

Oracle Database 12c

The Best Oracle Database 12c Tuning Features for Developers and DBAs

Presented by: Alex Zaballa, Oracle DBA 



Alex Zaballa



ORACLE
ACE Director



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Certified Specialist**

147 and counting...



<http://alexzaballa.blogspot.com/>



@alexzaballa



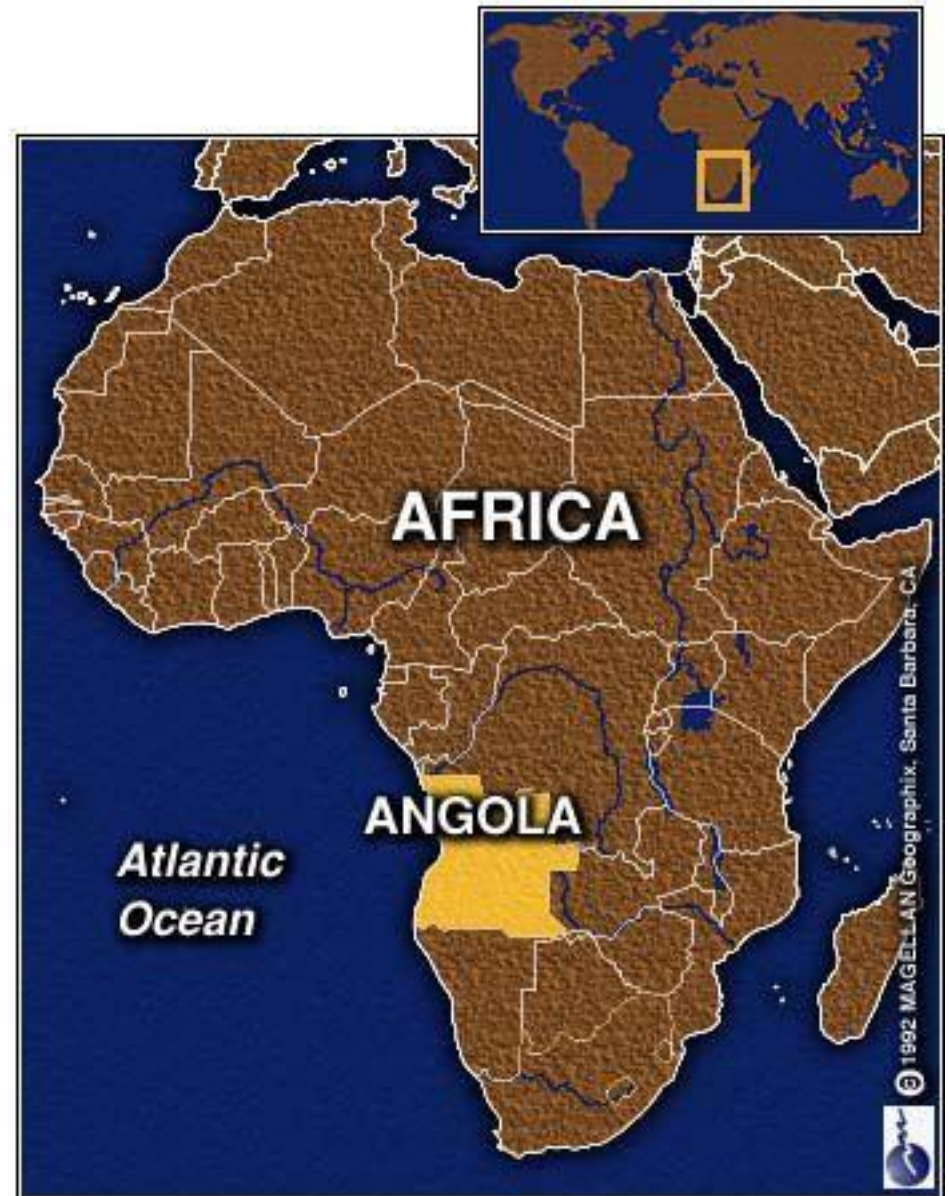
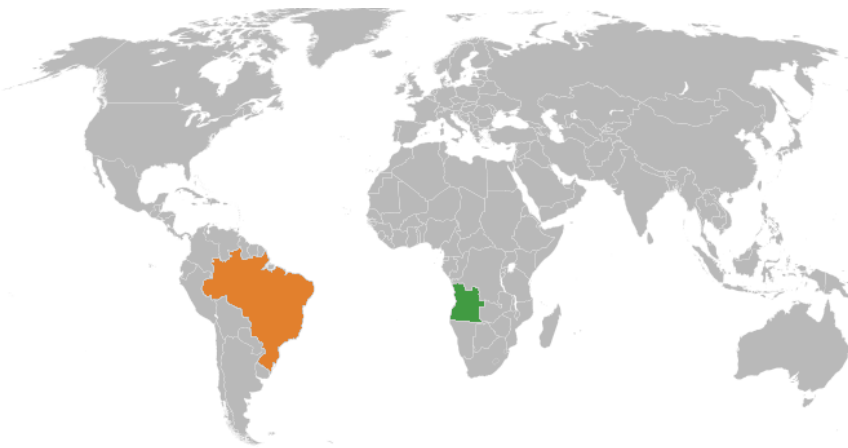
<https://www.linkedin.com/in/alexzaballa>



Worked for **7** years in **Brazil** as a **Developer**

Worked **8** years for the Ministry of Finance
In **Angola** as a **DBA**

March - 2007 until March - 2015



 **accenture**

**Accenture
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High performance. Delivered.



Oracle Specializations

- Oracle Database
- Oracle Exadata
- Oracle GoldenGate
- Oracle Data Integrator
- Oracle Data Warehouse
- Oracle Real Application Clusters
- Oracle Performance Tuning
- Oracle Database Security



Global systems integrator
focused on the Oracle Database
& Engineered Systems platform



Worldwide leader in Exadata
implementations (600+)

Oracle Database 12c

The Best Oracle Database 12c Tuning Features for Developers and DBAs

Oracle Official Documentation

12.1.0.2

- <http://docs.oracle.com/database/121/NEWFT/chapter12102.htm>

Oracle Learning Library (OLL)

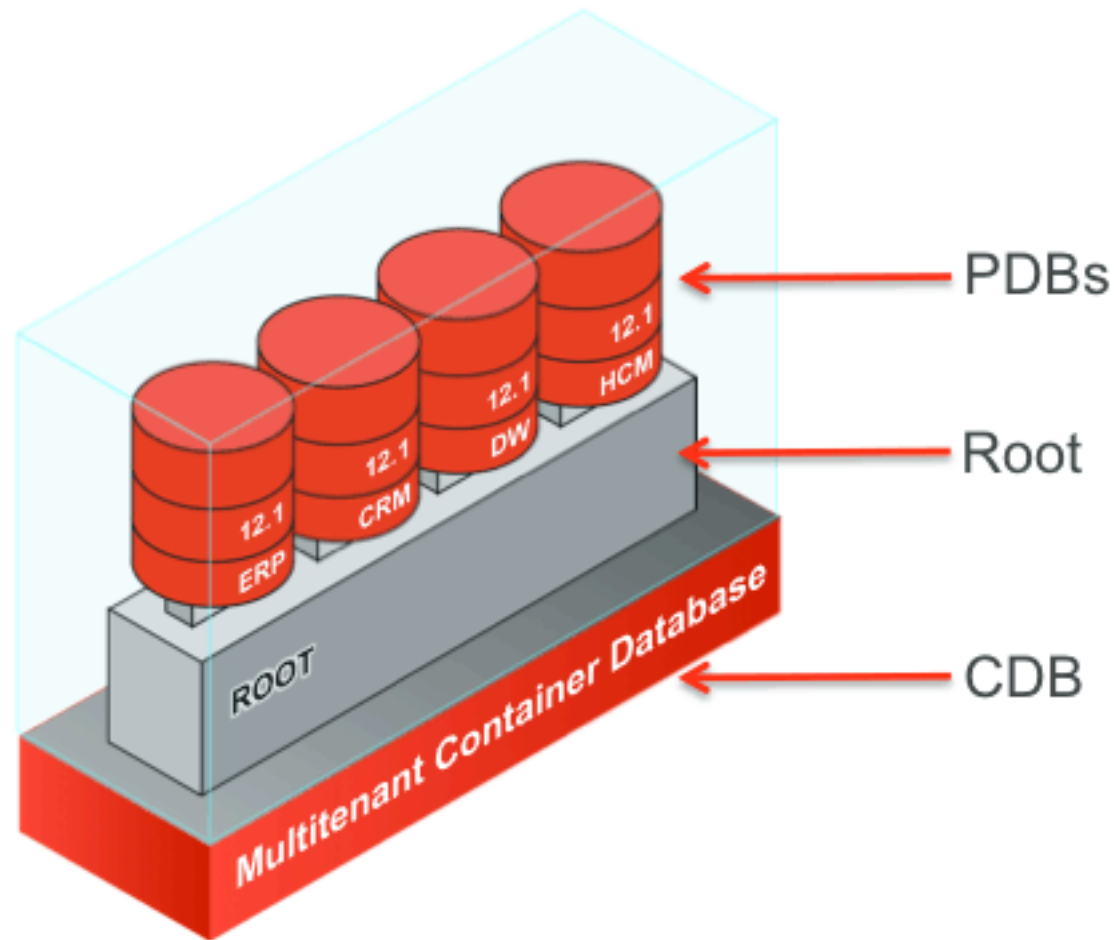
- <https://apexapps.oracle.com/pls/apex/f?p=44785:1:0>

Articles about 12c

- <https://oracle-base.com/articles/12c/articles-12c>
- <http://www.oraclealchemist.com/news/install-oracle-12c-12-1/>
- <http://www.profissionaloracle.com.br/>

“With more than **500 new features**, Oracle Database **12c** is designed to give Oracle customers exactly what they’ve told us they need for cloud computing, big data, security, and availability.”

Multitenant



Source: Oracle Documentation

Multitenant

Is it a Tuning Feature?

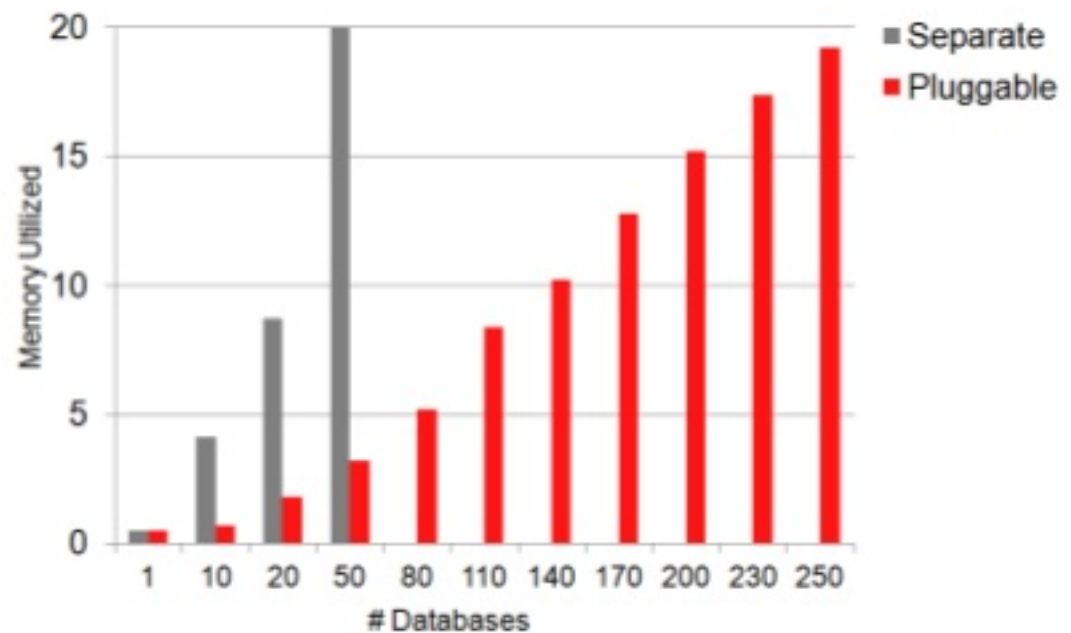
Pluggable vs Separate Databases

Highly Efficient: 6x Less H/W Resource, 5x more Scalable

OLTP benchmark comparison

Only 3GB of memory vs. 20GB memory used for 50 databases

Pluggable databases scaled to over 250 while separate database instances maxed at 50



ORACLE

Multitenant

Non-CDB architecture of Oracle databases is DEPRECATED since Oracle Database 12.1.0.2

By Mike Dietrich-Oracle on Jan 22, 2015

Beginning with Oracle Database 12.1.0.2 a **non-CDB architecture is deprecated**.

8.1.1 Deprecation of Non-CDB Architecture

The non-CDB architecture is deprecated in Oracle Database 12c, and may be desupported and unavailable in a later Oracle Database release. Oracle recommends use of the CDB architecture.

Note:

There remain a small number of features that do not work with the CDB architecture (see README, section 2.2.1 "Features Restricted or Not Available for a Multitenant Container Database"). If you need these features, then continue to use the non-CDB architecture until your required feature works with the CDB architecture.

Multitenant

What does this mean?

Deprecation first of all **does not mean "desupported"**.

Multitenant

Which features are not supported at the moment?

- Database Change Notification
- Continuous Query Notification (CQN)
- Client Side Cache
- Heat Map
- Automatic Data Optimization
- Oracle Streams
- Oracle Fail Safe
- Flashback Pluggable Database (Flashback Database works but will flashback CDB\$ROOT including all PDBs)
- DBVERIFY
- Data Recovery Advisor (DRA)
- Flashback Transaction Backout

In-Memory



Source: Oracle Documentation

In-Memory

SIMD Vector Processing

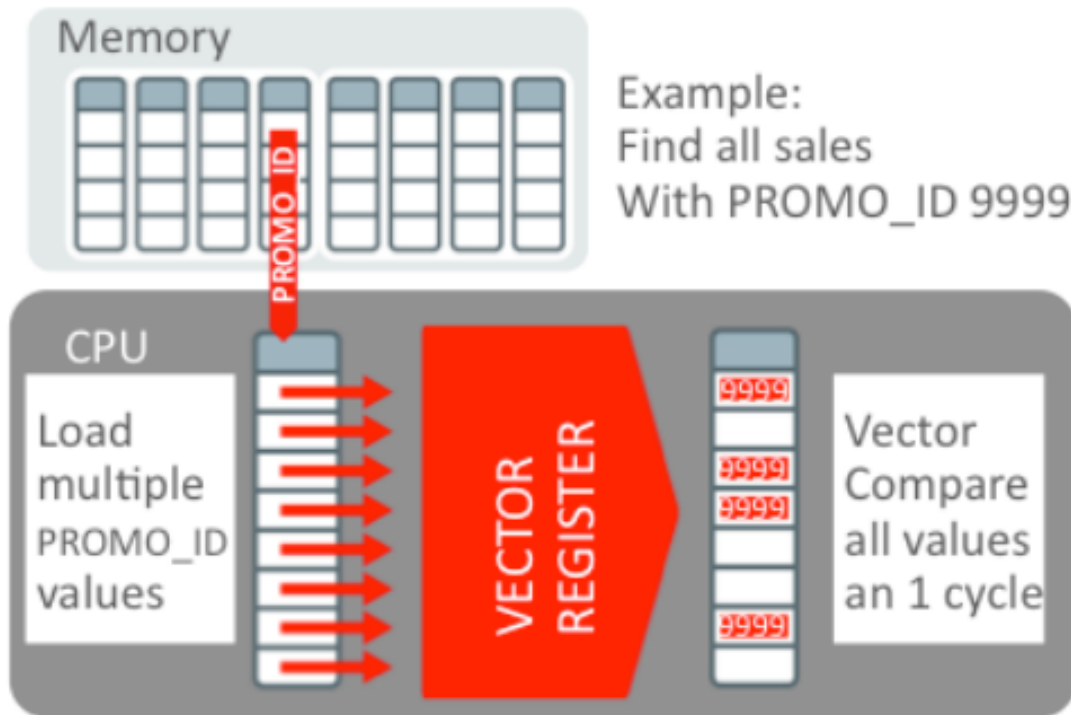


Figure 11. Using SIMD vector processing enables the scanning of billions of rows per second

Source: <http://www.oracle.com/technetwork/database/in-memory/overview/twp-oracle-database-in-memory-2245633.html>

In-Memory

Is it a Tuning Feature?

“Using Database In-Memory, businesses can **instantaneously** run analytics and reports that previously took **hours** or **days**.”

In-Memory

In-Memory Area – a static pool in SGA

In-Memory

```
ALTER SYSTEM SET SGA_TARGET=3G SCOPE=SPFILE;  
ALTER SYSTEM SET INMEMORY_SIZE=2G SCOPE=SPFILE;  
SHUTDOWN IMMEDIATE;  
STARTUP;
```

ORACLE instance started.

Total System Global Area	3221225472 bytes
Fixed Size	2929552 bytes
Variable Size	419433584 bytes
Database Buffers	637534208 bytes
Redo Buffers	13844480 bytes
In-Memory Area	2147483648 bytes

Database mounted.

Database opened.

In-Memory

Alter table hr.EMPLOYEES inmemory;

ALTER TABLE sales MODIFY PARTITION SALES_Q1_1998
NO INMEMORY;

ALTER TABLE sales INMEMORY NO INMEMORY(prod_id);

CREATE TABLESPACE tbs_test
DATAFILE '+DG01 SIZE 100M
DEFAULT INMEMORY;

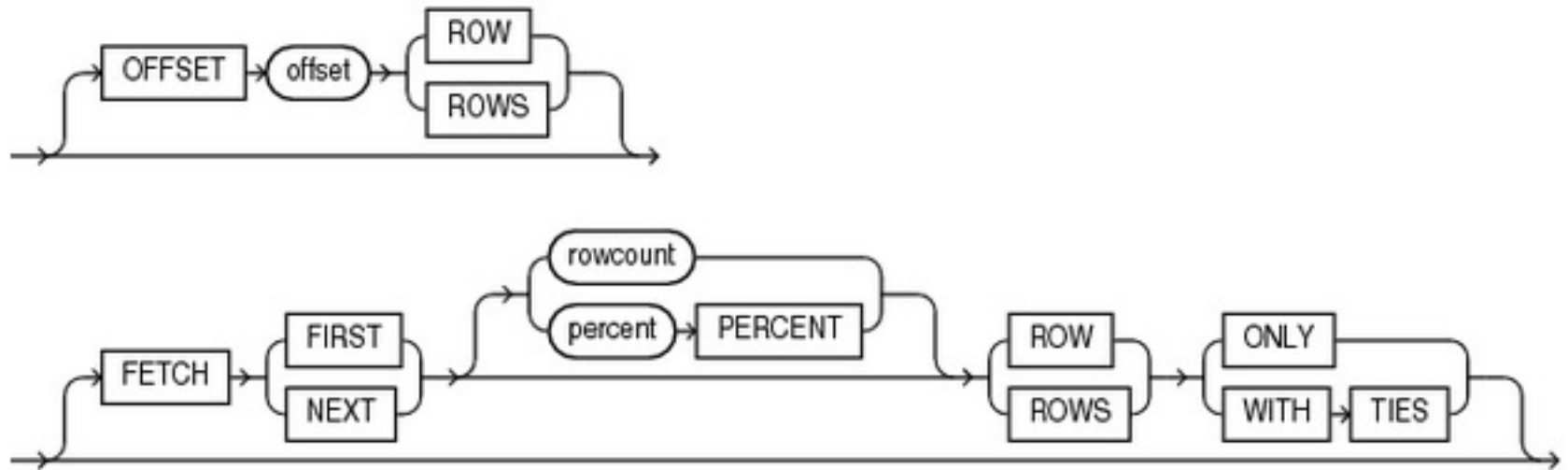
In-Memory

PRIORITY	DESCRIPTION
CRITICAL	Object is populated immediately after the database is opened
HIGH	Object is populated after all CRITICAL objects have been populated, if space remains available in the IM column store
MEDIUM	Object is populated after all CRITICAL and HIGH objects have been populated, and space remains available in the IM column store
LOW	Object is populated after all CRITICAL, HIGH, and MEDIUM objects have been populated, if space remains available in the IM column store
NONE	Objects only populated after they are scanned for the first time (Default), if space is available in the IM column store

Figure 7. Different priority levels controlled by the PRIORITY sub clause of the INMEMORY clause

Source: <http://www.oracle.com/technetwork/database/in-memory/overview/twp-oracle-database-in-memory-2245633.html>

SQL Query Row Limits and Offsets



SQL Query Row Limits and Offsets

Worksheet		Query Builder	
		<code>select * from tabela_teste</code>	
Script Output x		Query Result x	
		SQL All Rows Fetched: 10 in 0.029 seconds	
	CODIGO	NOME	SALARIO
1	1	Alex	100
2	2	Joao	200
3	3	Maria	300
4	4	Pedro	400
5	5	Paulo	500
6	6	Fernando	600
7	7	Rafael	700
8	8	Samuel	700
9	9	Daniel	800
10	10	Luciano	1000

SQL Query Row Limits and Offsets

Top-N Queries – Pré 12c

```
select * from ( select codigo, nome, salario  
                from tabela_teste  
                order by salario desc)  
where rownum <= 5
```

SQL Query Row Limits and Offsets

```
select codigo, nome, salario  
from tabela_teste  
order by salario desc  
FETCH FIRST 5 ROWS ONLY
```

CODIGO	NOME	SALARIO
10	Luciano	1000
9	Daniel	800
7	Rafael	700
8	Samuel	700
6	Fernando	600

SQL Query Row Limits and Offsets

```
select codigo, nome, salario
```

```
  from tabela_teste
```

```
 order by salario
```

FETCH FIRST 30 PERCENT ROWS ONLY

CODIGO	NOME	SALARIO
1	Alex	100
2	Joao	200
3	Maria	300

SQL Query Row Limits and Offsets

```
select codigo, nome, salario
```

```
  from tabela_teste
```

```
 order by salario desc
```

OFFSET 2 ROWS FETCH NEXT 2 ROWS ONLY;

CODIGO	NOME	SALARIO
7	Rafael	700
8	Samuel	700

DEMO

Approximate Count Distinct

This function provides an alternative to the COUNT (DISTINCT expr), with **negligible deviation from the exact result**.

```
SQL> SELECT count (distinct manager_id) AS "Gerentes Ativos"  
      FROM hr.employees_big;
```

```
Gerentes Ativos  
-----  
          18
```

Elapsed: 00:00:03.02

Utilizando a função *APPROX_COUNT_DISTINCT*:

```
SQL> SELECT APPROX COUNT DISTINCT(manager_id) AS "Gerentes Ativos"  
      FROM hr.employees_big;
```

```
Gerentes Ativos  
-----  
          18
```

Elapsed: 00:00:00.62

DEMO

PL/SQL From SQL

with

```
function Is_Number
(x in varchar2) return varchar2 is
    Plsql_Num_Error exception;
    pragma exception_init(Plsql_Num_Error, -06502);
begin
    if (To_Number(x) is NOT null) then
        return 'Y';
    else
        return "";
    end if;
exception
    when Plsql_Num_Error then
        return 'N';
end Is_Number;
```

```
select rownum, x, is_number(x) is_num from t;
```

DEMO

Session Level Sequences

Session level sequences are used to produce unique values in a session. Once the session ends, the sequence is reset.

Generating Primary Keys for a Global Temporary Table would be a field where those kinds of sequences could be used.

Session Level Sequences

```
CREATE SEQUENCE sequence_teste  
  START WITH 1  
  INCREMENT BY 1  
  SESSION  
/
```

Session Level Sequences

```
ALTER SEQUENCE sequence_teste  
SESSION;
```

```
ALTER SEQUENCE sequence_teste  
GLOBAL;
```

DEMO

Session private statistics for Global Temporary Tables

Pre 12c, statistics gathered for global temporary tables (GTTs) were common to all sessions.

Session private statistics for Global Temporary Tables

On 12c, by default session-private statistics are enabled

```
SELECT DBMS_STATS.get_prefs('GLOBAL_TEMP_TABLE_STATS')  
FROM dual;
```

STATS

SESSION

Session private statistics for Global Temporary Tables

How to change?

Behavior pre 12c:

```
BEGIN
  DBMS_STATS.set_global_prefs (
    pname => 'GLOBAL_TEMP_TABLE_STATS',
    pvalue => 'SHARED');
END;
/
```

Back to default on 12c:

```
BEGIN
  DBMS_STATS.set_global_prefs (
    pname => 'GLOBAL_TEMP_TABLE_STATS',
    pvalue => 'SESSION');
END;
/
```

Session private statistics for Global Temporary Tables

How to change for one table?

```
BEGIN
```

```
  dbms_stats.set_table_prefs('SCOTT','GTT_TESTE',  
    'GLOBAL_TEMP_TABLE_STATS','SHARED');
```

```
END;
```

```
BEGIN
```

```
  dbms_stats.set_table_prefs('SCOTT','GTT_TESTE',  
    'GLOBAL_TEMP_TABLE_STATS','SESSION');
```

```
END;
```

DEMO

Temporary Undo

Global Temporary Tables (GTT) hold the data in a temporary tablespace. The data in GTTs are either deleted after commit or kept until the session is connected depending of the definition of the GTT.(ON COMMIT PRESERVE OR DELETE ROWS).

DMLs in a Global Temporary Tables **do not generate REDO, but generate UNDO** and this will result in REDO generating.

Temporary Undo

```
alter session set temp_undo_enabled=true;
```

```
alter system set temp_undo_enabled=true;
```

**you can change for the session or for the database.

*default true

DEMO

Multiple Indexes on the same set of Columns

Pre 12c:

ORA-01408: such column list already indexed error.

Multiple Indexes on the same set of Columns

Is the ability to create more than one index on the same set of columns in 12c.

****Only one of these indexes can be visible at a time**

Multiple Indexes on the same set of Columns

Why would you want to do that?

- Unique versus nonunique
- B-tree versus bitmap
- Different partitioning strategies

DEMO

Limit the PGA

```
SQL> show parameter pga
```

NAME	TYPE	VALUE
------	------	-------

pga_aggregate_limit	big integer	2G
----------------------------	-------------	----

Limit the PGA

PGA_AGGREGATE_LIMIT is set to the greater of:

- 2 GB (default value)
- 200% of PGA_AGGREGATE_TARGET
- 3 MB times the PROCESSES parameter

Statistics During Loads

The ability to gather statistics automatically during **bulk loads**:

- CREATE TABLE AS SELECT
- INSERT INTO ... SELECT into an empty table using a **direct path insert**

DEMO

Partial Indexes for Partitioned Table

- You can create local and global indexes on a **subset** of the partitions of a table, enabling more flexibility in index creation.
- This feature is not supported for unique indexes, or for indexes used for enforcing unique constraints.

Partial Indexes for Partitioned Table

```
create table tabela_teste
```

```
(
```

```
  coluna1 number,
```

```
  coluna2 number
```

```
)
```

```
indexing on
```

```
partition by range(coluna1)
```

```
(
```

```
  partition part1 values less than(100) indexing off,
```

```
  partition part2 values less than(200) indexing on,
```

```
  partition part3 values less than(300),
```

```
  partition part4 values less than(400)
```

```
);
```

```
Table created.
```

DEMO

Full Database Caching

Can be used to cache the entire database in memory. It should be used when the buffer cache size of the database instance **is greater than the whole database size**.

```
SQL> ALTER DATABASE FORCE FULL DATABASE CACHING;  
Database altered.  
  
SQL> SELECT force_full_db_caching FROM v$database;  
  
FOR  
---  
YES
```

Adaptive Query Optimization



Adaptive Plans



Adaptive Join Method

Adaptive Join Method

Optimizer can change join from Nested Loop to Hash Join and vice versa.

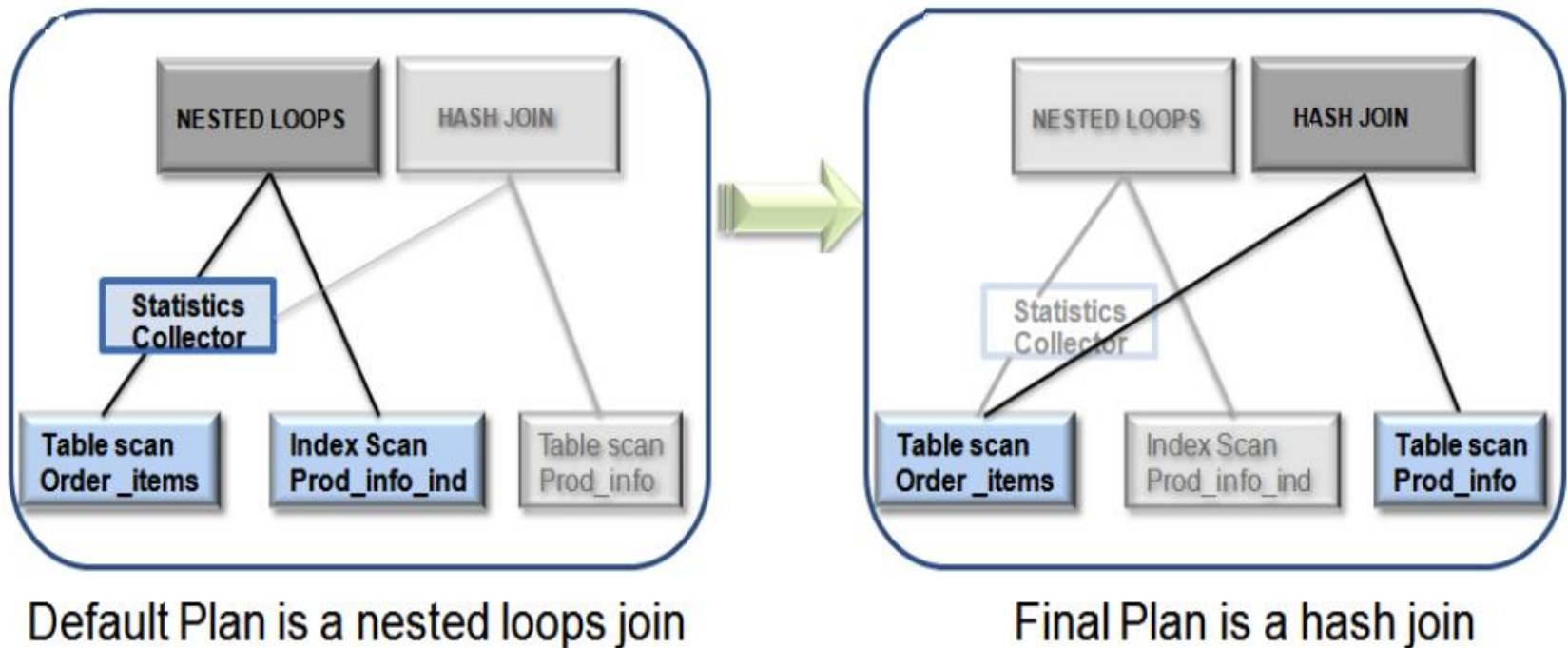
Why?

Optimizer mistakes

- Estimated Rows and Actual rows are different

Before 12c requires DBA/Developer intervention

Adaptive Join Method



Adaptive Join Method

Parameters that control Adaptive Plans:

Name	Type	Value
optimizer_adaptive_features	boolean	TRUE
optimizer_adaptive_reporting_only	boolean	FALSE
optimizer_features_enable	string	12.1.0.1

Explain Plan command shows the default plan

```
SQL> explain plan for
  2 select /*+ gather_plan_statistics*/ p.product_name
  3 from order_items2 o, product_information p
  4 where o.unit_price = 15
  5       and o.quantity > 1
  6       and p.product_id = o.product_id;
```

Explained.

```
SQL>
```

```
SQL> select * from table(dbms_xplan.display());
```

PLAN_TABLE_OUTPUT

Plan hash value: 983807676

Id	Operation	Name
0	SELECT STATEMENT	
1	NESTED LOOPS	
2	NESTED LOOPS	
* 3	TABLE ACCESS FULL	ORDER_ITEMS2
* 4	INDEX UNIQUE SCAN	PRODUCT_INFORMATION_PK
5	TABLE ACCESS BY INDEX ROWID	PRODUCT_INFORMATION

Predicate Information (identified by operation id):

3 - filter("O"."UNIT_PRICE"=15 AND "O"."QUANTITY">1)

DBMS_XPLAN.DISPLAY_CURSOR shows the final plan

```
SQL> select * from table(dbms_xplan.display_cursor());
```

PLAN_TABLE_OUTPUT

SQL_ID d3mzkmzx264d, child number 0

```
select /*+ gather_plan_statistics */ p.product_name from order_items2  
o, product_information p where o.unit_price = 15 and o.quantity > 1  
and p.product_id = o.product_id
```

Plan hash value: 2886494722

Id	Operation	Name	Rows	Bytes	Cost (%CPU)
0	SELECT STATEMENT				7 (100)
* 1	HASH JOIN		4	128	7 (0)
* 2	TABLE ACCESS FULL	ORDER_ITEMS2	4	48	3 (0)
3	TABLE ACCESS FULL	PRODUCT_INFORMATION	1	20	1 (0)

Predicate Information (identified by operation id):

- 1 - access("P"."PRODUCT_ID"="O"."PRODUCT_ID")
- 2 - filter(("O"."UNIT_PRICE"=15 AND "O"."QUANTITY">1))

DEMO

Real-Time SQL Monitoring

- Sql Monitoring requires both Diagnostics and Tuning Pack licenses

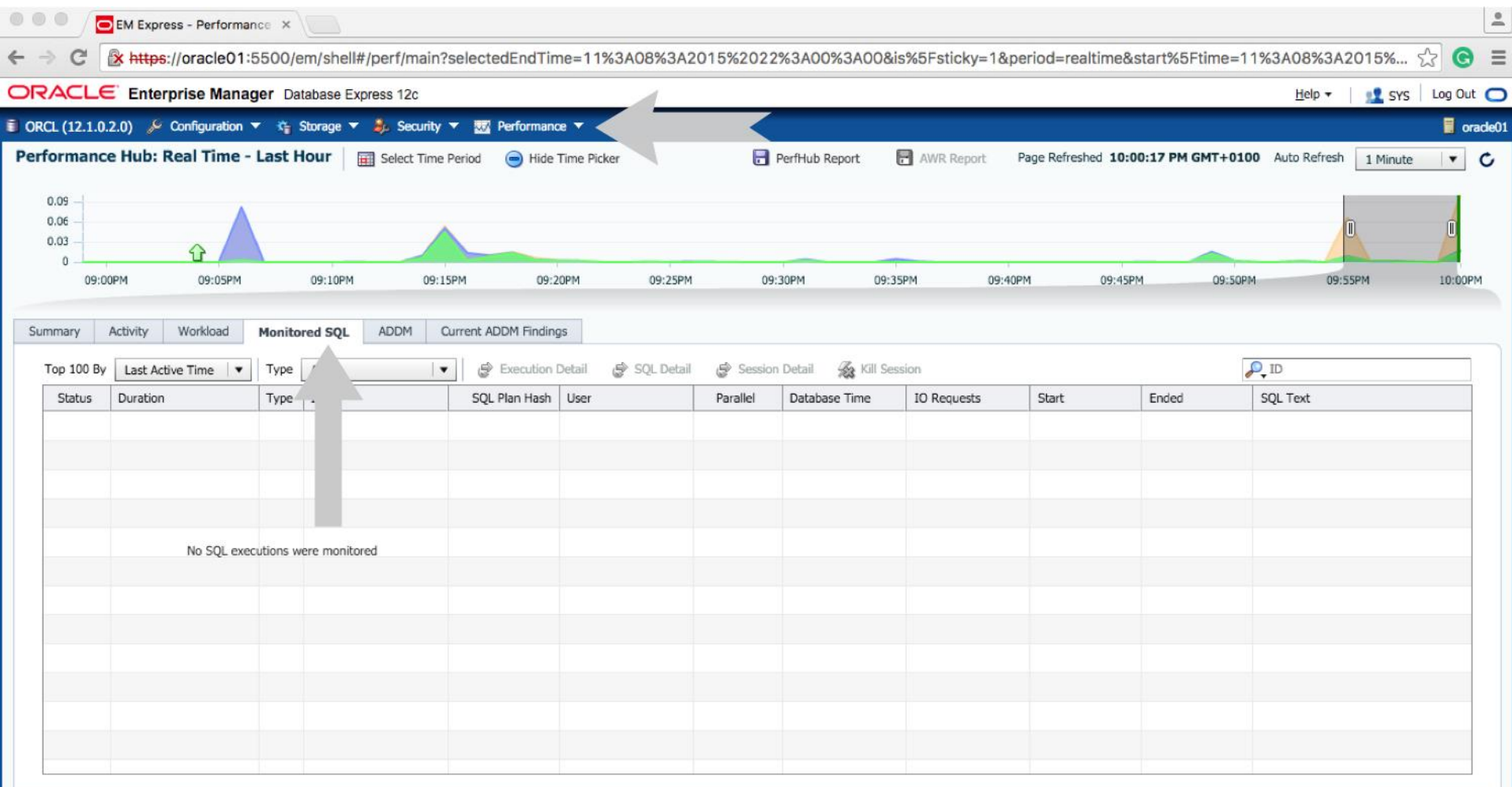
Real-Time SQL Monitoring

- MONITOR Hint

```
SELECT /*+ MONITOR */
```

- All parallel statements
- After 5 seconds of CPU/IO time spent for serial queries

Real-Time SQL Monitoring



Real-Time SQL Monitoring

ORACLE Enterprise Manager Database Express 12c Help SYS Log Out

ORCL (12.1.0.2.0) Configuration Storage Security Performance oracle01

Monitored SQL Execution Details: 8pkcq5nts37t8 Navigate to SQL Details Save Page Refreshed 10:21:41 PM GMT+0100

Overview

General

SQL Text: `SELECT /*+ MONITOR */ d.dname, count(e.ename) AS e`

Execution Started: Sun Nov 8, 2015 10:21:21 PM

Last Refresh Time: Sun Nov 8, 2015 10:21:21 PM

Execution ID: 16777216

User: SYS

Fetch Calls: 1

Time & Wait Statistics

Duration: 2.8ms

Database Time: 2.8ms

PL/SQL & Java: 0s

Activity %: 0

IO Statistics

Buffer Gets: 9

IO Requests: 4

IO Bytes: 64KB

Details

Plan Statistics Plan Activity

Plan Hash Value: 2970111170 Plan Note

Operation	Name	Line...	Estimated R...	Cost	Timeline(0.002774s)	Executi...	Actual Rows	Memory (...)	Temp (Max)	O...	IO Reque...	IO By...	Activity %
SELECT STATEMENT		0				1	3						
SORT GROUP BY		1	4	7		1	3	2KB					
MERGE JOIN		2	14	6		1	14						
TABLE ACCESS BY INDEX ROWID	DEPT	3	4	2		1	4				1	8KB	
INDEX FULL SCAN	PK_DEPT	4	4	1		1	4				1	8KB	
SORT JOIN		5	14	4		4	14	2KB					
TABLE ACCESS FULL	EMP	6	14	3		1	14				2	48KB	

Real-Time SQL Monitoring

ORACLE Enterprise Manager Database Express 12c Help SYS Log Out

ORCL (12.1.0.2.0) Configuration Storage Security Performance oracle01

Monitored SQL Execution Details: 5dhu4w0j59yp7 Navigate to SQL Details Save Page Refreshed 10:23:49 PM GMT+0100

Overview

General

SQL Text: `SELECT /*+ MONITOR */ d.dname, count(e.ename) AS e`

Execution Started: Sun Nov 8, 2015 10:23:24 PM

Last Refresh Time: Sun Nov 8, 2015 10:23:24 PM

Execution ID: 16777216

User: SYS

Fetch Calls: 1

Time & Wait Statistics

Duration: 3.5ms

IO Statistics

Buffer Gets: 9

IO Requests: 0

IO Bytes: 0

Details

Plan Statistics Plan Activity

Plan Hash Value: 2970111170 Plan Note

Operation	Name	Line...	Estimated R...	Cost	Timeline(0.003519s)	Executi...	Actual Rows	Memory (...)	Temp (Max)	O...	IO Reque...	IO By...	Activity %
SELECT STATEMENT		0											
SORT GROUP BY		1	2										
MERGE JOIN		2	12										
TABLE ACCESS BY INDEX ROWID	DEPT	3	4										
INDEX FULL SCAN	PK_DEPT	4	4										
SORT JOIN		5	12										
TABLE ACCESS FULL	EMP	6	12										

SQL Text

`SELECT /*+ MONITOR */ d.dname, count(e.ename) AS employees
FROM scott.emp e
 JOIN scott.dept d ON e.deptno = d.deptno
WHERE e.deptno <> :1
GROUP BY d.dname
ORDER BY d.dname`

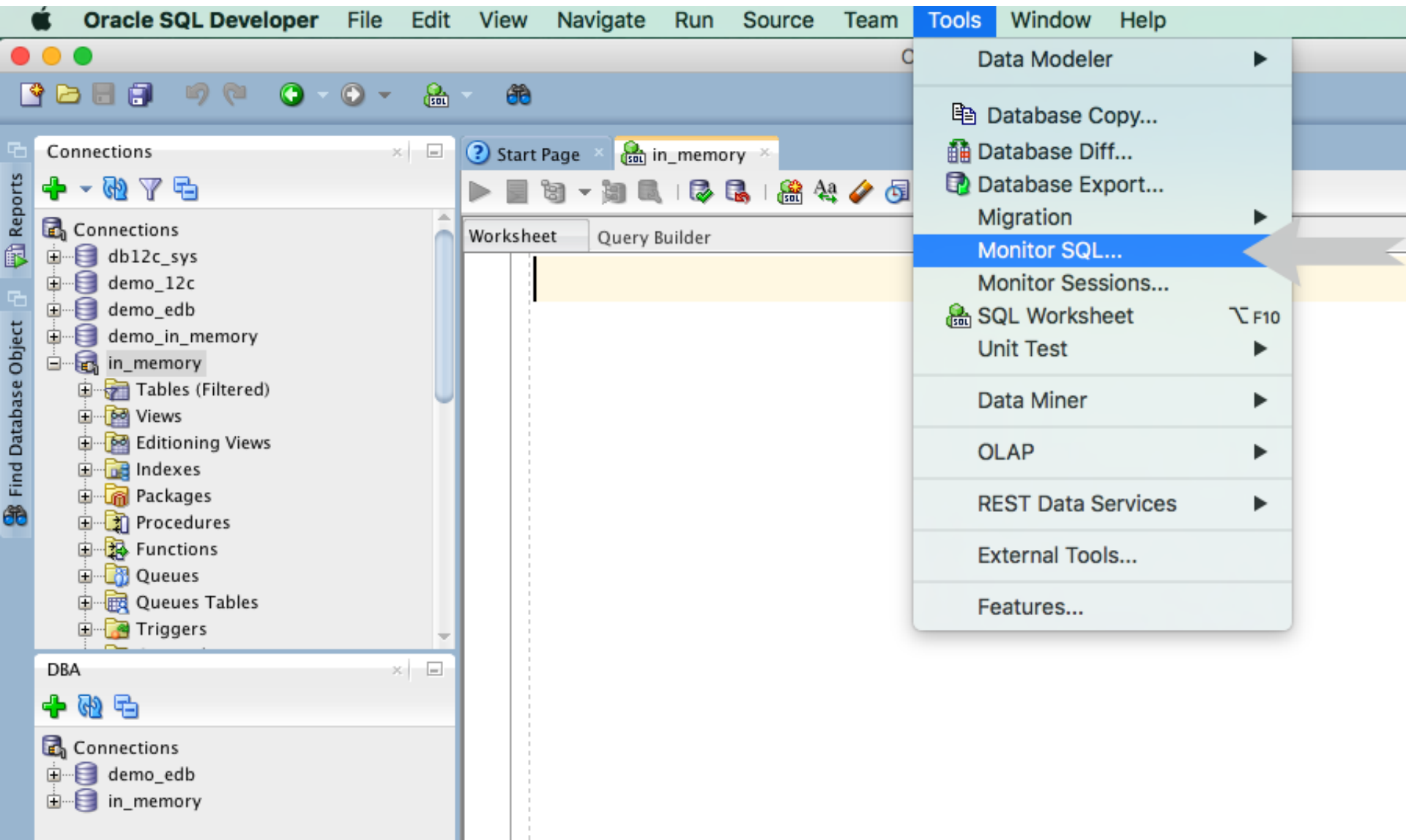
Show SQL Binds Save OK

SQL Binds

Position	Name	Value	Type
1	:1	0	VARCHAR2(32)

Save OK

Real-Time SQL Monitoring



Real-Time SQL Monitoring

Oracle SQL Developer : Real Time SQL Monitoring

Connections

- db12c_sys
- demo_12c
- demo_edb
- demo_in_memory
- in_memory
 - Tables (Filtered)
 - Views
 - Editing Views
 - Indexes
 - Packages
 - Procedures
 - Functions
 - Queues
 - Queues Tables
 - Triggers

DBA

- Connections
 - demo_edb
 - in_memory

Start Page | in_memory | Real Time SQL Monitoring

Refresh | Refresh 0

STATUS	DURATION	SQL_ID	SESSION_ID	SESSION_SERIAL	INSTANCE_DOP	CPU_TIME	IO_TIME	START_TIME
DONE (ALL ROWS)		05dhy4w0i59yp7	261	77331 0		0		008-NOV-2015
DONE (ALL ROWS)		ca5nts37t8	261	77331 0		0		008-NOV-2015

- Save Grid as Report...
- Single Record View...
- Count Rows...
- Find/Highlight...
- Publish to APEX...
- Show SQL Details
- Export...

Real-Time SQL Monitoring

Oracle SQL Developer : Real Time SQL Monitoring

Connections

- db12c_sys
- demo_12c
- demo_edb
- demo_in_memory
- in_memory
- Tables (Filtered)
- Views
- Editing Views
- Indexes
- Packages
- Procedures
- Functions
- Queues
- Queues Tables
- Triggers

DBA

- Connections
- demo_edb
- in_memory

Start Page | in_memory | Real Time SQL Monitoring

Refresh | Refresh 0

Overview

SQL Id: 5dhu4w0j59yp7
Execution Started: 11/08/2015 22:23:24
Last Refresh time: 11/08/2015 22:23:24
Execution Id: 16777216
Session: 261
Fetch Calls: 1
Run Status: DONE (ALL ROWS)

User Information:

User Name: SYS
OS User: alexzaballa
Process: 51558
Machine: Alexs-MacBook-Pro.local
Program: SQL Developer
Module: SQL Developer
Client Info:

```
SELECT /*+ MONITOR */ d.dname, count(e)
FROM   scott.emp e
       JOIN scott.dept d ON e.deptno = d.deptno
WHERE  e.deptno <> :1
```

OPERATION	NAME	ESTIMATED_RO...	COST	TIMELINE	EXECUTIONS	ACTUAL_ROWS	MEMORY/MEMO...	TEMP/TEMP(MAX)	CPU
SELECT STATEMENT					1	3	0 / 0	0 / 0	
SORT (GROUP BY)		2	7		1	3	0 / 2048	0 / 0	
MERGE JOIN		12	6		1	14	0 / 0	0 / 0	
TABLE ACCESS (DEPT)		4	2		1	4	0 / 0	0 / 0	
INDEX (PK_DEPT)		4	1		1	4	0 / 0	0 / 0	
SORT (JOIN)		12	4		4	14	0 / 2048	0 / 0	
TABLE ACCESS (EMP)		12	3		1	14	0 / 0	0 / 0	

Real-Time SQL Monitoring

The screenshot shows the SQL Developer interface with the 'Query Builder' tab active. The command 'desc dbms_sqltune' is entered in the query area. The 'Script Output' window below shows the execution results, indicating the task completed in 0.286 seconds. The output is a table with three columns: the object name, the data type, and the data length. The first row shows 'REPORT_SQL_MONITOR (FUNCTION)' with a data type of '<return value>' and a length of 'CLOB'. Subsequent rows list various parameters of the function, such as 'SQL_ID', 'SESSION_ID', 'SESSION_SERIAL', 'SQL_EXEC_START', 'SQL_EXEC_ID', 'INST_ID', 'START_TIME_FILTER', 'END_TIME_FILTER', 'INSTANCE_ID_FILTER', 'PARALLEL_FILTER', 'PLAN_LINE_FILTER', 'EVENT_DETAIL', 'BUCKET_MAX_COUNT', 'BUCKET_INTERVAL', and 'BASE PATH', each with their respective data types and lengths.

Object Name	Data Type	Data Length
REPORT_SQL_MONITOR (FUNCTION)	<return value>	CLOB
SQL_ID	VARCHAR2	
SESSION_ID	NUMBER	
SESSION_SERIAL	NUMBER	
SQL_EXEC_START	DATE	
SQL_EXEC_ID	NUMBER	
INST_ID	NUMBER	
START_TIME_FILTER	DATE	
END_TIME_FILTER	DATE	
INSTANCE_ID_FILTER	NUMBER	
PARALLEL_FILTER	VARCHAR2	
PLAN_LINE_FILTER	NUMBER	
EVENT_DETAIL	VARCHAR2	
BUCKET_MAX_COUNT	NUMBER	
BUCKET_INTERVAL	NUMBER	
BASE PATH	VARCHAR2	

Command key down to perform "Go to Declaration"

Real-Time SQL Monitoring

```
SPOOL /tmp/report_sql_monitor.htm
```

```
SELECT DBMS_SQLTUNE.report_sql_monitor(  
  sql_id      => '5dhu4w0j59yp7',  
  type       => 'HTML',  
  report_level => 'ALL') AS report  
FROM dual;
```

```
SPOOL OFF
```


Real-Time SQL Monitoring

SQL Monitoring Report

SQL Text

SELECT /*+ MONITOR */ d.dname, count(e.ename) AS employees FROM scott.emp e JOIN scott.dept d ON e.deptno = d.deptno WHERE e.deptno <> :1 GROUP BY d.dname ORDER BY d.dname

Global Information: DONE (ALL ROWS)

Instance ID : 1
Session : SYS (261:7733)
SQL ID : 5dhu4w0j59yp7
SQL Execution ID : 16777216
Execution Started : 11/08/2015 22:23:24
First Refresh Time : 11/08/2015 22:23:24
Last Refresh Time : 11/08/2015 22:23:24
Duration : .003519s
Module/Action : SQL Developer/-
Service : SYS\$USERS
Program : SQL Developer
Fetch Calls : 1

Buffer Gets	Database Time	Wait Activity
9	0s	

Binds

Name	Position	Type	Value
:1	1	VARCHAR2(32)	0

SQL Plan Monitoring Details (Plan Hash Value=2970111170)

Id	Operation	Name	Estimated Rows	Cost	Active Period (.003519s)	Execs	Rows	Memory (Max)	Temp (Max)	IO Requests	CPU Activity	Wait Activity
0	SELECT STATEMENT					1	3					
1	SORT GROUP BY		2	7		1	3	2.0KB				
2	MERGE JOIN		12	6		1	14					
3	TABLE ACCESS BY INDEX ROWID	DEPT	4	2		1	4					
4	INDEX FULL SCAN	PK_DEPT	4	1		1	4					
5	SORT JOIN		12	4		4	14	2.0KB				
6	TABLE ACCESS FULL	EMP	12	3		1	14					

SQL> SPOOL OFF

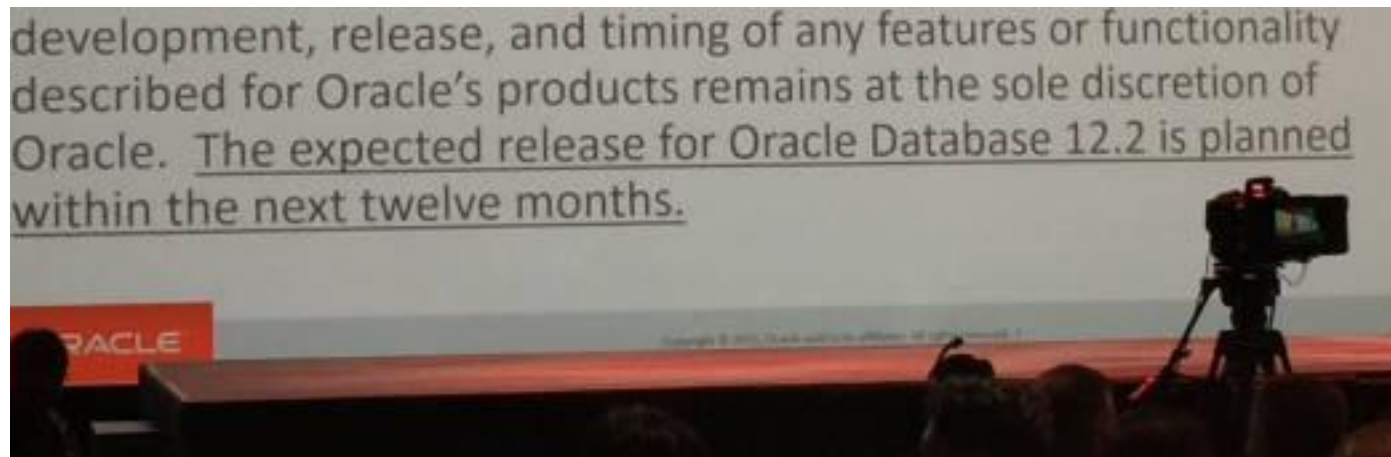
DEMO

Oracle Database 12.2

Oracle Announces Beta Availability of Oracle Database 12c Release 2 - Oct 26, 2015

- PLUGGABLE DATABASES
From 252 to 4096
- HOT CLONING
Don't need to put the source in read-only for cloning
- SHARDING
It's like partitioning in a shared nothing database
The data is split into multiple databases
- In-Memory
In-Memory column Store on Active Data Guard
Heat Map
- APPLICATION CONTAINER
Pluggable Databases will share application objects
- More isolation, resource manager will limit the memory in addition to CPU and I/O.
- AWR will work on Active Data Guard Database: you can tune your reporting database

Availability of Oracle Database 12.2



Oracle Database Release Status

MOS Note:742060.1

Release	Patching Ends	Notes and Exceptions*
12.1.0.2	31-Jul-2021	Extended Support begins 1-Aug-2018
12.1.0.1	31-Aug-2016	
11.2.0.4	31-Dec-2020	Extended Support fees waived until May 31, 2017. An ES service contract is required starting 1-Jun-2017.
11.2.0.3	27-Aug-2015	
11.2.0.2	31-Oct-2013	End date extended beyond normal.
11.2.0.1	13-Sep-2011	Patch end date for Exadata is 30-Apr-2012
11.1.0.7	31-Aug-2015 ⁷	HP-UX Itanium - Patching ends Dec 2015. Beginning Sep 1, 2015 Sev 1 fixes only (no PSU or CPU will be produced). Extended Support required starting 1-Sep-2012
11.1.0.6	18-Sep-2009	
10.2.0.5	31-Jul-2015 ⁷	All platforms - standard Extended Support ended 31-Jul-2013. After that, Limited Extended Support is available from Aug 2013 through July 2015, Sev 1 fixes only (no PSU or SPU will be produced). See Oracle Software Technical Support Policies . HP-UX, Linux, and Windows Itanium - patching ends Dec 2015. Beginning Aug 1, 2013, Sev 1 fixes only (no PSU or CPU will be produced).

SQLcl



Oracle SQL Developer 4.1 EA2 (4.1.0.18.37)

March 9, 2015

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Linux RPM - Installation Notes	Download 301 M
Other Platforms - Installation Notes	Download 307 M

Command Line - SQLcl Update Apr 16, 2015	
All Platforms	Download 12 M
• Over 350+ Bugs Fixed	
Getting Started Video	



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Thank You