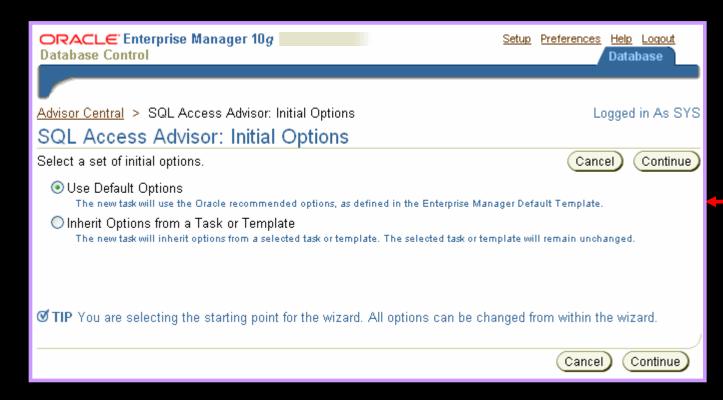
Preserved Snapshot Sets

Advisor — SQL Tuning Advisor

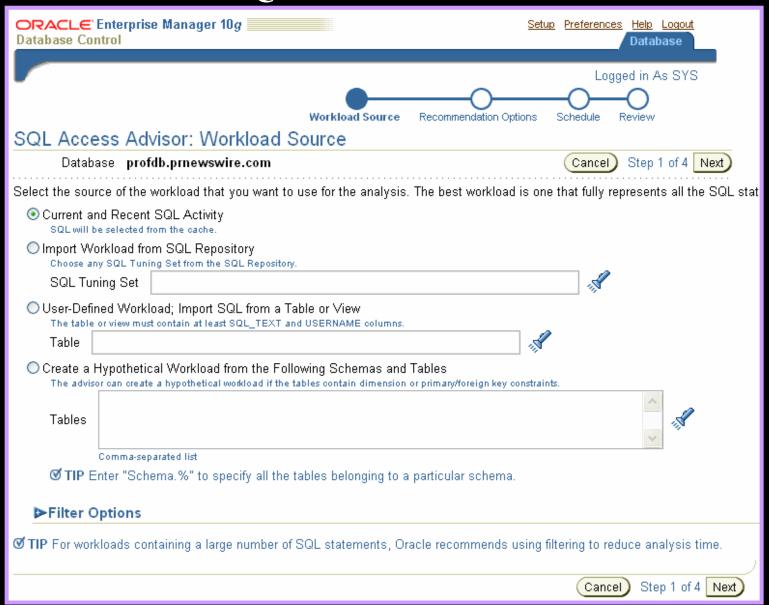


Advisor — SQL Access Advisor





Advisor — SQL Access Advisor



Advisor — SQL Access Advisor

Analysis will be exhaustive

Memory Advisor - ASMM

Automatic Shared Memory Management

Advisor Central

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Advisors

ADDM

Segment Advisor

Undo Management

Memory Advisor SQL Access Advisor MTTR Advisor SQL Tuning Advisor

Advisor — ASMM

SGA = 20G

DB Buffer Cache

Shared Pool

Java Pool

Large Pool

Streams Pool

Auto Tuned

Redolog Buffer

Fixed SGA

SGA_TARGET = 20G

SGA_MAX_SIZE = 20G

STATISTICS_LEVEL = TYPICAL

LOG BUFFER

DB KEEP CACHE SIZE

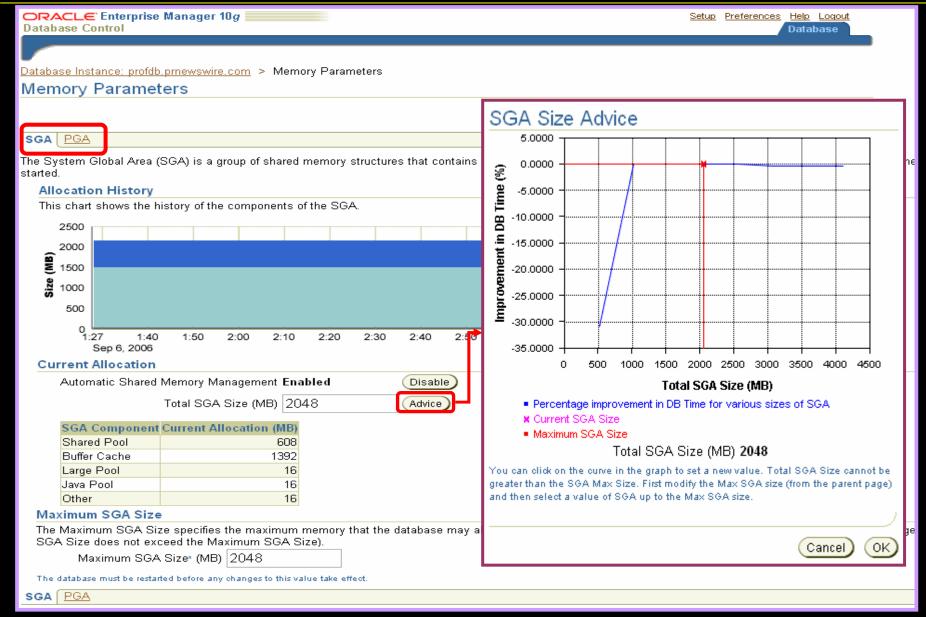
DB RECYCLE CACHE SIZE

DB nK CACHE SIZE

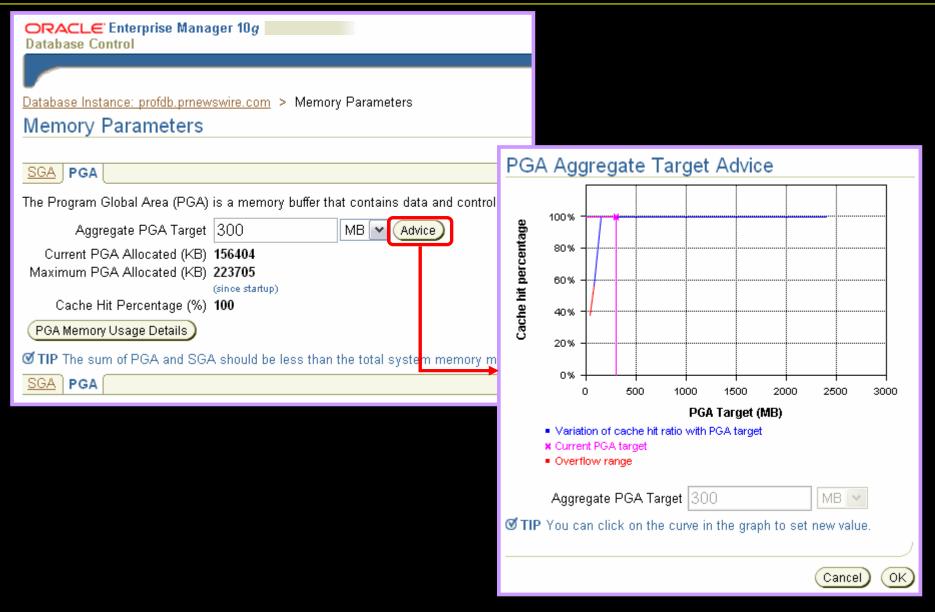
Manually Tuned Parameters

- Set STATISTICS LEVEL = TYPICAL | ALL to use ASMM
- Set SGA_TARGET > 0 [Default =0 means ASMM is disabled]
- DB_CACHE_SIZE/SHARED_POOL_SIZE/JAVA_POOL_SIZE/LARGE_POOL_SIZE/STREAMS_POOL_SIZE = 0 when SGA_TARGET is set to non Zero value
- If you specify any value to above Auto Tuned variable in initialization parameter file, they will become Lower bound value
 - e.g. if SGA_TARGET=20G and SHARED_POOL_SIZE=5G, then SHARED POOL never shrink below 5G
 - ASMM uses new Background process MMAN [Memory Manager]
 - MMAN coordinates the sizing of Memory components

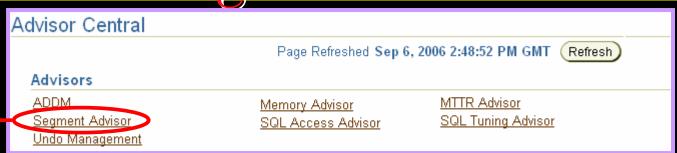
Advisor — ASMM

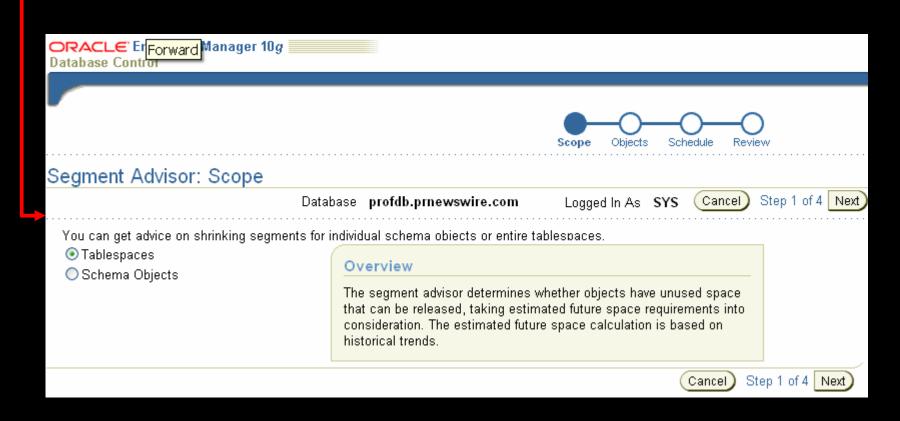


Advisor — ASMM



Advisor — Segment Advisor





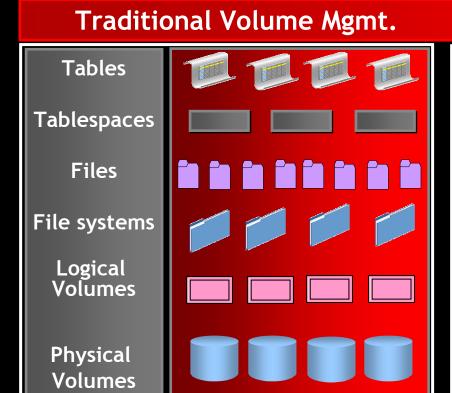
What is ASM

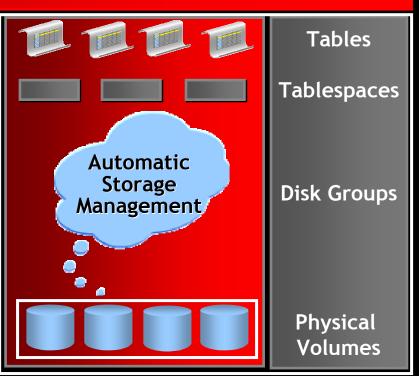
- ASM stands for Automatic Storage Management
- It is Oracle Cluster File System and Volume Manager
- Designed for Oracle Database Related Files
- Provide Storage management capabilities like striping as

well as mirroring Not Certified for **Trace Files** Data files Temp File **ORACLE HOME Voting Disk** Log files **SPfile OCR Files Alert Log** DG file Archived files **Password File Control Files** Flashback Logs Binary File (BFILE) Datapump File **DataGuard** Change Tracking File

Benefits of Automatic Storage Management

- Provide efficient management of storage
- No need for buggy OCFS or expensive 3rd party CFS
- Provide integrated Cluster File system and Volume management capabilities

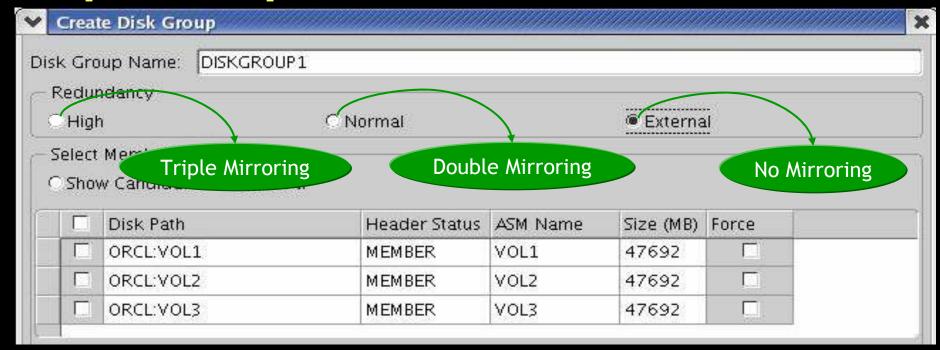




ASM

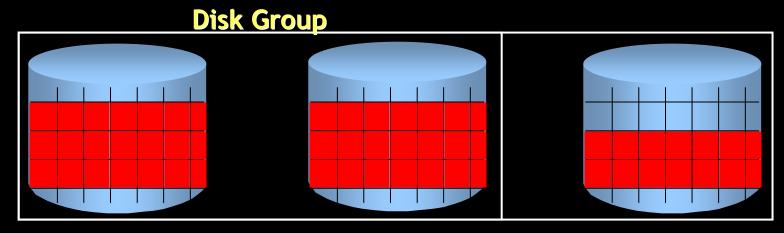
Benefits of Automatic Storage Management

- Provide efficient management of storage
- Provide integrated Cluster File system and Volume management capabilities
- No need for buggy OCFS or expensive 3rd Party CFS
- Provide Software Mirroring on top of vendor supplied SAN [2 or 3 Mirrors]



Benefits of Automatic Storage Management

- Provide efficient management of storage
- Provide integrated Cluster File system and Volume management capabilities
- No need for buggy OCFS or expensive 3rd Party CFS
- Provide Software Mirroring on top of vendor supplied SAN [2 or 3 Mirrors]
- Automatic online re-organization of disk space for any new addition/removal of storage capacity



Pre-Requisite for ASM

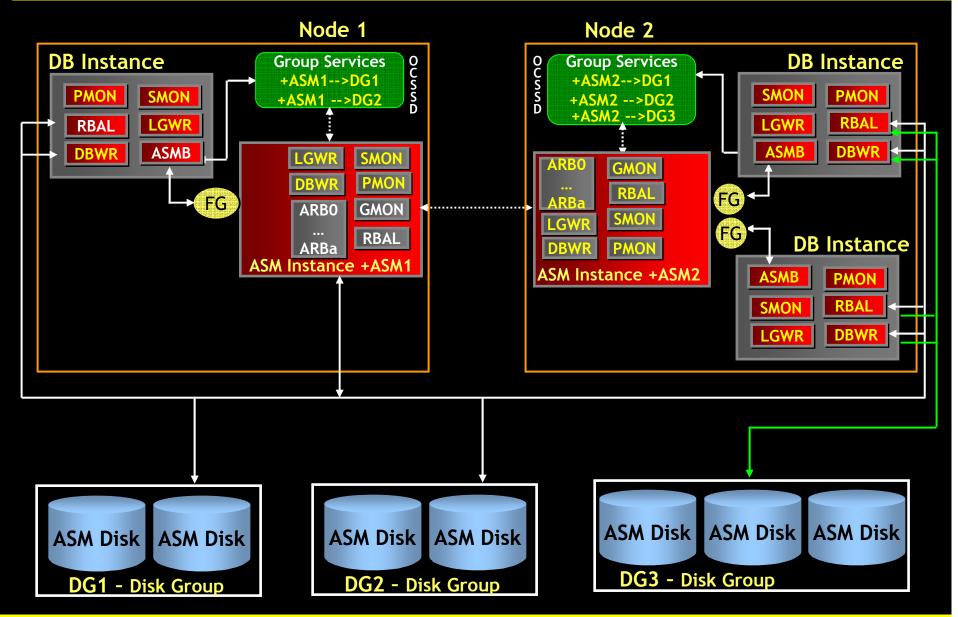
- Need CSS daemon for creating an ASM instance
 \$ ps -ef | grep css
 - 1. In RAC, it is done by Oracle Custerware
 - 2. In Single Instance environment, you have to run \$ORACLE_HOME/bin/localconfig add

To reconfigure the CSS daemon to run from the new Oracle home:

\$ORACLE_HOME/bin/localconfig reset \$ORACLE_HOME

Need Additional at least 100M of memory for ASM instance

ASM Architecture



ASM Components

- ASM Instance
- ASM Disk
- Disk Group
- Failure Group
- ASM Files

ASM Components – ASM Instance

10g has two types of Instance INSTANCE_TYPE = asm

■ INSTANCE_TYPE = asm ASM Instance

• INSTANCE_TYPE = rdbms [Default] DB Instance

Feature of ASM instance

 Do not mount the database but manage metadata required to make ASM files available for DB instances

\$ sqlplus /nolog SQL> connect / as sysdba Connected to an Idle instance SQL> startup

ASM instance started

Total System Global Area 79691776 bytes

Fixed Size 1247396 bytes

Variable Size 53278556 bytes

ASM Cache 25165824 bytes

ASM diskgroups mounted

ASM Components – ASM Instance

10g has two types of Instance INSTANCE_TYPE = asm

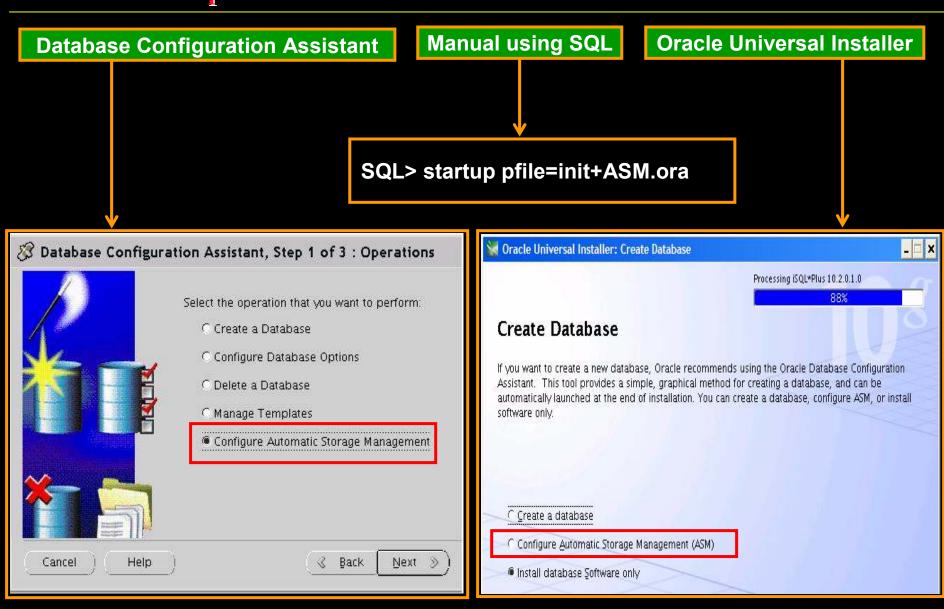
ASM Instance

INSTANCE_TYPE = rdbms [Default] **DB** Instance

Feature of ASM instance

- Do not mount the database but manage metadata required to make ASM files available for DB instances
- DB Instance access ASM files directly and contact ASM instance only for the layout of ASM files
- Contains no physical files like log files / control files or data files
- Requires only the init.ora file for startup
- Instance Name is +ASM or +ASM1..n [RAC]

ASM Components — ASM Instance



ASM Components

- ASM Instance
- ASM Disk
- Disk Group
- Failure Group
- ASM Files

ASM Components — ASM Disks

It is first task in ASM environment to discover and add Disks to ASM management

```
asm_diskstring ='/dev/dsk/sdc4','/dev/dsk/sdd'
```

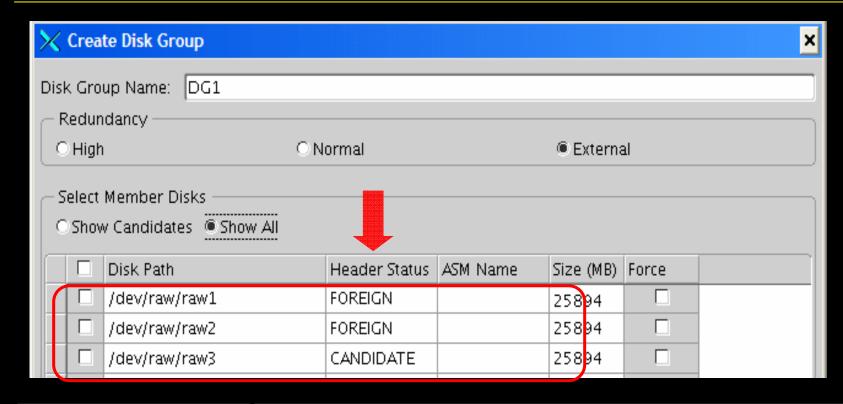
In 10g Rel 2, Disk names are unique within Disk Group while in Rel 1 it is unique within ASM instance.

```
SQL> CREATE DISKGROUP data_dg1 EXTERNAL REDUNDANCY DISK '/dev/dsk/sdc4','/dev/dsk/sdd4';

SQL> SELECT name FROM v$asm_disk;

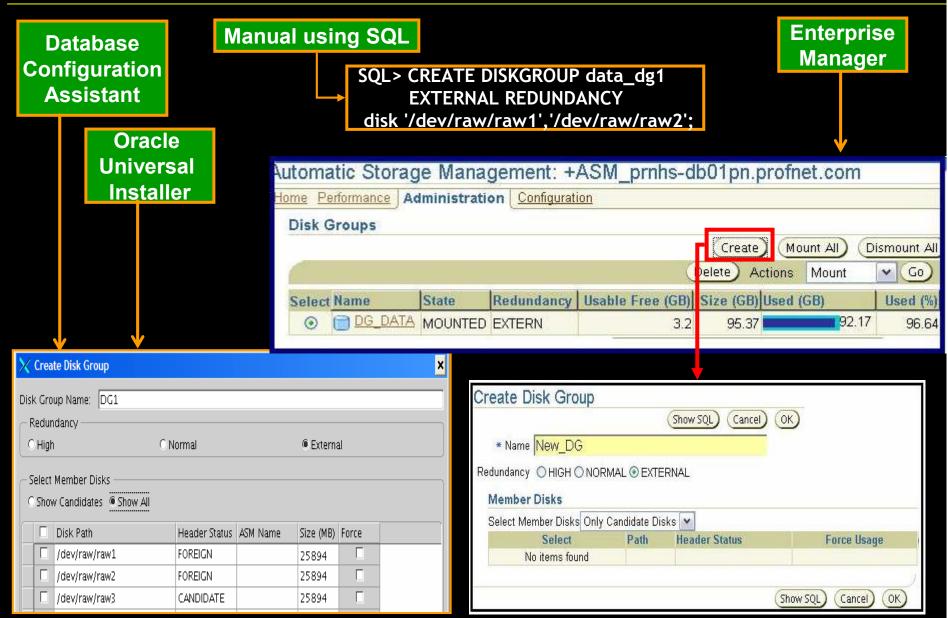
Name
DATA_DG1_0000
DATA_DG1_0001
```

ASM Components — ASM Disks



FOREIGN	Means Disk is of Oracle Object but can only be added to disk group with FORCE keyword
CANDIDATE	Means Disk is available to be added to any disk group
PROVISIONED	Same as CANDIDATE except that Disk is configured using ASMLIB
FORMER	Means Disk was formerly part of some disk group
MEMBER	Means Disk is already part of existing disk group

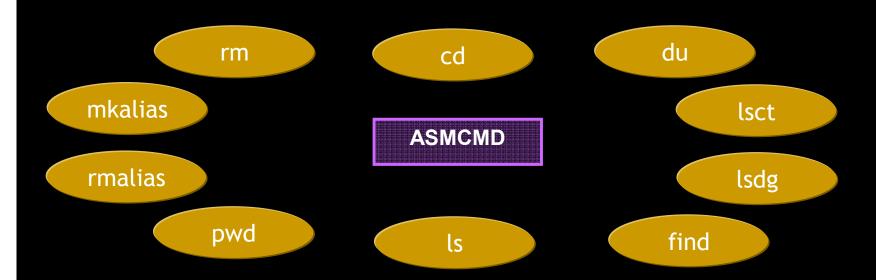
ASM Components — ASM Disk Groups Creation



Tablespace and Disk Group

```
SQL> CREATE TABLESPACE indy_data DATAFILE '+DATA_DG1' size 100M;
Set the parameter DB_CREATE_FILE_DEST_to +DATA_DG1
Examples: For the SID = DEVDB1
SQL > CREATE TABLESPACE indy_test_tblspc DATAFILE_SIZE 100M;
+DATA_DG1/DEVDB1/datafile/indy_test_tblspc.299.121212129
SQL> CREATE TABLESPACE TEST100 DATAFILE '+DATADG1' size 100M;
+DATA_DG1/DEVDB1/datafile/indy_test_tblspc.300.121212129
SQL> CREATE TEMPORARY TABLESPACE TEMP1 TEMPFILE
      '+DATADG1/DEVDB1/datafile/temp2.tst' size 100M;
+DATA DG1/DEVDB1/datafile/temp1.tst
```

ASMCMD — Command Line Interface

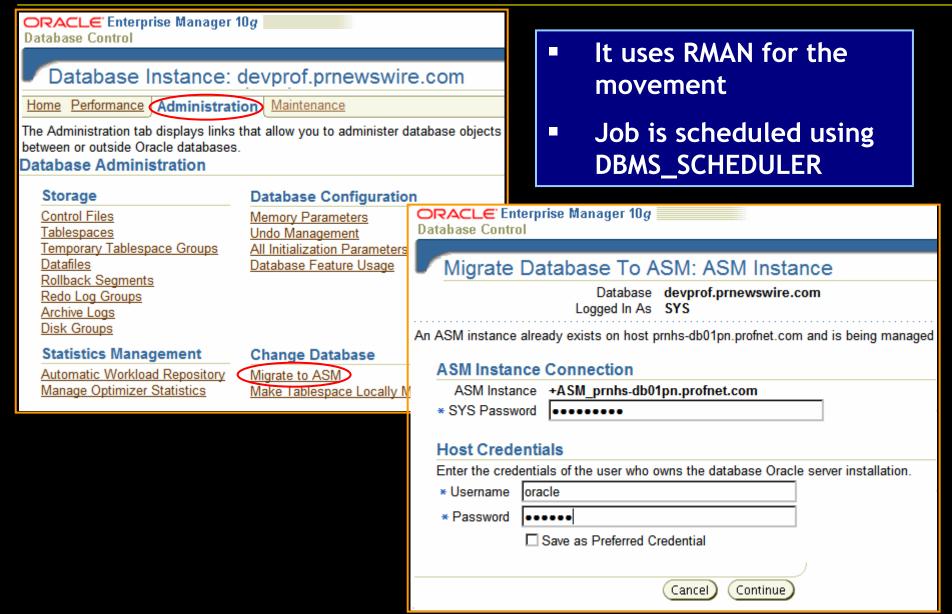


```
$ export ORACLE_SID=+ASM
$ asmcmd
ASMCMD> Is -Itr
State Type Rebal Unbal Name
MOUNTED EXTERN N N DG_DATA/
```

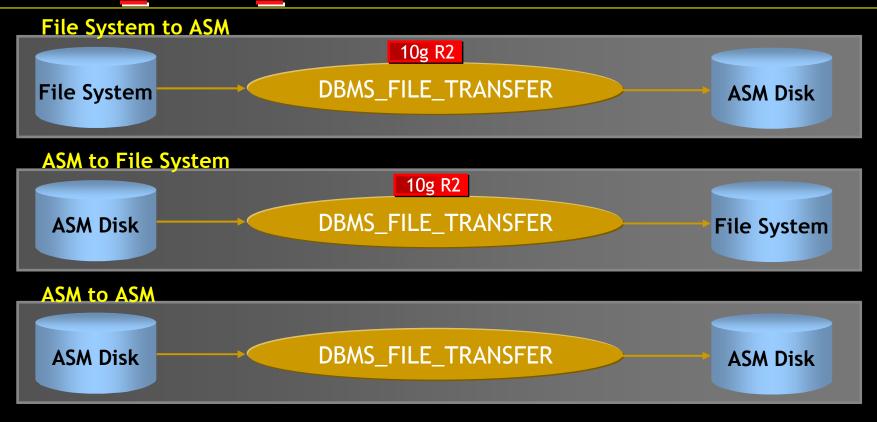
File System to ASM Migration

- Using EM
- Using DBMS_FILE_TRANSFER
- Using RMAN Manually
- Using XMLDB

Moving from File System to ASM - EM



DBMS FILE TRANSFER and ASM



COPY_FILE - Read Local File and copy it to new location on local system

GET_FILE - Contact Remote DB to read Remote file and copy it to Local system

PUT_FILE - Read Local File and contact Remote DB to copy it to remote system

Note: This operation can be performed directly without having to convert the datafile

It will only be used for Database files like Datafile, tempfiles, controlfiles etc

DBMS FILE TRANSFER Example

```
SQL> CREATE DIRECTORY NonASM AS '/export/home/oracle/data';
Directory created.
SQL> CREATE DIRECTORY ASM_D AS as '+DATAD_G1/DEVPROF';
Directory created.
SQL> begin
 2 DBMS_FILE_TRANSFER.COPY_FILE(
       source_directory_object => 'ASM_D'
       source_file_name => 'spfiledevprof.ora' ,
       destination_directory_object => 'NonASM' ,
       destination_file_name => 'spfileDEV.ora');
 7 end;
 ጸ /
PL/SQL procedure successfully completed.
```

File System to ASM Migration

- Using EM
- Using DBMS_FILE_TRANSFER
- Using RMAN Manually
- Using XMLDB



I can be reached at indy.johal@prnewswire.com for any questions

