

Sept. 21<sup>th</sup>, 2006

# Data Softech Inc.

The Complete Database Solution Provider

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

**Inderpal S. Johal**  
Principal Consultant



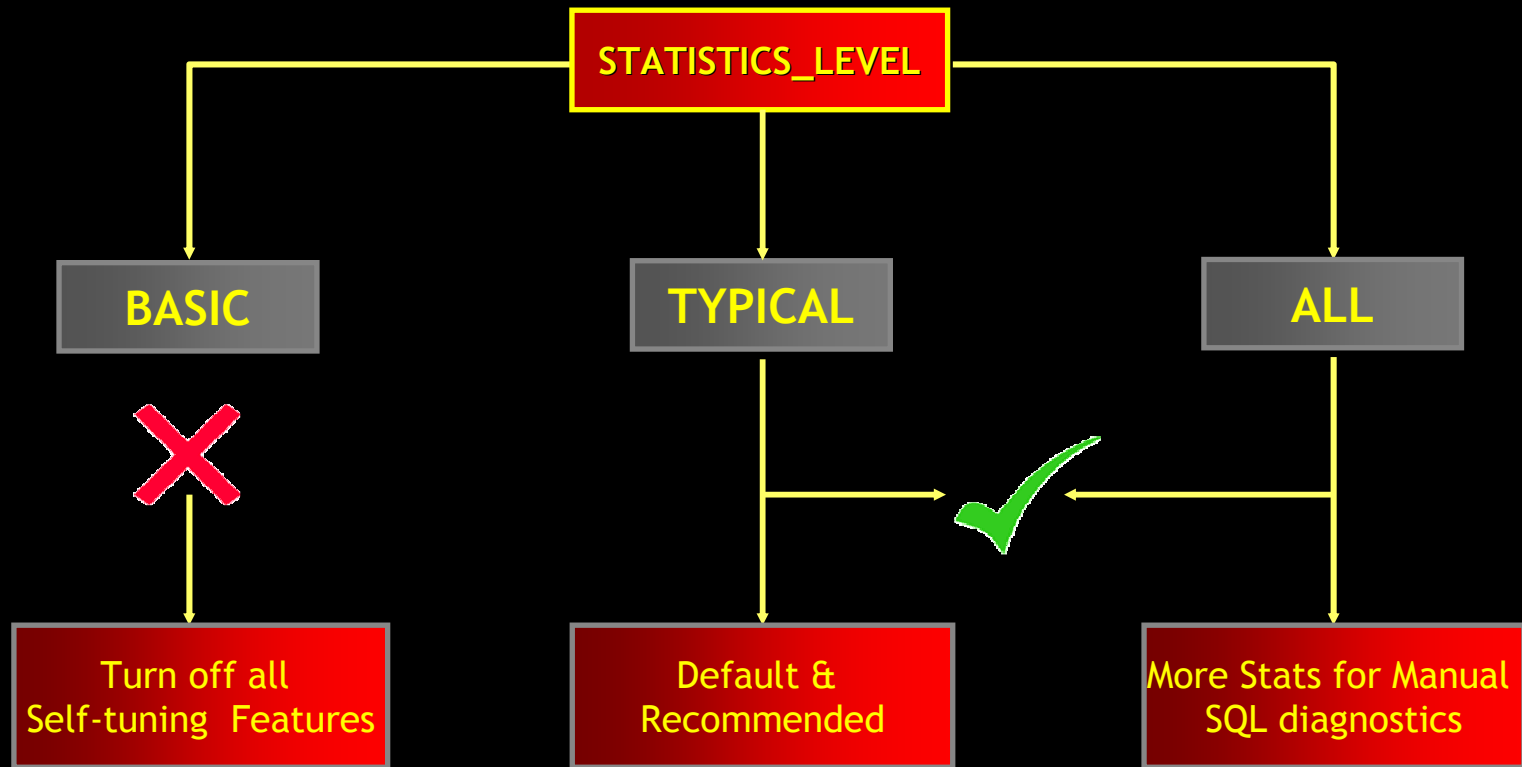
DATA SOFTECH INC.  
Complete Database Solution Provider

# Agenda

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- **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-Requirement for Self Tuning Features

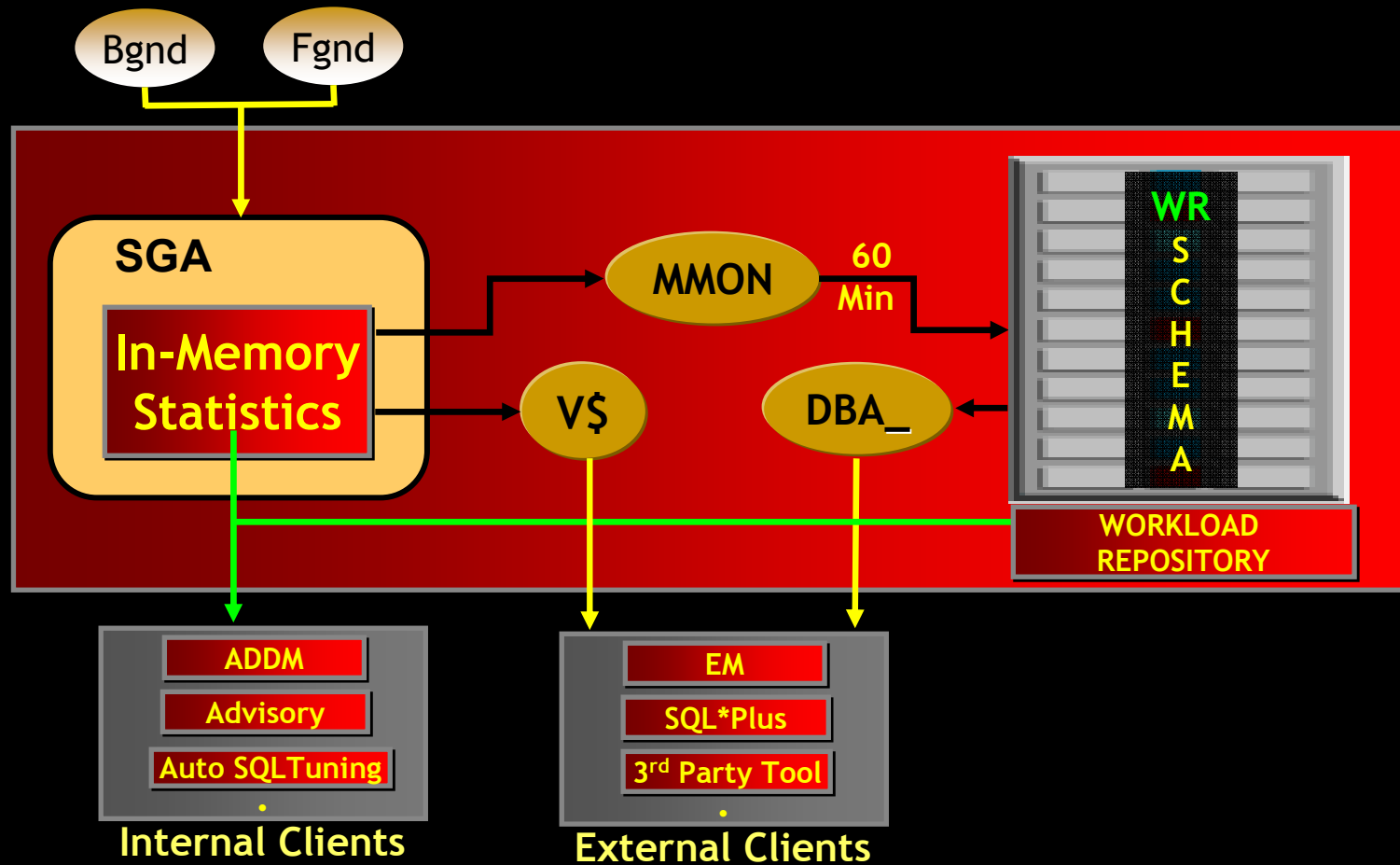


# Self Tuning Features

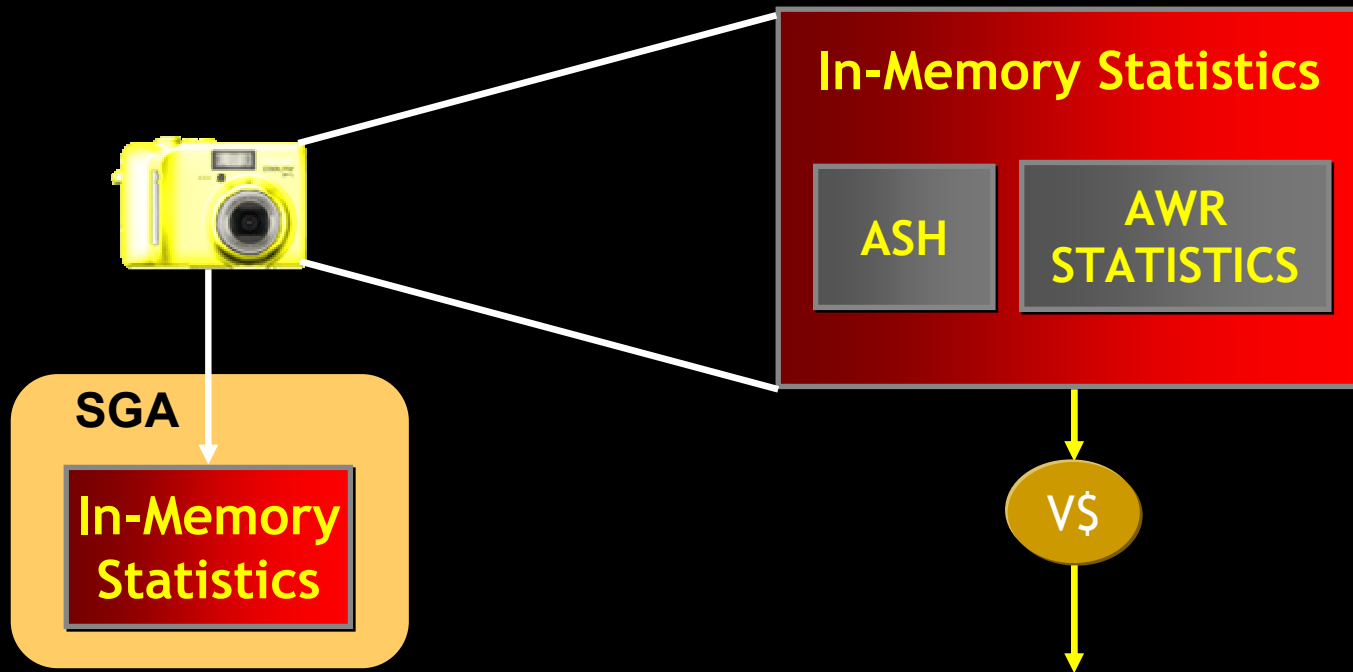
```
SELECT statistics_name, activation_level  
FROM v$statistics_level  
ORDER BY 2;
```

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



## 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**

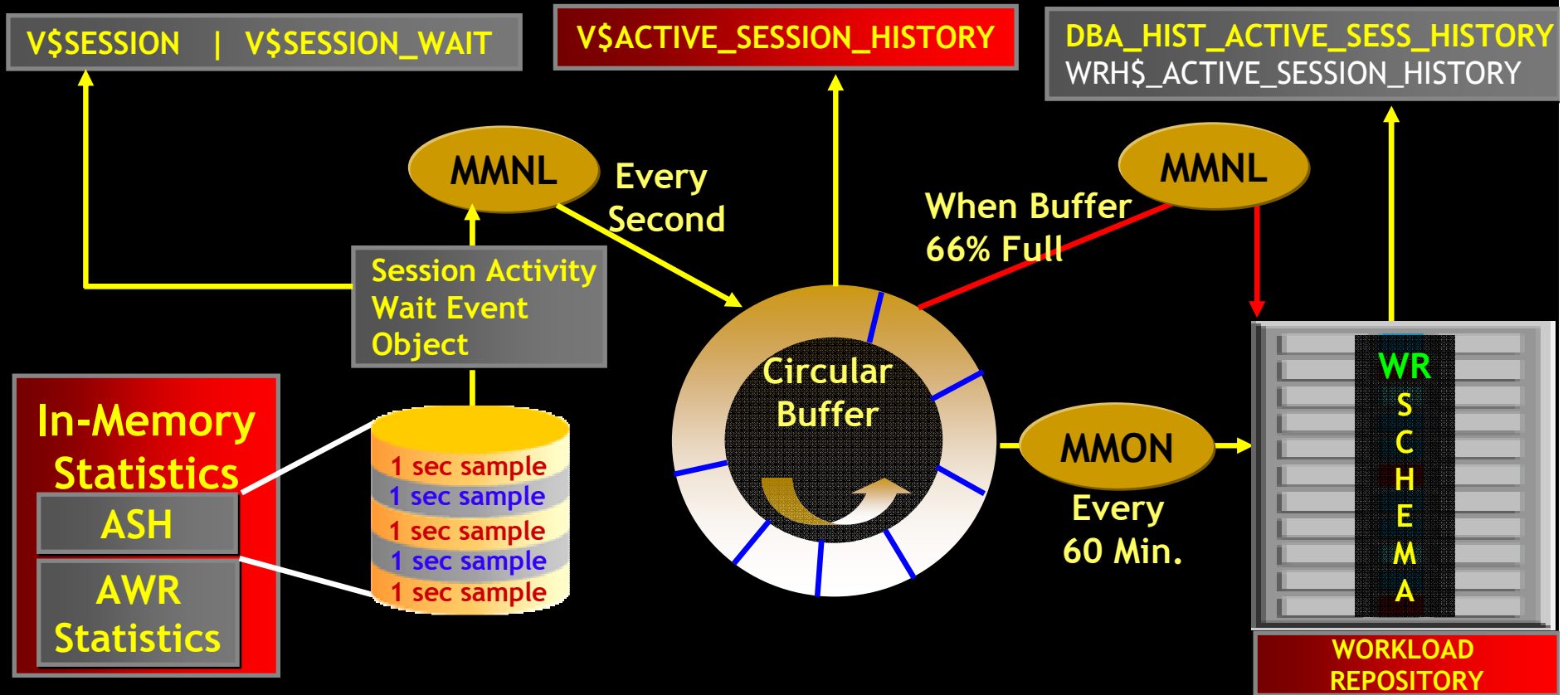
SYSTEM Statistics

**V\$OSSTAT**

OS Statistics showing CPU and Memory

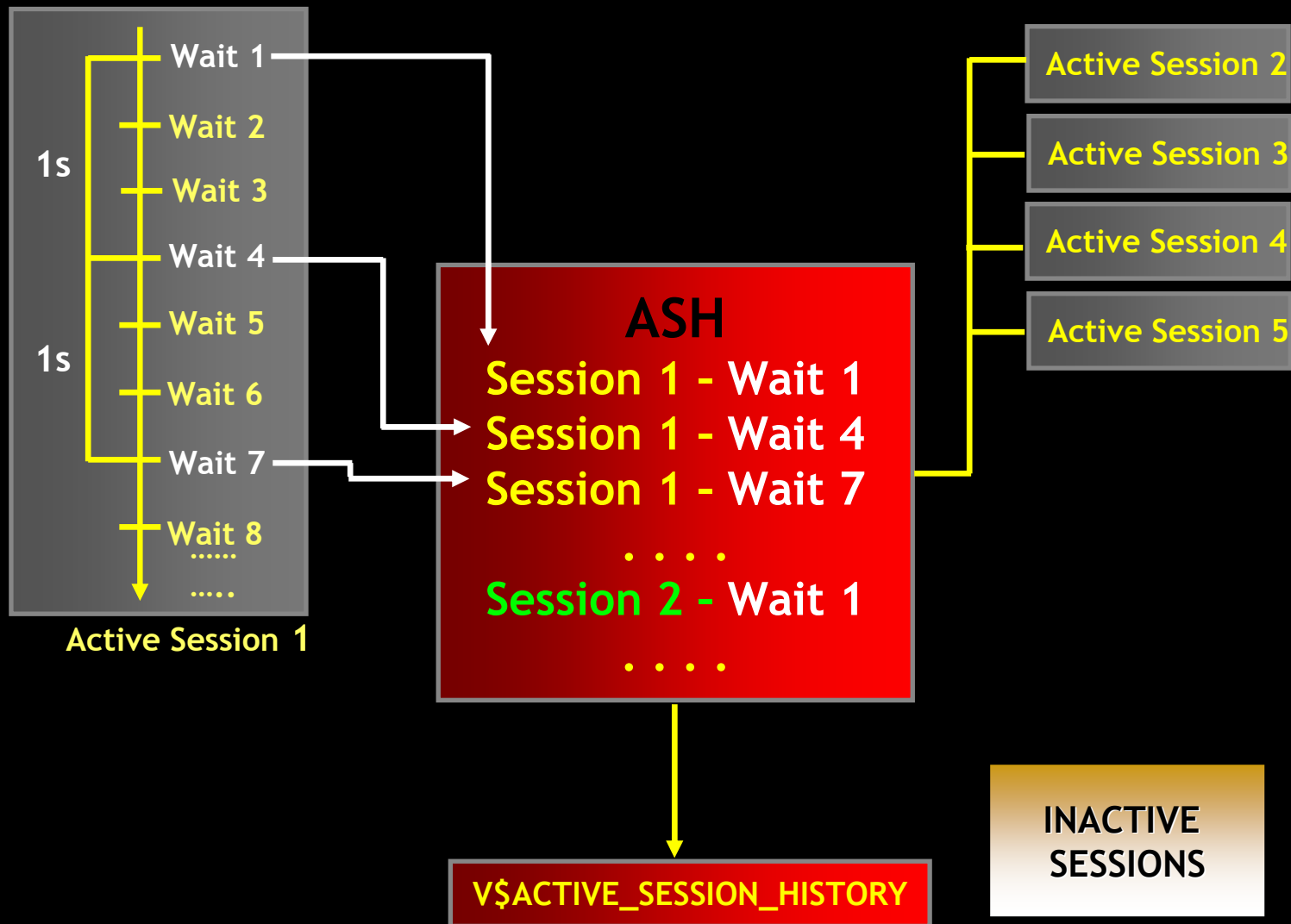
**V\$ACTIVE\_SESSION\_HISTORY - Recent Session Activities**

# 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
- $\text{Max}(\text{Min}(\text{No. of CPU} * 2 \text{ M}, 5\% \text{ of SHARED\_POOL\_SIZE}, 2\% \text{ of SGA\_TARGET}), 1\text{M})$
- 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

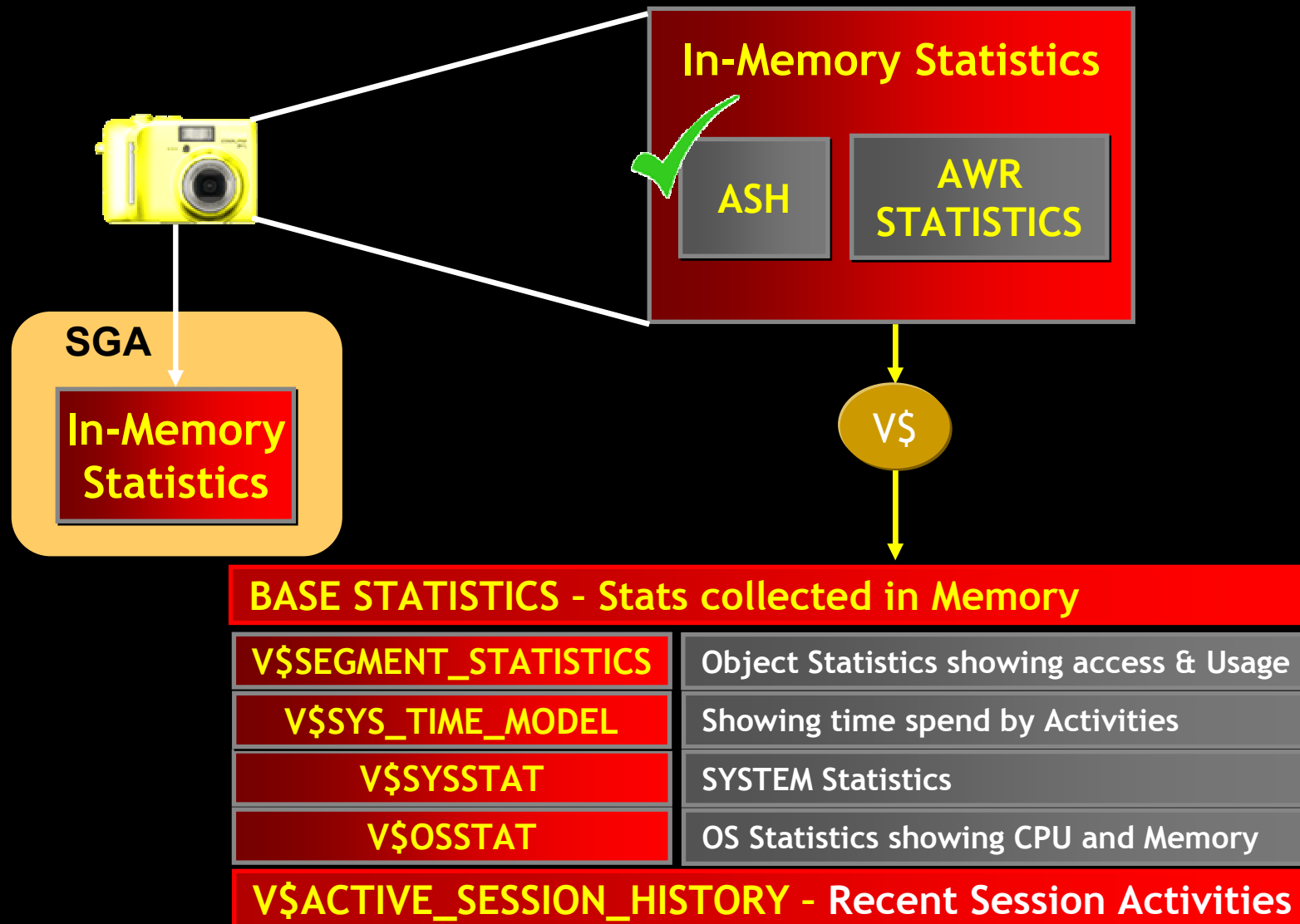
- You can Dump ASH content to File

SQL> oradebug setmypid

SQL> oradebug dump ashdump 5

-- This will dump last 5 minute content

# AWR – In Memory Statistics



# 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

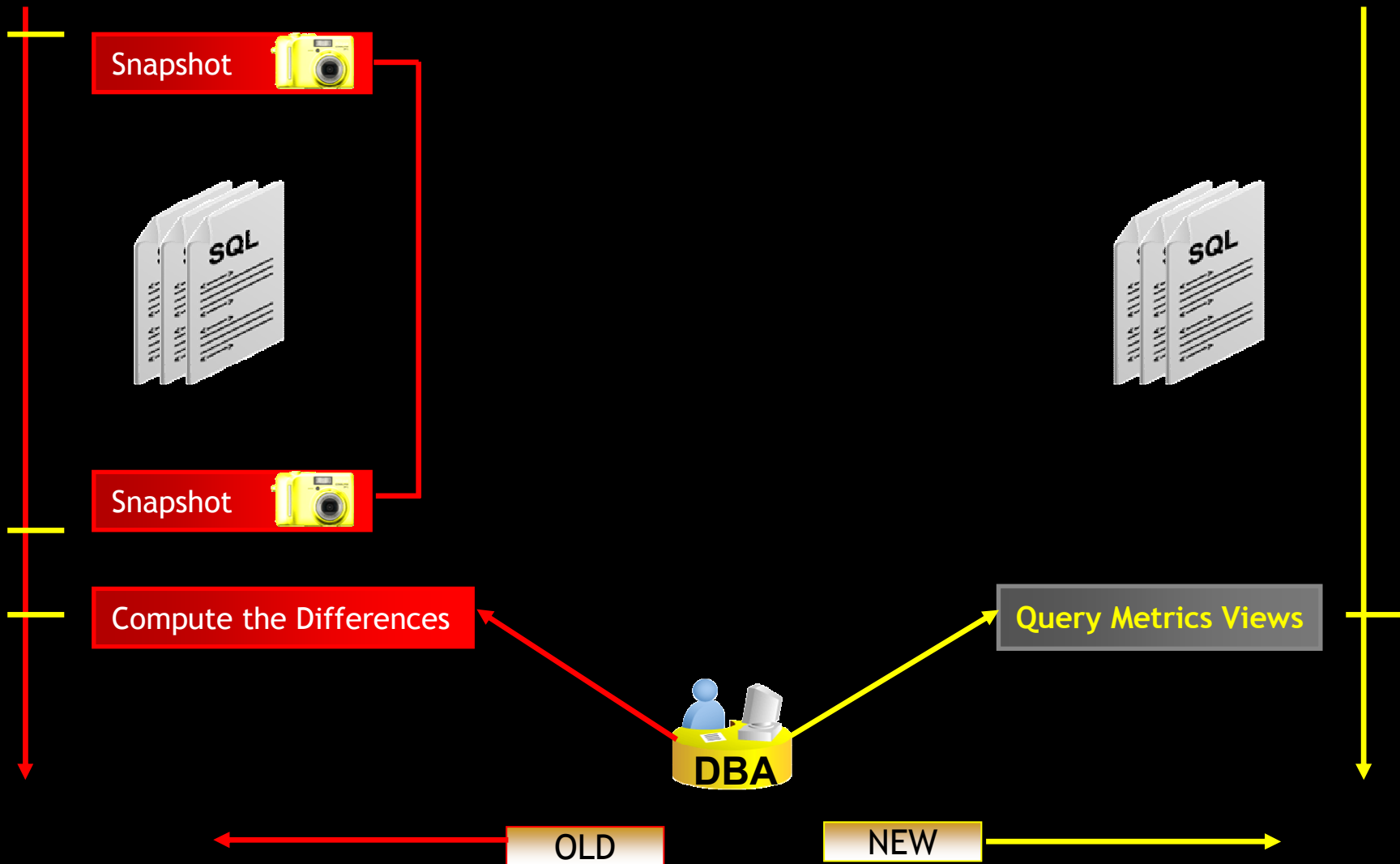
## Metrics

- 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

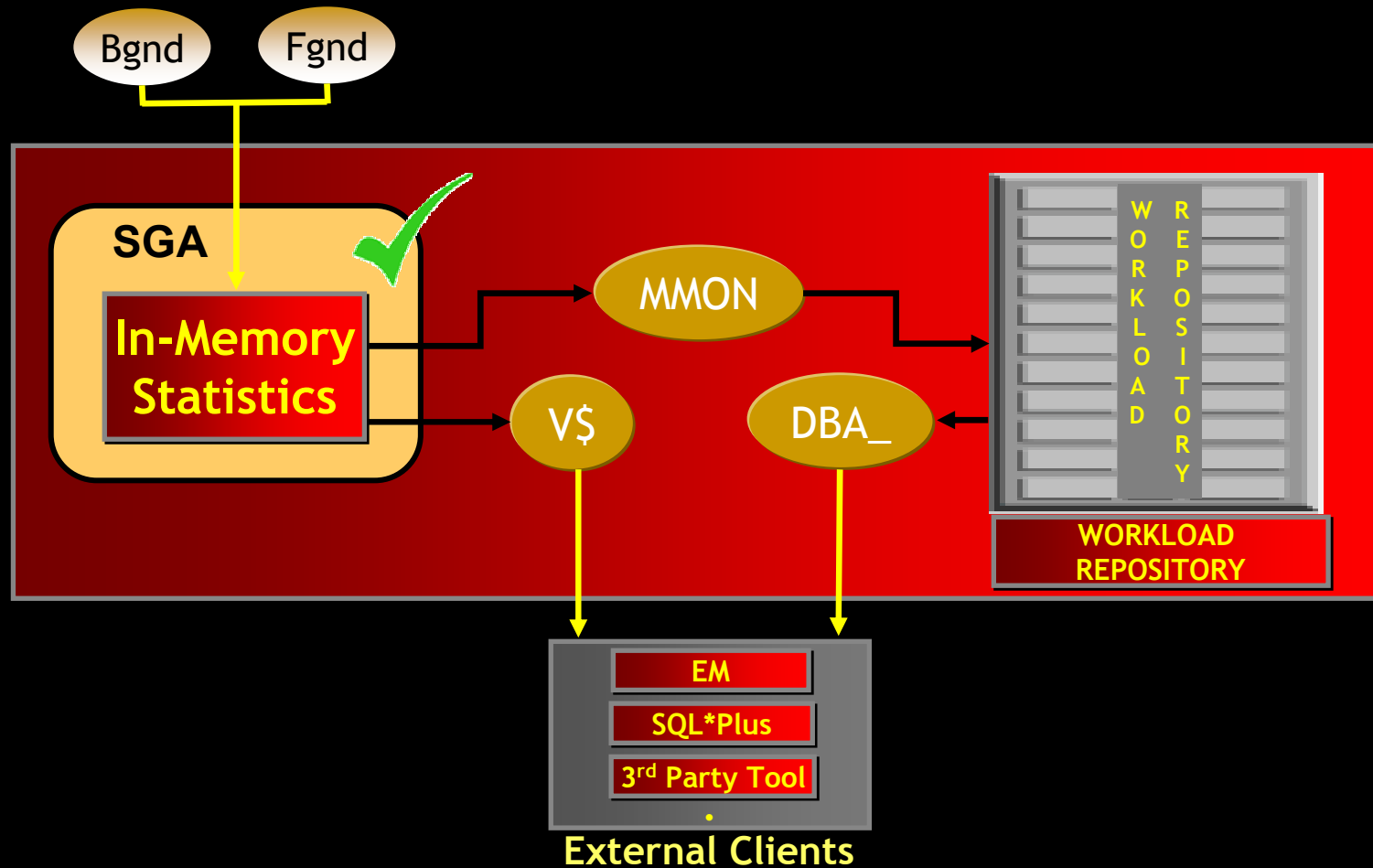
# Metrics Views

<b>METRICS GENERAL INFORMATION</b>	V\$METRICNAME V\$METRICGROUP V\$METRIC V\$METRIC_HISTORY DBA_HIST_METRIC_NAME
<b>SYSTEM METRICS</b>	V\$SYSMETRIC V\$SYSMETRIC_HISTORY V\$SYSMETRIC_SUMMARY DBA_HIST_SYSMETRIC_HISTORY DBA_HIST_SYSMETRIC_SUMMARY
<b>SESSIONS METRICS</b>	V\$SESSMETRIC DBA_HIST_SESSMETRIC_HISTORY
<b>FILES METRICS</b>	V\$FILEMETRIC V\$FILEMETRIC_HISTORY DBA_HIST_FILEMETRIC_HISTORY
<b>WAIT EVENTS METRICS</b>	V\$EVENTMETRIC V\$WAITCLASSMETRIC V\$WAITCLASSMETRIC_HISTORY

# Benefit of Metrics

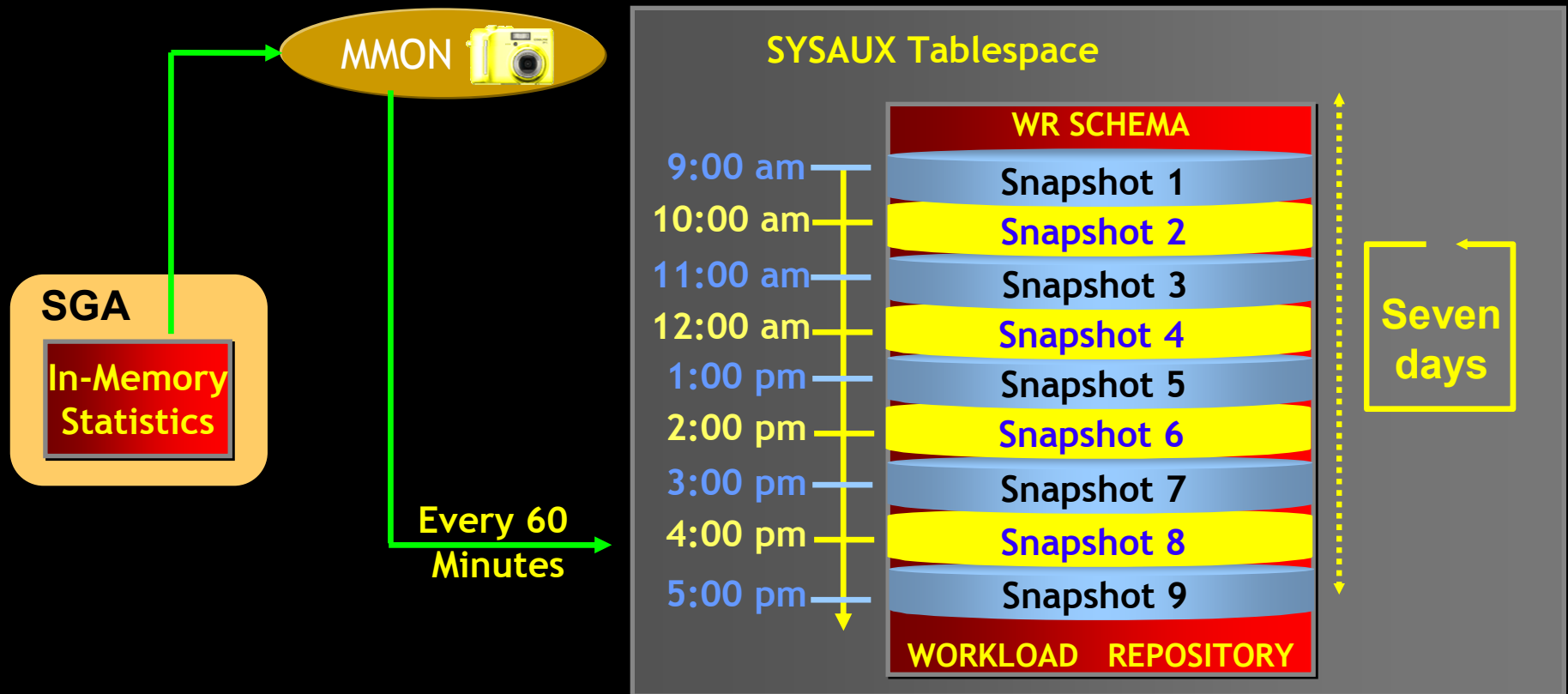


# AWR – Automatic Workload Repository





# AWR – Workload Repository

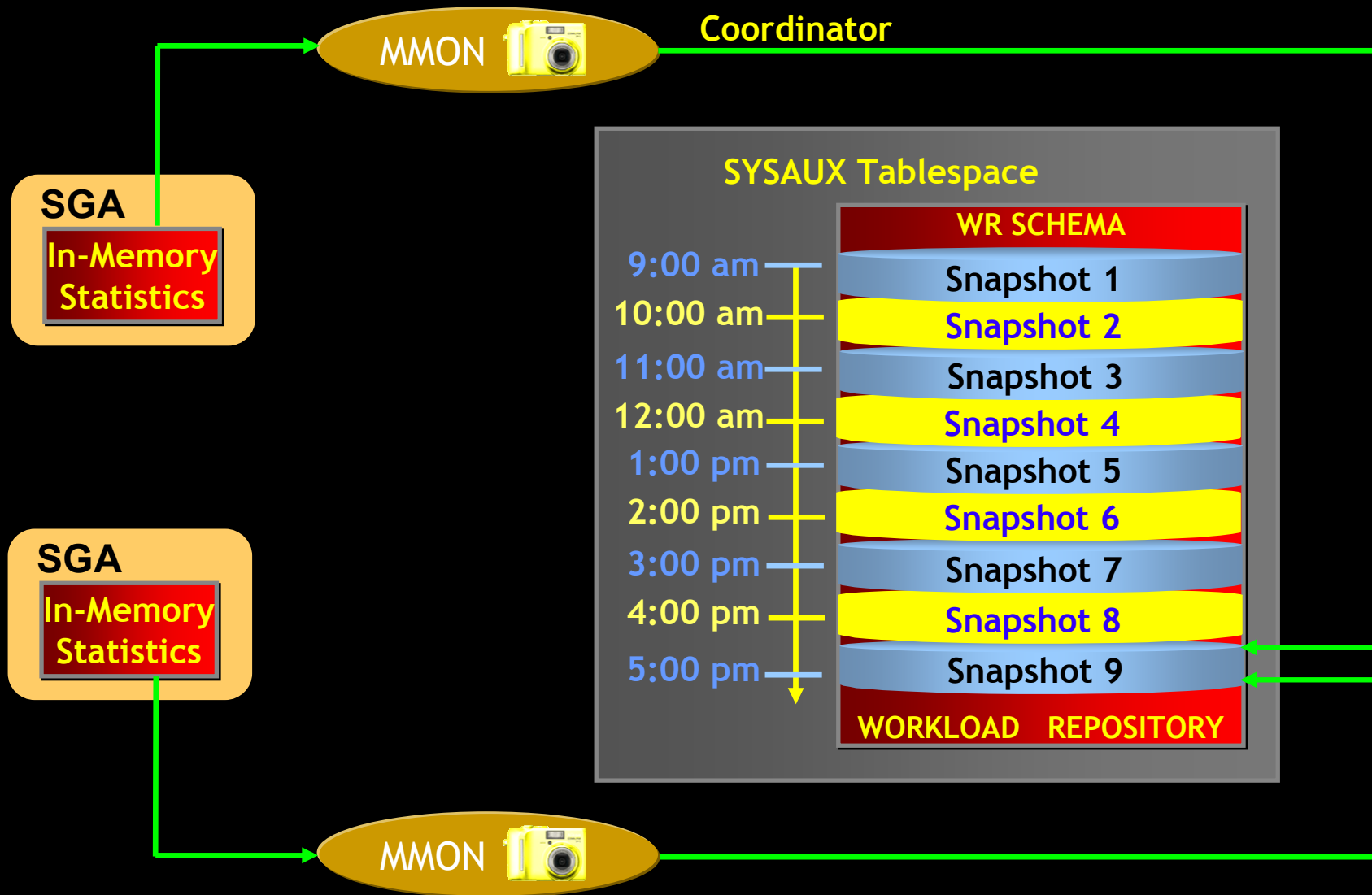


# AWR – Workload Repository

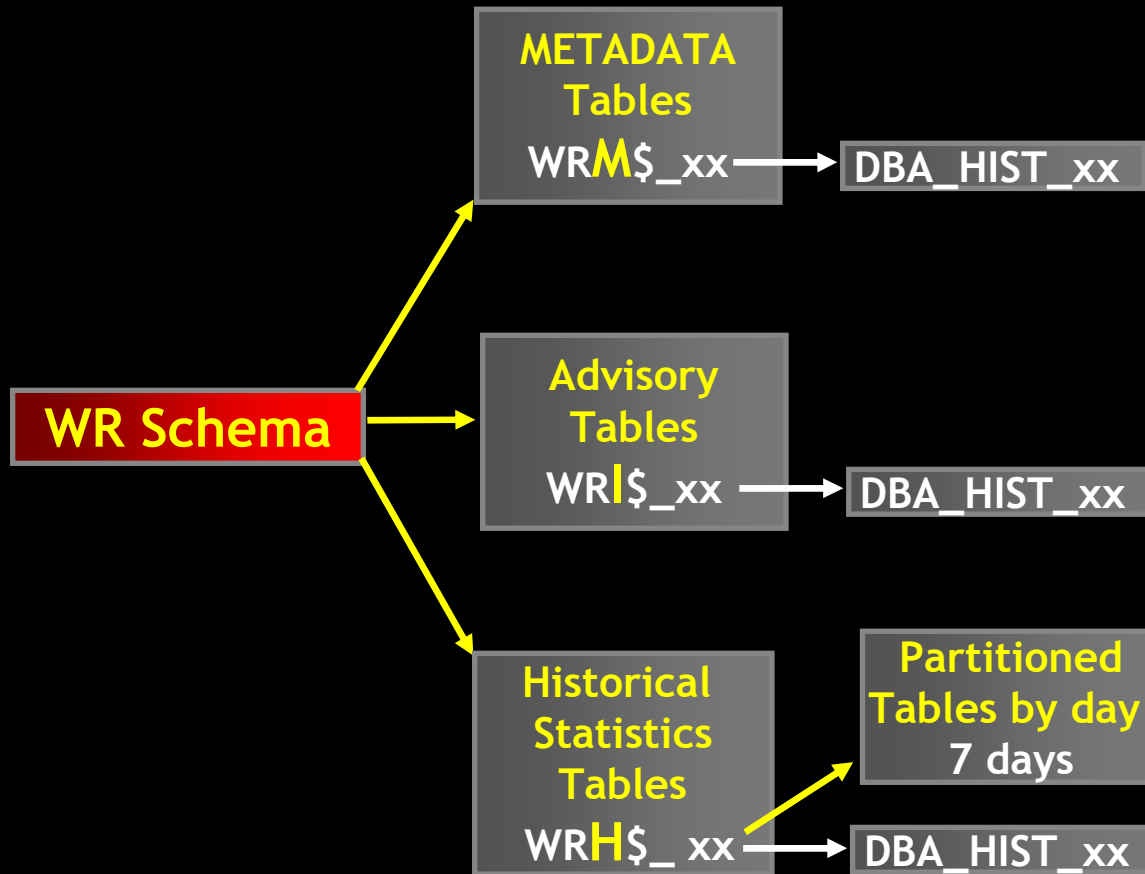
```
dbms_workload_repository.modify_snapshot_settings  
( interval => 60,  
  retention => 43200);          --30 days=43200
```

```
SELECT snap_interval, retention FROM dba_hist_wr_control;
```

# AWR – RAC Workload Repository



# AWR – WR Schema



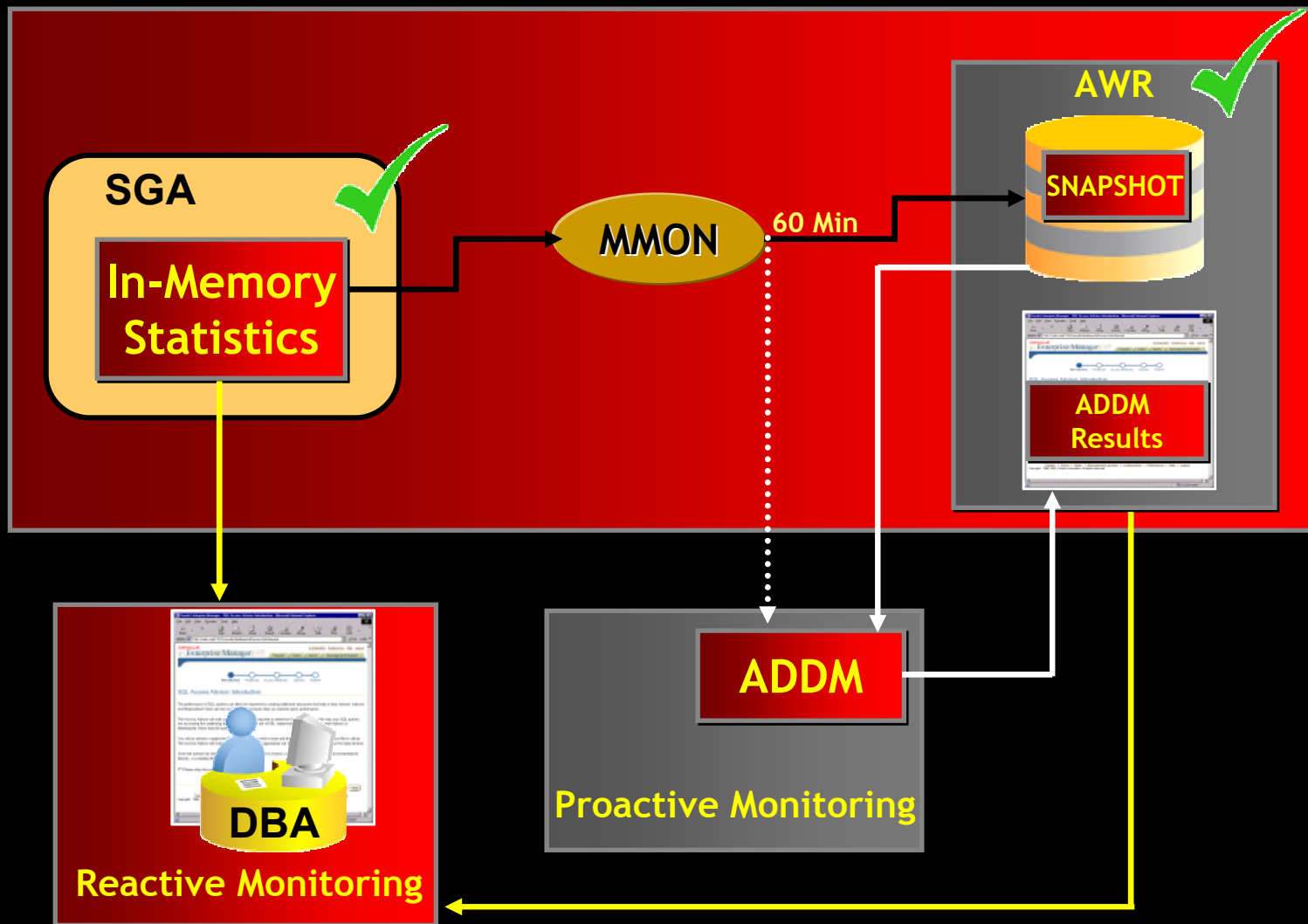
# AWR- Reports

## Different types of AWR report

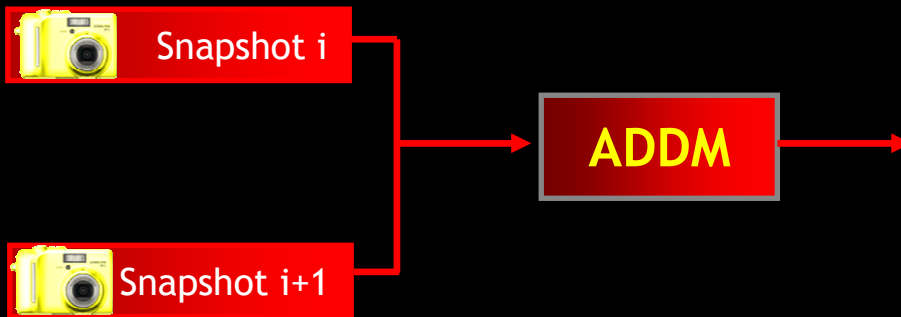
awrrpt.sql	-	AWR Workload Report
awrddrpt.sql	-	Side by Side AWR comparision
awrinfo.sql	-	AWR Information like current Usage and Data Distribution
awrload.sql	-	Load AWR Dump from one DB to another
awrsqrpt.sql	-	Create AWR report for specific SQL statement

# 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**

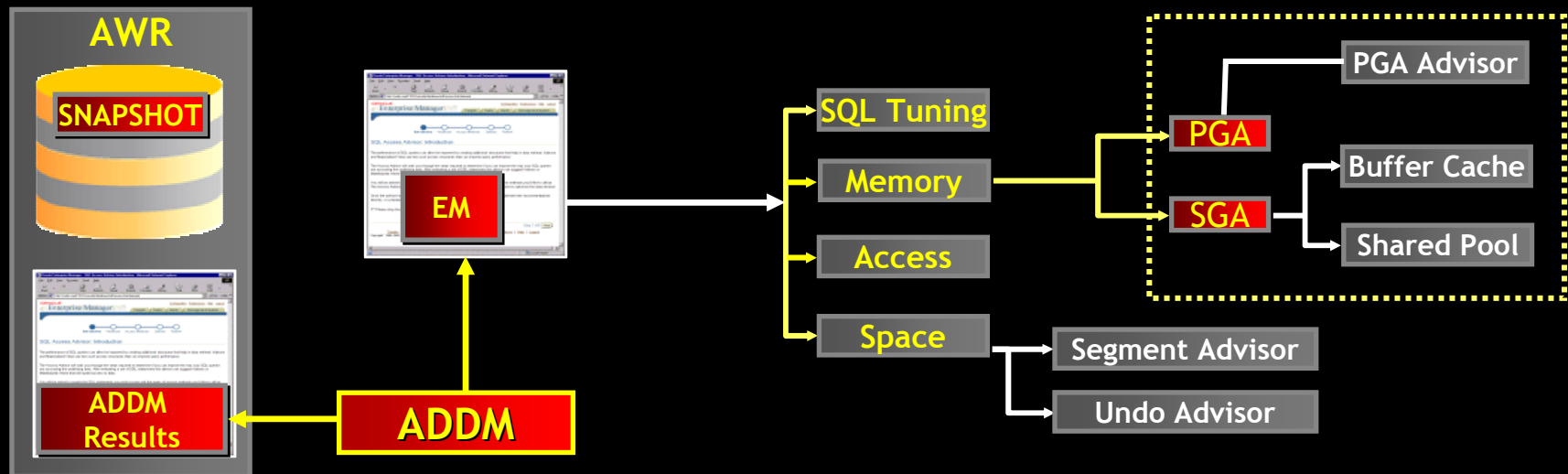
Impact (%) ▾	Finding	Recommendations
89.2	SQL statements consuming significant database time were found	3 SQL Tuning

# 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





# ADDM

## ▶ 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

ORACLE Enterprise Manager 10g Setup Preferences Help Logout  
Database Control Database

Database Instance: [profdb.pnewswire.com](#) > [Advisor Central](#) > [Automatic Database Diagnostic Monitor \(ADDM\)](#) > Performance Finding Details

### Performance Finding Details


Database Time (minutes)	<b>113.4</b>	Period Start Time	<b>Sep 5, 2006 7:00:56 PM GMT</b>	Period Duration (minutes)	<b>59.2</b>
Task Owner	<b>SYS</b>	Task Name	<b>ADDM:643928553_1_1782</b>	Average Active Sessions	<b>1.9</b>

Finding **SQL statements consuming significant database time were found.**  
Impact (minutes) **101.1**  
Impact (%)  89.2

#### Recommendations


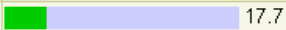
[Schedule SQL Tuning Advisor](#)

[Select All](#) | [Select None](#) | [Show All Details](#) | [Hide All Details](#)

Select	Details	Category	Benefit (%) ▾
<input type="checkbox"/>	<a href="#">Hide</a>	SQL Tuning	 51

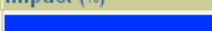
Action **Investigate the SQL statement with SQL\_ID "avksq8fzy1h6h" for possible performance improvements.**  
SQL Text [call Sp\\_Deletequeriesfrominbox \(.\)](#)  
SQL ID [avksq8fzy1h6h](#)

Rationale **SQL statement with SQL\_ID "avksq8fzy1h6h" was executed 45 times and had an average elapsed time of 77 seconds.**

<input checked="" type="checkbox"/>	<a href="#">Show</a>	SQL Tuning	 18.1
<input checked="" type="checkbox"/>	<a href="#">Show</a>	SQL Tuning	 17.7

#### Findings Path

[Expand All](#) | [Collapse All](#)

Findings	Impact (%)	Additional Information
SQL statements consuming significant database time were found.	 89.2	

# 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](#)

[User-Defined Metrics](#)

[Alert Log Content](#)

[iSQL\\*Plus](#)

[Metric Baselines](#)

[Monitor in Memory Access Mode](#)

# Oracle 10g Advisor

ORACLE Enterprise Manager 10g Database Control [Setup](#) [Preferences](#) [Help](#) [Logout](#) [Database](#)

Database Instance: [profdb.pnnewswire.com](#) > Advisor Central Logged in As SYS

## Advisor Central

Page Refreshed Sep 6, 2006 2:48:52 PM GMT [Refresh](#)

### Advisors

<a href="#">ADDM</a>	<a href="#">Memory Advisor</a>	<a href="#">MTTR Advisor</a>
<a href="#">Segment Advisor</a>	<a href="#">SQL Access Advisor</a>	<a href="#">SQL Tuning Advisor</a>
<a href="#">Undo Management</a>		

### Advisor Tasks

[Change Default Parameters](#)

### Search

Select an advisory type and optionally enter a task name to filter the data that is displayed in your results set.

Advisory Type	Task Name	Advisor Runs	Status	
All Types <input type="button" value="v"/>	<input type="text"/>	Last Run <input type="button" value="v"/>	All <input type="button" value="v"/>	<input type="button" value="Go"/>

By default, the search returns all uppercase matches beginning with the string you entered. To run an exact or case-sensitive match, double quote the search string.

### Results

[View Result](#) [Delete](#) [Actions](#) [Re-schedule](#)

Select	Advisory Type	Name	Description	User	Status
<input checked="" type="radio"/>	SQL Tuning Advisor	<a href="#">SQL_TUNING_indy1</a>		SYS	COMPLE
<input type="radio"/>	ADDM	<a href="#">ADDM:643928553_1_1799</a>	ADDM auto run: snapshots [1798, 1799], instance 1 id 643928553	SYS	COMPLE
<input type="radio"/>	Segment Advisor	<a href="#">SYS_AUTO_SPCADV_5022592006</a>	Auto Space Advisor	SYS	COMPLE

# Advisor – SQL Tuning Advisor

## Advisor Central

Page Refreshed Sep 6, 2006 2:48:52 PM GMT [Refresh](#)

### Advisors

[ADDM](#)

[Segment Advisor](#)

[Undo Management](#)

[Memory Advisor](#)

[SQL Access Advisor](#)

[MTTR Advisor](#)

[SQL Tuning Advisor](#)

ORACLE Enterprise Manager 10g

Database Control

[Database Instance: profdb.prnewswire.com](#) > [Advisor Central](#) > 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](#)

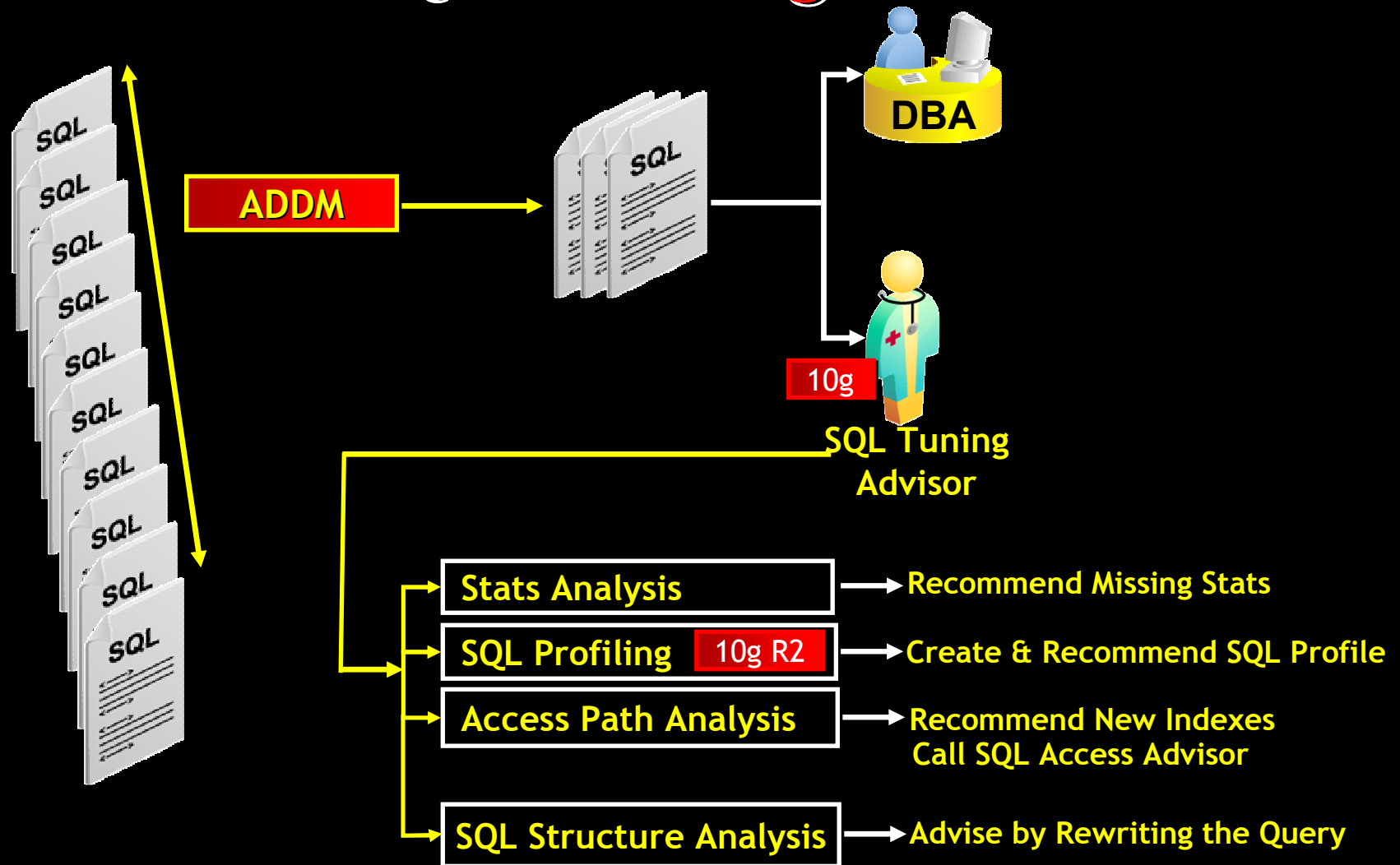
[Period SQL](#)

[SQL Tuning Sets](#)

[Snapshots](#)

[Preserved Snapshot Sets](#)

# Advisor – SQL Tuning Advisor



# Advisor – SQL Access Advisor

Advisor Central

Page Refreshed Sep 6, 2006 2:48:52 PM GMT [Refresh](#)

**Advisors**

<a href="#">ADDM</a>	<a href="#">Memory Advisor</a>	<a href="#">MTTR Advisor</a>
<a href="#">Segment Advisor</a>	<a href="#">SQL Access Advisor</a>	<a href="#">SQL Tuning Advisor</a>
<a href="#">Undo Management</a>		

ORACLE Enterprise Manager 10g Database Control [Setup](#) [Preferences](#) [Help](#) [Logout](#) Database

[Advisor Central](#) > SQL Access Advisor: Initial Options Logged in As SYS

## SQL Access Advisor: Initial Options

Select a set of initial options. [Cancel](#) [Continue](#)

- Use Default Options  
The new task will use the Oracle recommended options, as defined in the Enterprise Manager Default Template.
- Inherit Options from a Task or Template  
The new task will inherit options from a selected task or template. The selected task or template will remain unchanged.

**TIP** You are selecting the starting point for the wizard. All options can be changed from within the wizard.

[Cancel](#) [Continue](#)

# Advisor – SQL Access Advisor

ORACLE Enterprise Manager 10g Database Control Setup Preferences Help Logout

Database

Logged in As SYS

● — ○ — ○ — ○  
Workload Source Recommendation Options Schedule Review

## SQL Access Advisor: Workload Source

Database **profdb.pnewswire.com** Cancel Step 1 of 4 Next

Select the source of the workload that you want to use for the analysis. The best workload is one that fully represents all the SQL statements that are currently being executed in the database.

- Current and Recent SQL Activity  
SQL will be selected from the cache.
- Import Workload from SQL Repository  
Choose any SQL Tuning Set from the SQL Repository.  
SQL Tuning Set
- User-Defined Workload; Import SQL from a Table or View  
The table or view must contain at least SQL\_TEXT and USERNAME columns.  
Table
- Create a Hypothetical Workload from the Following Schemas and Tables  
The advisor can create a hypothetical workload if the tables contain dimension or primary/foreign key constraints.  
Tables   
Comma-separated list

**TIP** Enter "Schema.%" to specify all the tables belonging to a particular schema.


**Filter Options**

**TIP** For workloads containing a large number of SQL statements, Oracle recommends using filtering to reduce analysis time.

Cancel Step 1 of 4 Next

# Advisor – SQL Access Advisor

ORACLE Enterprise Manager 10g  
Database Control



Workload Source Recommendation Options Schedule Review

## SQL Access Advisor: Recommendation Options

Database **profdb.prnewswire.com**

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### Recommendation Types

The advisor may recommend indexes or materialized views to reduce the time it takes to read data. However you must balance this benefit of structures to be recommended by the advisor.

- Indexes
- Materialized Views
- Both Indexes and Materialized Views
- Evaluation Only  
Evaluates usage of existing access structures and describes which access structures are currently being used by this workload. No new access structures will be recommended.

### Advisor Mode

The advisor can run in one of two modes, Limited or Comprehensive. Limited Mode is meant to return quickly after processing the statements below a certain threshold. Comprehensive Mode will perform an exhaustive analysis.

- Limited Mode  
Analysis will focus on highest cost statements
- Comprehensive Mode  
Analysis will be exhaustive

▶ **Advanced Options**



# Memory Advisor - ASMM

## Automatic Shared Memory Management

Advisor Central

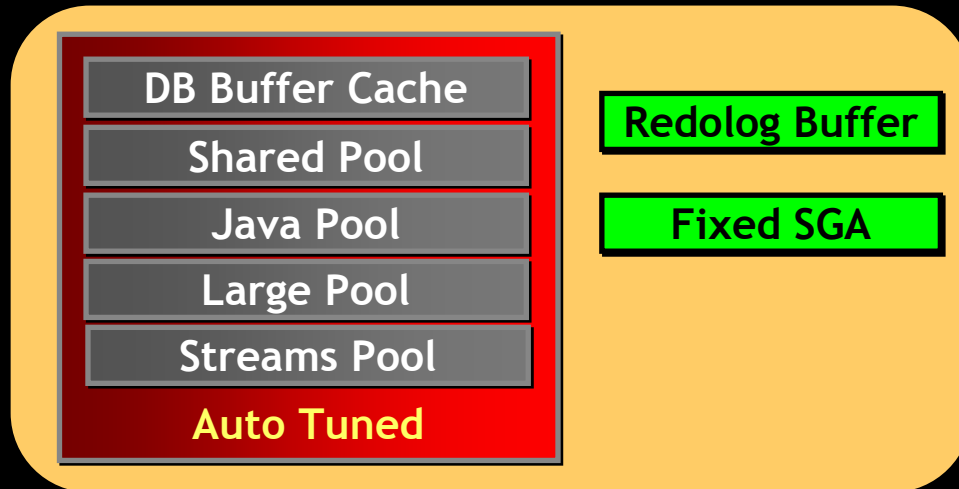
Page Refreshed Sep 6, 2006 2:48:52 PM GMT

**Advisors**

<a href="#">ADDM</a>	<a href="#">Memory Advisor</a>	<a href="#">MTTR Advisor</a>
<a href="#">Segment Advisor</a>	<a href="#">SQL Access Advisor</a>	<a href="#">SQL Tuning Advisor</a>
<a href="#">Undo Management</a>		

# Advisor – ASMM

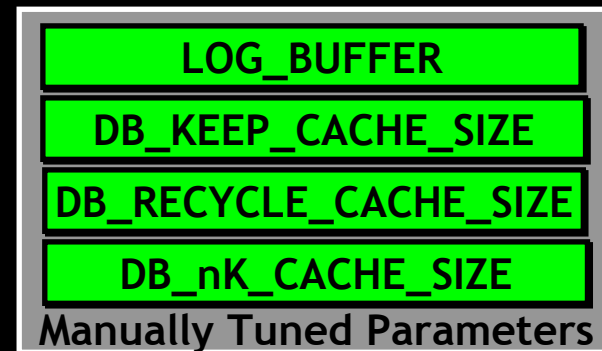
SGA = 20G



SGA\_TARGET = 20G

SGA\_MAX\_SIZE = 20G

STATISTICS\_LEVEL = TYPICAL



- 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

Database Instance: profdb.pnewswire.com > Memory Parameters

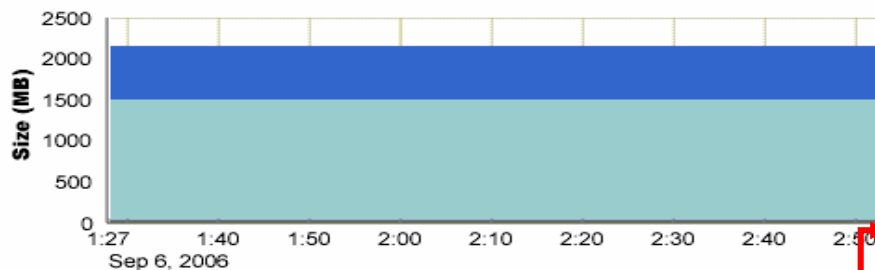
## Memory Parameters

**SGA** PGA

The System Global Area (SGA) is a group of shared memory structures that contains started.

### Allocation History

This chart shows the history of the components of the SGA.



### Current Allocation

Automatic Shared Memory Management **Enabled**

Total SGA Size (MB)

SGA Component	Current Allocation (MB)
Shared Pool	608
Buffer Cache	1392
Large Pool	16
Java Pool	16
Other	16

### Maximum SGA Size

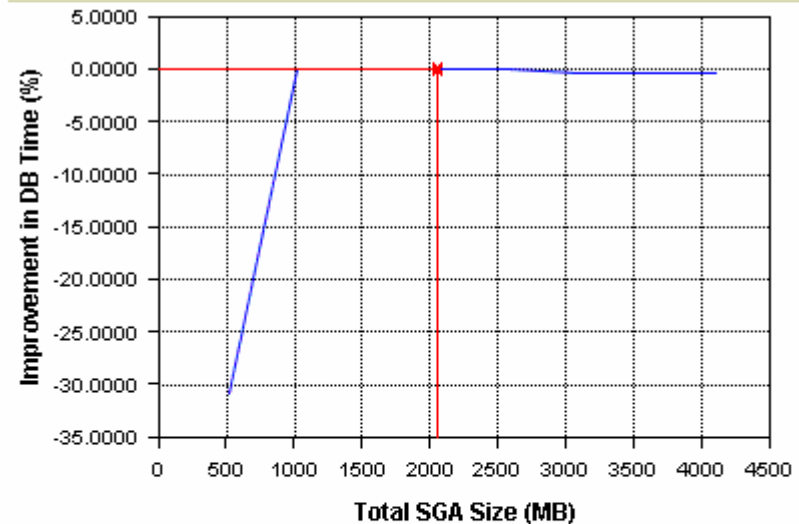
The Maximum SGA Size specifies the maximum memory that the database may a SGA Size does not exceed the Maximum SGA Size).

Maximum SGA Size\* (MB)

The database must be restarted before any changes to this value take effect.

**SGA** PGA

## SGA Size Advice



- Percentage improvement in DB Time for various sizes of SGA
- ✖ Current SGA Size
- Maximum SGA Size

Total SGA Size (MB) 2048

You can click on the curve in the graph to set a new value. Total SGA Size cannot be greater than the SGA Max Size. First modify the Max SGA size (from the parent page) and then select a value of SGA up to the Max SGA size.

# Advisor – ASMM

ORACLE Enterprise Manager 10g  
Database Control

Database Instance: profdb.prnewswire.com > Memory Parameters

## Memory Parameters

SGA PGA

The Program Global Area (PGA) is a memory buffer that contains data and control

Aggregate PGA Target  MB

Current PGA Allocated (KB) 156404

Maximum PGA Allocated (KB) 223705

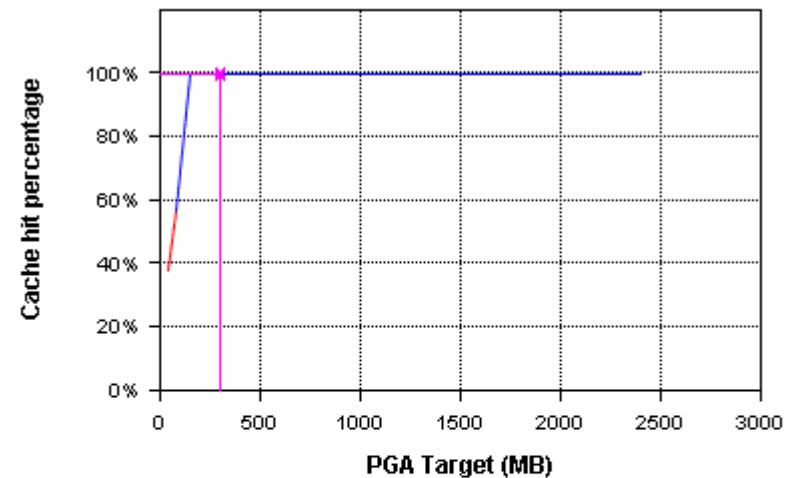
(since startup)

Cache Hit Percentage (%) 100

TIP The sum of PGA and SGA should be less than the total system memory m

SGA PGA

## PGA Aggregate Target Advice



Aggregate PGA Target  MB

TIP You can click on the curve in the graph to set new value.

# Advisor – Segment Advisor

Advisor Central

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**Advisors**

<a href="#">ADDM</a>	<a href="#">Memory Advisor</a>	<a href="#">MTTR Advisor</a>
<a href="#">Segment Advisor</a>	<a href="#">SQL Access Advisor</a>	<a href="#">SQL Tuning Advisor</a>
<a href="#">Undo Management</a>		

ORACLE Enterprise Manager 10g Database Control [Forward](#)

Scope Objects Schedule Review

## Segment Advisor: Scope

Database **profdb.pnewswire.com** Logged In As **SYS** [Cancel](#) Step 1 of 4 [Next](#)

You can get advice on shrinking segments for individual schema objects or entire tablespaces.

- Tablespaces
- Schema Objects

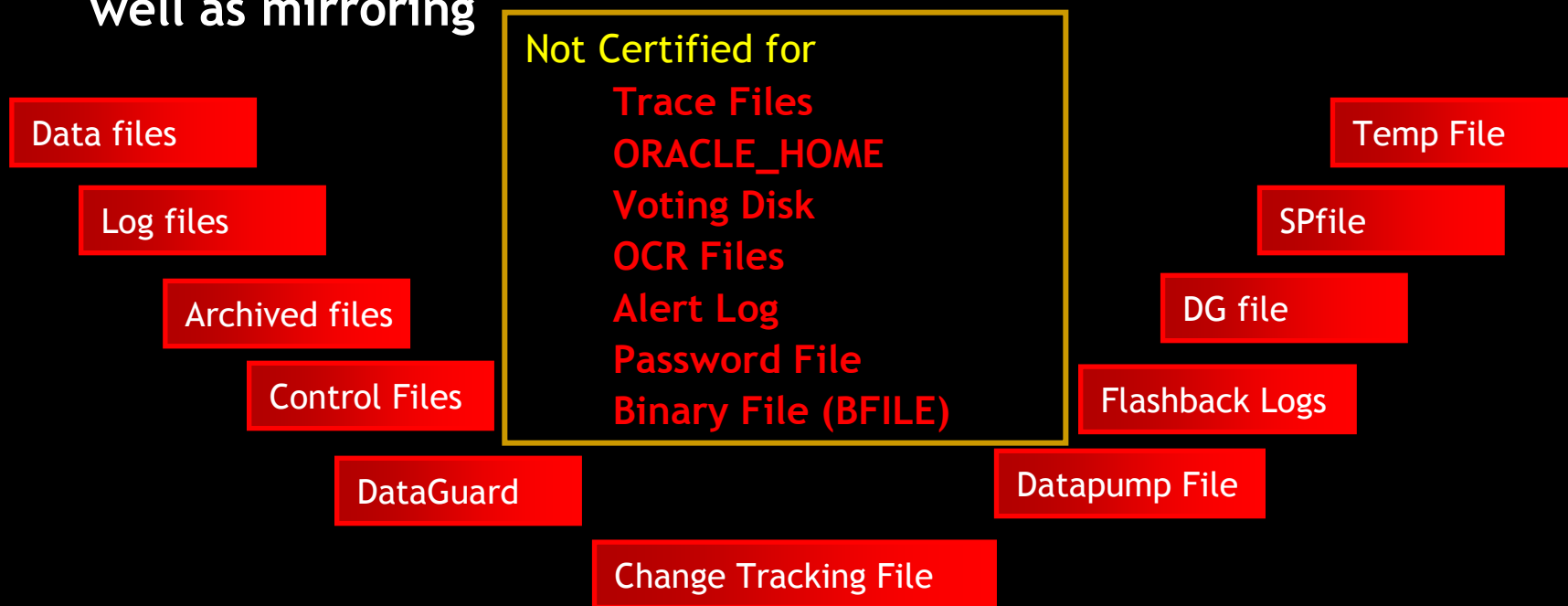
### Overview

The segment advisor determines whether objects have unused space that can be released, taking estimated future space requirements into consideration. The estimated future space calculation is based on historical trends.

[Cancel](#) Step 1 of 4 [Next](#)

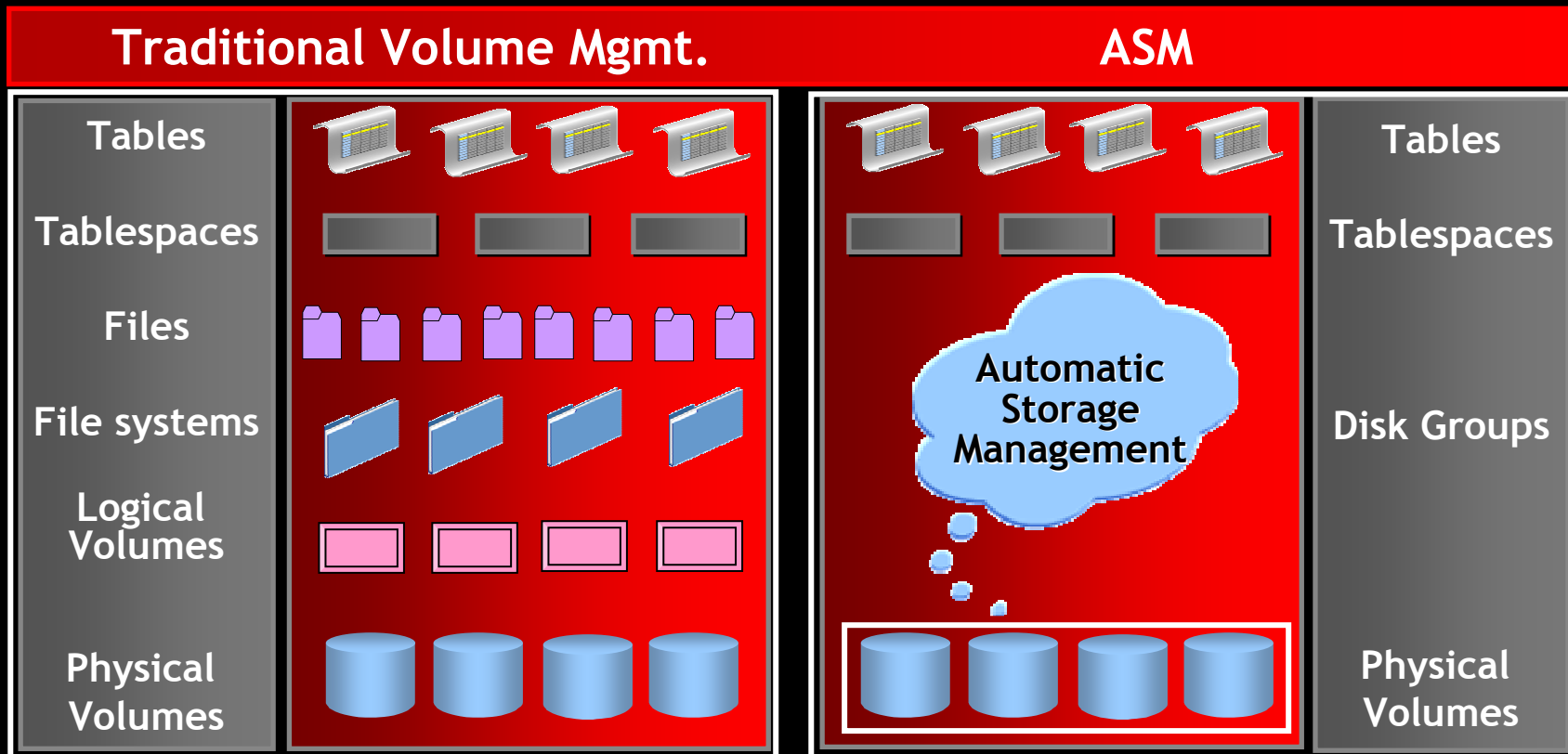
# What is ASM

- 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



# Benefits of Automatic Storage Management

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



# 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 3<sup>rd</sup> Party CFS
- Provide Software Mirroring on top of vendor supplied SAN [2 or 3 Mirrors]

The screenshot shows the 'Create Disk Group' dialog box. The 'Disk Group Name' is 'DISKGROUP1'. Under 'Redundancy', there are three radio buttons: 'High', 'Normal', and 'External'. The 'External' option is selected. Below this, there are three green ovals with arrows pointing to the 'High', 'Normal', and 'External' options, labeled 'Triple Mirroring', 'Double Mirroring', and 'No Mirroring' respectively. The 'Select Members' section shows three disks selected: 'ORCL:VOL1', 'ORCL:VOL2', and 'ORCL:VOL3'. Below this is a table with columns: 'Disk Path', 'Header Status', 'ASM Name', 'Size (MB)', and 'Force'.

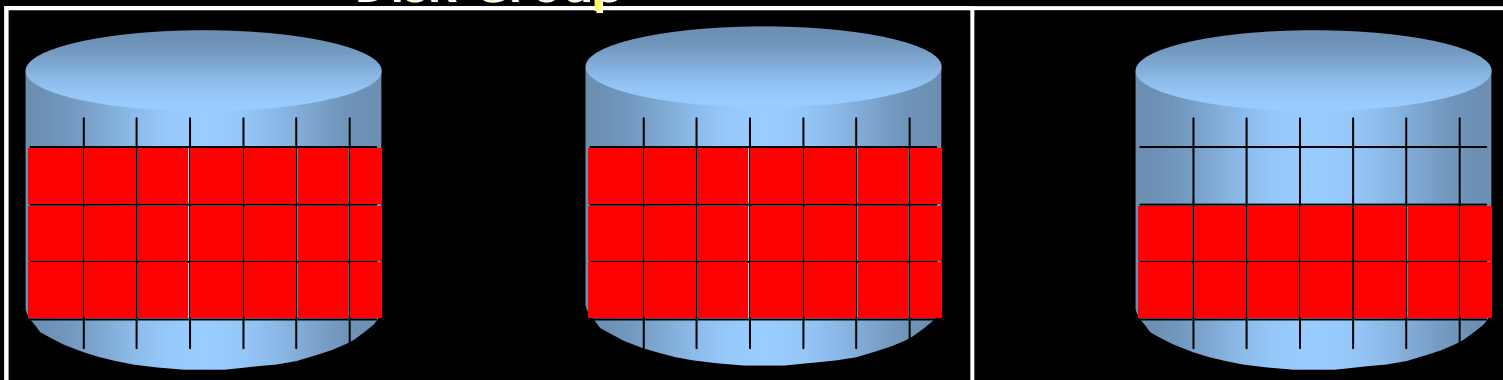
<input type="checkbox"/>	Disk Path	Header Status	ASM Name	Size (MB)	Force
<input type="checkbox"/>	ORCL:VOL1	MEMBER	VOL1	47692	<input type="checkbox"/>
<input type="checkbox"/>	ORCL:VOL2	MEMBER	VOL2	47692	<input type="checkbox"/>
<input type="checkbox"/>	ORCL:VOL3	MEMBER	VOL3	47692	<input type="checkbox"/>



# 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 3<sup>rd</sup> 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**

**Disk Group**



# Pre-Requirement for ASM

- Need CSS daemon for creating an ASM instance

```
$ ps -ef | grep css
```

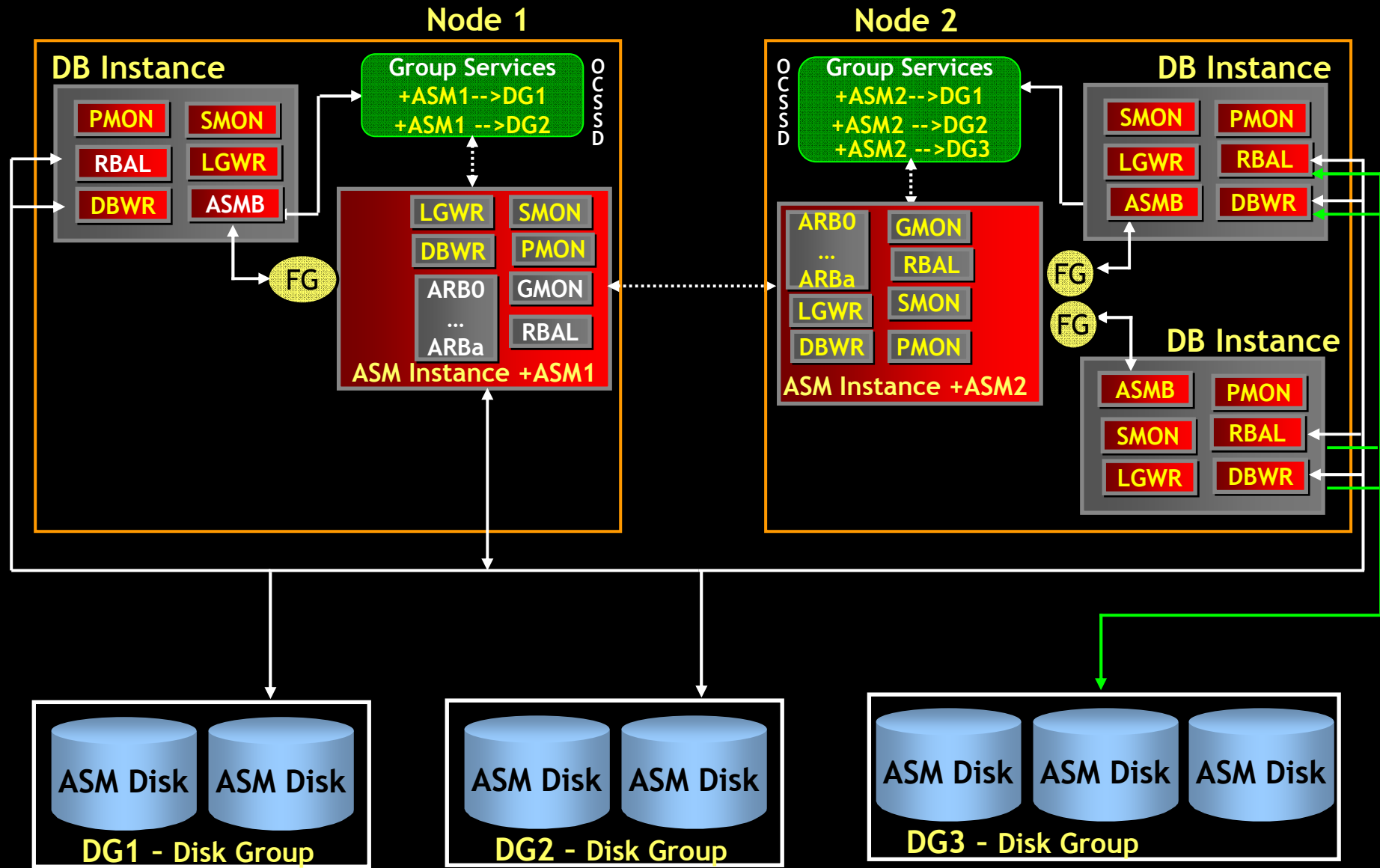
1. In RAC, it is done by Oracle Clusterware
2. In Single Instance environment, you have to run  
`$ORACLE_HOME/bin/localconfig add`

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                   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]

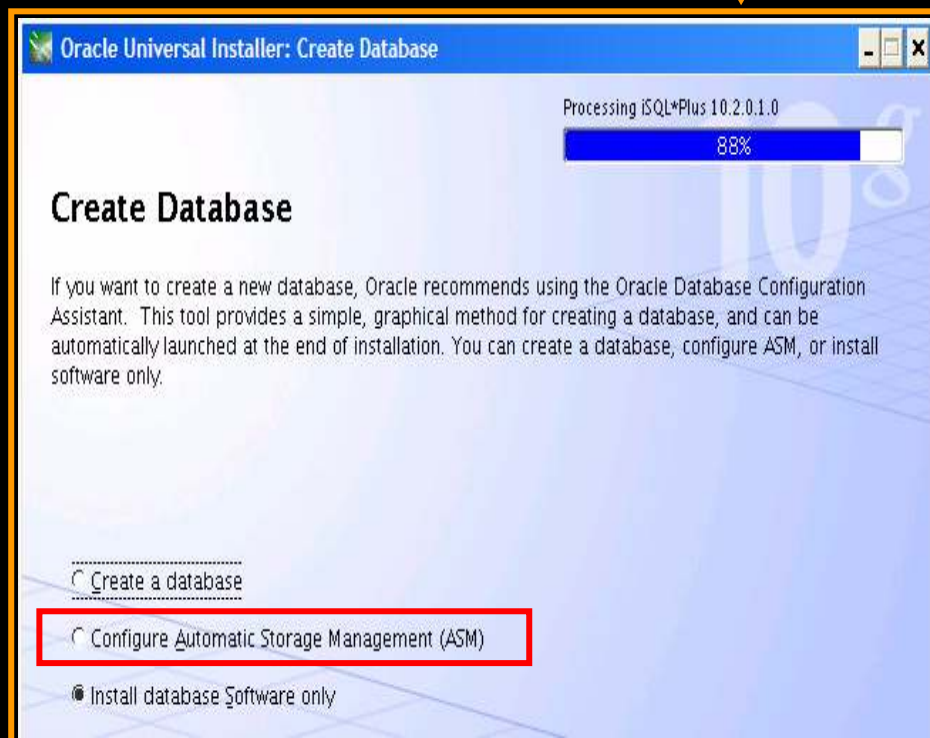
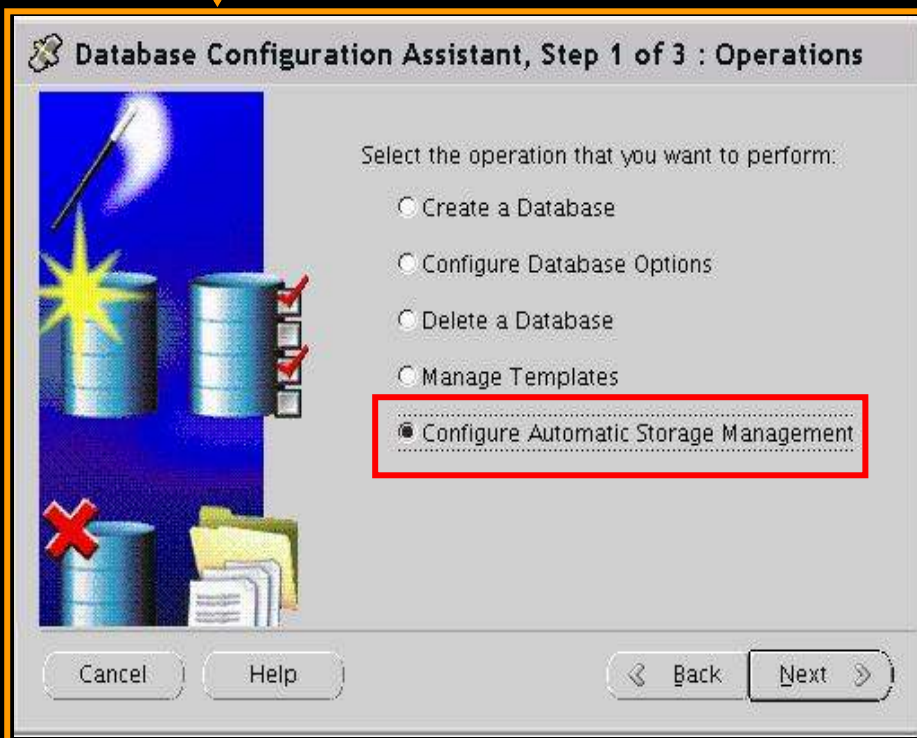
# ASM Components — ASM Instance

Database Configuration Assistant

Manual using SQL

Oracle Universal Installer

SQL> startup pfile=init+ASM.ora



# 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

Create Disk Group

Disk Group Name:

Redundancy

High  Normal  External

Select Member Disks

Show Candidates  Show All

<input type="checkbox"/>	Disk Path	Header Status	ASM Name	Size (MB)	Force
<input type="checkbox"/>	/dev/raw/raw1	FOREIGN		25894	<input type="checkbox"/>
<input type="checkbox"/>	/dev/raw/raw2	FOREIGN		25894	<input type="checkbox"/>
<input type="checkbox"/>	/dev/raw/raw3	CANDIDATE		25894	<input type="checkbox"/>

## 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

Database Configuration Assistant

Manual using SQL

Enterprise Manager

Oracle Universal Installer

```
SQL> CREATE DISKGROUP data_dg1  
EXTERNAL REDUNDANCY  
disk '/dev/raw/raw1','/dev/raw/raw2';
```

Automatic Storage Management: +ASM\_prnhs-db01pn.profn.net.com

Home Performance Administration Configuration

Disk Groups

Create Mount All Dismount All

Delete Actions Mount Go

Select	Name	State	Redundancy	Usable Free (GB)	Size (GB)	Used (GB)	Used (%)
<input type="checkbox"/>	DG_DATA	MOUNTED	EXTERN	3.2	95.37	92.17	96.64

Create Disk Group

Disk Group Name: DG1

Redundancy

High  Normal  External

Select Member Disks

Show Candidates  Show All

<input type="checkbox"/>	Disk Path	Header Status	ASM Name	Size (MB)	Force
<input type="checkbox"/>	/dev/raw/raw1	FOREIGN		25894	<input type="checkbox"/>
<input type="checkbox"/>	/dev/raw/raw2	FOREIGN		25894	<input type="checkbox"/>
<input type="checkbox"/>	/dev/raw/raw3	CANDIDATE		25894	<input type="checkbox"/>

Create Disk Group

Show SQL Cancel OK

\* Name New\_DG

Redundancy  HIGH  NORMAL  EXTERNAL

Member Disks

Select Member Disks Only Candidate Disks

Select	Path	Header Status	Force Usage
No items found			

Show SQL Cancel OK

# Tablespace and Disk Group

```
SQL> CREATE TABLESPACE indy_data DATAFILE '+DATA_DG1' size 100M ;
```

Set the parameter DB\_CREATE\_FILE\_DEST to +DATA\_DG1

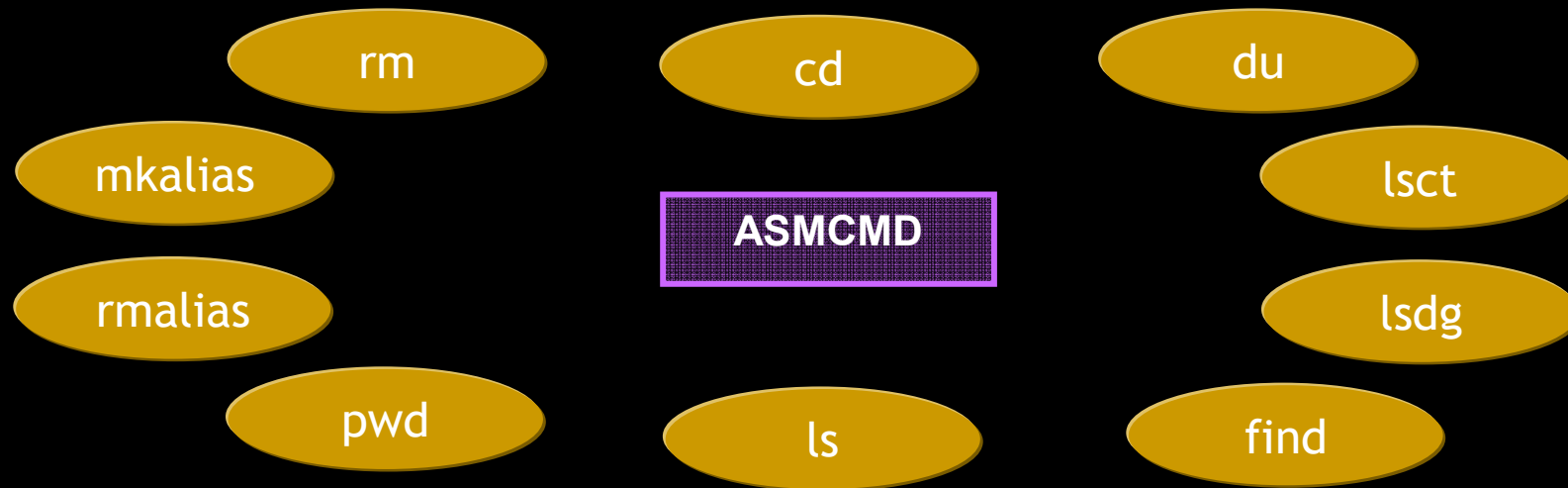
Examples: For the SID = DEVDB1

```
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 TEMPFIL  
      '+DATADG1/DEVDB1/datafile/temp2.tst' size 100M ;  
+DATA_DG1/DEVDB1/datafile/temp1.tst
```

# ASMCMD – Command Line Interface

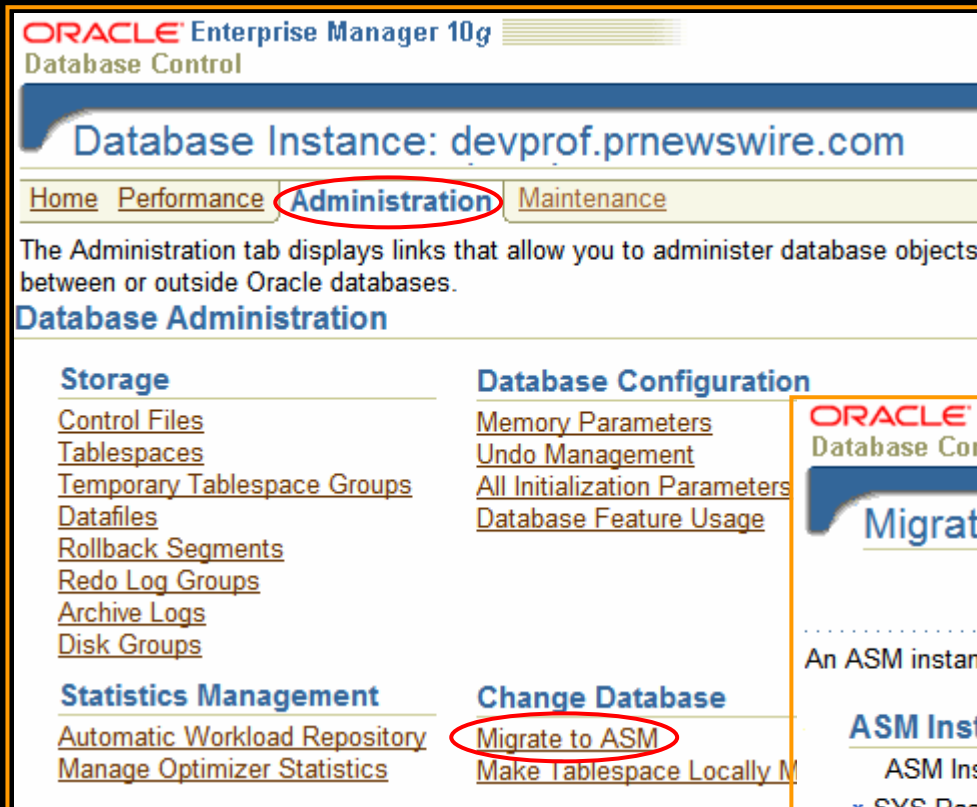


```
$ export ORACLE_SID=+ASM
$ asmcmd
ASMCMD> ls -ltr
State      Type      Rebal  Unbal  Name
MOUNTED   EXTERN   N      N      DG_DATA/
```

# File System to ASM Migration

- Using EM
- Using DBMS\_FILE\_TRANSFER
- Using RMAN Manually
- Using XMLDB

# Moving from File System to ASM - EM



ORACLE Enterprise Manager 10g  
Database Control

Database Instance: devprof.prnewswire.com

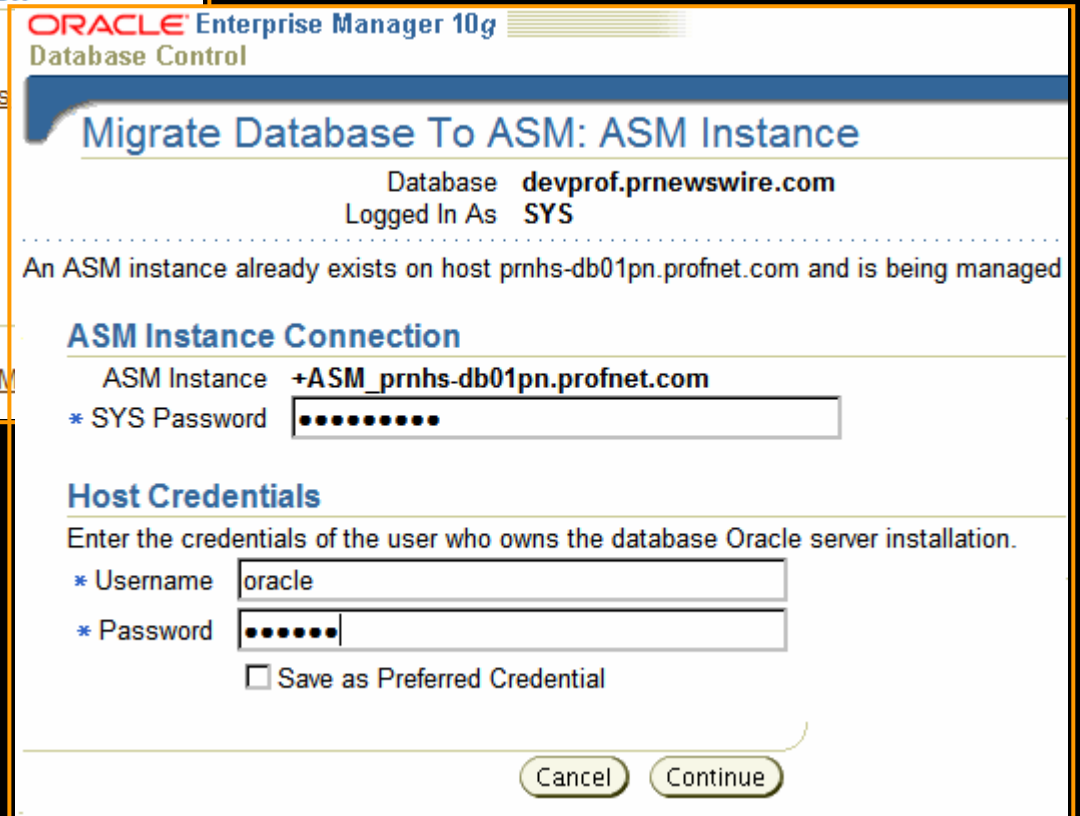
Home Performance **Administration** Maintenance

The Administration tab displays links that allow you to administer database objects between or outside Oracle databases.

**Database Administration**

<b>Storage</b> <ul style="list-style-type: none"><li>Control Files</li><li>Tablespaces</li><li>Temporary Tablespace Groups</li><li>Datafiles</li><li>Rollback Segments</li><li>Redo Log Groups</li><li>Archive Logs</li><li>Disk Groups</li></ul>	<b>Database Configuration</b> <ul style="list-style-type: none"><li>Memory Parameters</li><li>Undo Management</li><li>All Initialization Parameters</li><li>Database Feature Usage</li></ul>
<b>Statistics Management</b> <ul style="list-style-type: none"><li>Automatic Workload Repository</li><li>Manage Optimizer Statistics</li></ul>	<b>Change Database</b> <ul style="list-style-type: none"><li><b>Migrate to ASM</b></li><li>Make Tablespace Locally M...</li></ul>

- It uses RMAN for the movement
- Job is scheduled using DBMS\_SCHEDULER



ORACLE Enterprise Manager 10g  
Database Control

**Migrate Database To ASM: ASM Instance**

Database devprof.prnewswire.com  
Logged In As SYS

.....

An ASM instance already exists on host prnhs-db01pn.profnat.com and is being managed

**ASM Instance Connection**

ASM Instance +ASM\_prnhs-db01pn.profnat.com  
\* SYS Password [REDACTED]

**Host Credentials**

Enter the credentials of the user who owns the database Oracle server installation.

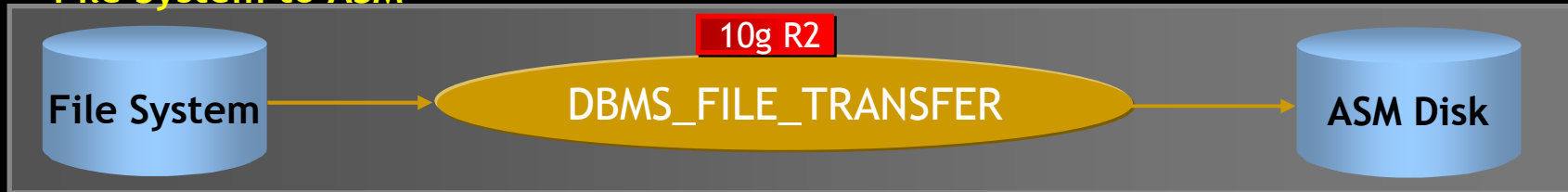
\* Username oracle  
\* Password [REDACTED]

Save as Preferred Credential

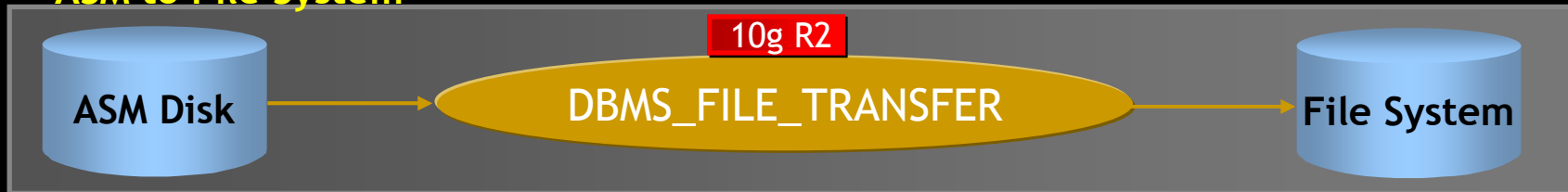
Cancel Continue

# DBMS\_FILE\_TRANSFER and ASM

## File System to ASM



## ASM to File System



## ASM to 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 '+DATAD_G1/DEVPROF' ;  
Directory created.
```

```
SQL> begin  
2 DBMS_FILE_TRANSFER.COPY_FILE(  
3     source_directory_object => 'ASM_D' ,  
4     source_file_name => 'spfiledevprof.ora' ,  
5     destination_directory_object => 'NonASM' ,  
6     destination_file_name => 'spfileDEV.ora');  
7 end ;  
8 /
```

```
PL/SQL procedure successfully completed.
```

# File System to ASM Migration

- Using EM
- Using DBMS\_FILE\_TRANSFER
- Using RMAN Manually
- Using XMLDB

**QUESTIONS**  
**ANSWERS**



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I can be reached at  
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for any questions

*THANKS*