

# Oracle SQL Monitor

**Lisa Garczynski**  
**November 13, 2015**

## Agenda

- What is it?
- How to execute?
- Features
- Comparisons

# Introduction

## Lisa Garczynski

Paychex, Inc.

Lead Database Architect

Database Administrator ~ 18 years

Architect last 3 years

Started 1995 Oracle 6.0.36 supporting Oracle Apps

Passionate about family, fun and using the right technology to solve business problems.



# What is Oracle SQL Monitor Report?

## ▶ SQL Monitor Report introduced in Oracle 11g

- Identify run-time performance problems with long running queries and parallel SQL statements
- Active Report - Interactive (even when saved)
- Statistics like execution duration, number of reads and writes, I/O wait
- Examples and FAQ:  
<http://www.oracle.com/technetwork/database/manageability/sqlmonit-or-084401.html#A3>

# How do you run it?

To run a report for the last SQL run in your session:

```
set trimspool on set trim on set pages 0 set linesize 1000 set long 1000000
set longchunksize 1000000
spool sqlmon_active.html
select DBMS_SQLTUNE.REPORT_SQL_MONITOR(
session_id=> sys_context('USERENV', 'SID'), type=> 'ACTIVE',
report_level=>'ALL') as report
from dual;
spool off
```

Report Types – ACTIVE (interactive), HTML, TEXT

Other Options:

SQL\_ID => Specify a specific SQL ID

```
select DBMS_SQLTUNE.REPORT_SQL_MONITOR(
session_id=> sys_context('USERENV', 'SID'), type=> 'ACTIVE',
report_level=>'ALL') as report
from dual;
```

## ► From the database page

- Performance -> SQL Monitoring
  - requires database login with OEM\_MONITOR privilege
- Click on desired SQL ID

The screenshot displays the Oracle Database Performance page for a specific SQL execution. The page is titled "Monitored SQL Execution Details: 0bmm1skj9vv9c" and is logged in as SYSTEM. The page is refreshed at 9:34:45 PM GMT-0500.

**Overview**

- General**
  - SQL Text: select /\*+ MONITOR \*/ \* from dual
  - Execution Started: Thu Nov 12, 2015 9:05:47 PM
  - Last Refresh Time: Thu Nov 12, 2015 9:05:47 PM
  - Execution ID: 33554443
  - User: SYSTEM
  - Fetch Calls: 1
- Time & Wait Statistics**
  - Duration: 1.00ms
  - Database Time: 1.00ms
  - PL/SQL & Java: 0us
  - Wait Activity %: 100
- IO Statistics**
  - Buffer Gets: 3
  - IO Requests: 0
  - IO Bytes: 0

**Details**

Plan Statistics | Plan | Activity

Plan Hash Value: 4017058736 | Plan Note

Operation	Name	Line ID	Estimated Rows	Cost	Timeline(0.000999s)	Executions	Actual Rows	Memory (Max)	Temp (Max)	O...	IO Requests	IO Bytes	Activity %
SELECT STATEMENT		0				1	1						
TABLE ACCESS FULL	DUAL	1	1	2		1	1						

- ▶ From the SQL Screen
  - Click SQL Monitoring Tab

Oracle Database ▾ Performance ▾ Availability ▾ Security ▾ Schema ▾ Administration ▾

Top Activity > SQL Details: 0bmm1skj9vv9c Logged in as SYSTEM  
**SQL Details: 0bmm1skj9vv9c**  
Switch Database Instance:  ▾   
Switch to SQL ID:   View Data  ▾   Actions  ▾

**Text**

```
select /*+ MONITOR */ *  
from dual
```

**Details**

Select the plan hash value to see the details below. Plan Hash Value:  ▾

**Statistics**

**Summary**

**General**

Module TOAD 11.5.1.2  
Action  
Parsing Schema SYSTEM  
PL/SQL Source (Line Number) Not Applicable  
SQL Profile n/a  
SQL Plan Baseline n/a

**Activity By Waits**

100% CPU(100%)

**Activity By Time**

Elapsed Time (sec) 0.01  
CPU Time (sec) 0.01  
Wait Time (sec) -0.00

**Elapsed Time Breakdown**

SQL Time (sec) 0.01  
PL/SQL Time (sec) 0.00  
Java Time (sec) 0.00

**Shared Cursors Statistics**

Total Parses 13  
Hard Parses 2  
Child Cursors 2

**Execution Statistics**

	Total	Per Execution	Per Row
Executions	12	1	1.00

**Other Statistics**

Executions that Fetched all Rows (%) 100.00  
Average Persistent Mem (KB) 5.84  
Average Runtime Mem (KB) 4.66

# SQL Monitor with Binds

The screenshot displays the Oracle Enterprise Manager SQL Monitor interface. The main window shows 'Monitored SQL Execution Details' for SQL ID '1wgkafmd9uf82'. The 'Overview' section includes execution time, refresh time, and user information. The 'Details' section shows the execution plan with various join types and table accesses. The 'Binds' table lists the values for the query's bind variables. The 'IO Statistics' section shows a bar chart for Buffer Gets (109K), IO Requests (14K), and IO Bytes (873MB). A table at the bottom provides a detailed view of IO statistics for each step in the execution plan.

**SQL Text**

```

SELECT calendar_year ,
       calendar_quarter_number ,
       calendar_month_number ,
       SUM(amount_sold)
FROM sales ,
     times ,
     products ,
     customers ,
     countries
WHERE sales.time_id =times.time_id
      AND sales.prod_id =products.prod_id
      AND customers.country_id = countries.country_id
    
```

**Monitored SQL Execution Details**

SQL ID: 1wgkafmd9uf82

Execution Started: Fri Oct 9, 2009 3:16:47 PM

Last Refresh Time: Fri Oct 9, 2009 3:17:26 PM

Execution ID: 33554439

User: SH3

Fetch Calls: 3

**Time & Wait Statistics**

Duration

Database Time

PL/SQL & Java

Wait Activity %

**IO Statistics**

Buffer Gets: 109K

IO Requests: 14K

IO Bytes: 873MB

**Binds**

Name	Position	Type	Value
:PROD1	1	VARCHAR2(2000)	External 101-key keyboa
:PROD2	2	VARCHAR2(2000)	External 6X CD-ROM
:COUNTRY_CODE	3	VARCHAR2(32)	NL
:YEAR	4	NUMBER	2002

**Operation**

- SELECT STATEMENT
- SORT GROUP BY ROLLUP
- HASH JOIN
  - TABLE ACCESS FULL
  - HASH JOIN
    - HASH JOIN
      - HASH JOIN
        - PART JOIN FILTER CREATE
          - TABLE ACCESS FULL (TIMES)
        - HASH JOIN
          - TABLE ACCESS FULL (PRODUCTS)
        - PARTITION RANGE JOIN-FILTER
          - TABLE ACCESS FULL (SALES)
        - TABLE ACCESS FULL (CUSTOMERS)

**IO Statistics Table**

...	Actual Ro...	Memory (...)	Temp (Max)	IO Requests	CPU Activity %	Wait Activity %
1	18					
1	18					
1	2,348	373KB				
1	1					
1	51K	2MB	20MB	103		2.5
1	51K	703KB				
1	365					
1	365					
1	466K	42K				
1	2					
1	3,444K					
4	3,444K			1,041		20
1	3,100K			12K		78

Copyright © 1996, 2015, Oracle and/or its affiliates. All rights reserved. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.

- ▶ **Timeline of where time is being spent**
  - Helps to narrow down problem area quickly
- ▶ **Estimated number of rows from an operation vs. actual**
  - Optimizer estimate can be different from actual runtime
  - Estimate could be based on single execution, not cumulative
  - Large variations can point to issue with statistics
    - Recalculating statistics, enhanced statistics (column groups) or histograms may help.

Operation	Name	Line ID	Estimated Rows	Cost	Timeline(3s)	Executions	Actual Rows	Memory (Max)	Temp (Max)	Ot...	IO Requests	IO Bytes	Activity %
[-] PARTITION RANGE ALL		59	1	77		1,008	2,323						
[-] TABLE ACCESS BY LOCAL INDEX ROWID BATCHED	WPTD_DET1	60	1	77		8,064	2,323						100
[-] INDEX RANGE SCAN	IDX_WPTDD_CLTPC_ID	61	161	25		8,064	1,759K						

- ▶ **Oracle choosing wrong index**
  - Number of estimated rows from partition range 1, actual 2323
  - Number of estimated rows 161, actual 1,759k (executions 8064)



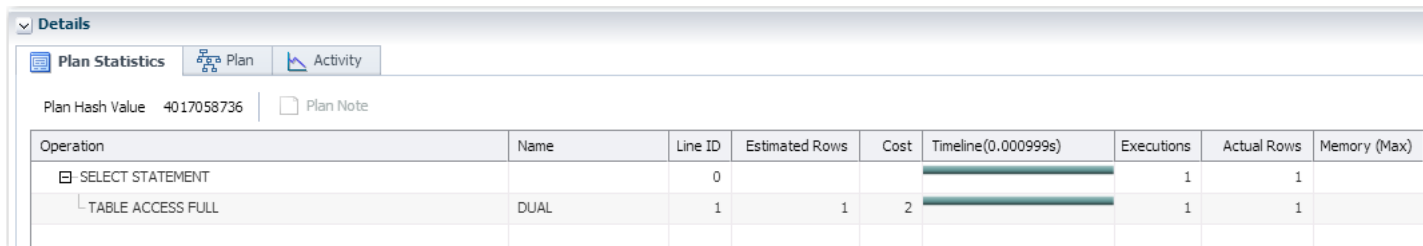
# SQL Monitor

## ▶ Adaptive Plan Hash Value (FULL\_PLAN\_HASH\_VALUE)

- PLAN\_HASH\_VALUE = 272002086
- FULL\_PLAN\_HASH\_VALUE = 4017058736

## ▶ OEM 12c target displays adaptive full plan hash value

- even if not adaptive plan



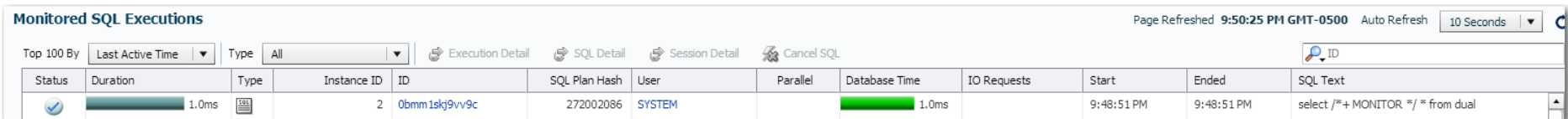
Details

Plan Statistics | Plan | Activity

Plan Hash Value 4017058736 | Plan Note

Operation	Name	Line ID	Estimated Rows	Cost	Timeline(0.000999s)	Executions	Actual Rows	Memory (Max)
SELECT STATEMENT		0				1	1	
TABLE ACCESS FULL	DUAL	1	1	2		1	1	

- First Page and Saved Active Report shows plan\_hash\_value

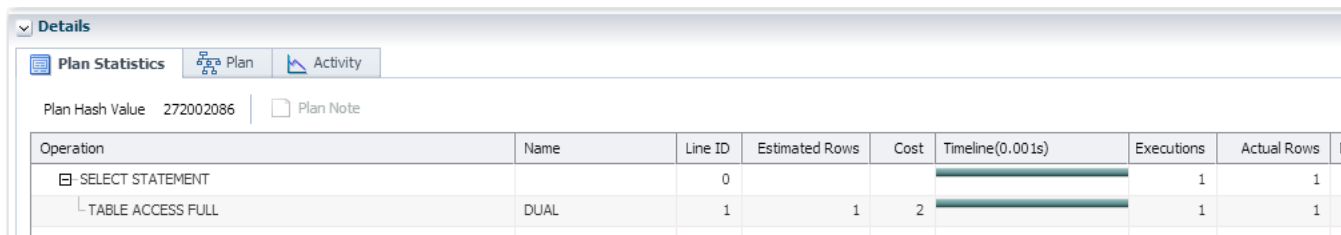


Monitored SQL Executions

Page Refreshed 9:50:25 PM GMT-0500 Auto Refresh 10 Seconds

Top 100 By Last Active Time Type All Execution Detail SQL Detail Session Detail Cancel SQL ID

Status	Duration	Type	Instance ID	ID	SQL Plan Hash	User	Parallel	Database Time	IO Requests	Start	Ended	SQL Text
✓	1.0ms		2	0bmm1skj9vv9c	272002086	SYSTEM		1.0ms		9:48:51 PM	9:48:51 PM	select /*+ MONITOR */ * from dual



Details

Plan Statistics | Plan | Activity

Plan Hash Value 272002086 | Plan Note

Operation	Name	Line ID	Estimated Rows	Cost	Timeline(0.001s)	Executions	Actual Rows	Memory (Max)
SELECT STATEMENT		0				1	1	
TABLE ACCESS FULL	DUAL	1	1	2		1	1	

# What is missing?

- ▶ **Parsing Details, VPD issues**

- 10046 trace

- ▶ **Optimizer “math” as to why a particular plan was chosen**

- alter session set events 'trace[rdbms.SQL\_Optimizer.\*]]sql:mysqlid]';
- 10053 trace