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Mining the AWR v1

Alternative Methods for Identification of the Top SQLs

MARIS ELSINS Lead Database Consultant Pythian

Can you read this?

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Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

"The best zoom lens is your legs." - Ernst Haas









Located in Riga, Latvia Oracle [Apps] DBA since 2005 Speaker at conferences since 2007

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Melsins@pythian.com

http://bit.ly/getMOSPatchV2

PS C:\Users\elsins> java -jar .\getMOSPatch.jar patch=6880880 platform=233P regexp=.*112.* download=all Enter your MOS username: elsins@pythian.com Enter your MOS password:

Enter Comma separated platforms to list: 233P

We're going to download patches for the following Platforms/Languages: 233P - Microsoft Windows ×64 (64-bit)

Processing patch 6880880 for Microsoft Windows x64 (64-bit) and applying regexp .*112.* to the filenames: 1 - p6880880_112000_MSWIN-x86-64.zip Enter Comma separated files to download: all All files will be downloadad because download=all was specified.

Downloading all selected files: Downloading p6880880_112000_M5WIN-x86-64.zip: 46MB at average speed of 8203KB/s - DONE! PS C:\Users\elsins> java -version java version "1.8.0_66" Java(TM) SE Runtime Environment (build 1.8.0_66-b18) Java HotSpot(TM) Client VM (build 25.66-b18, mixed mode, sharing) PS C:\Users\elsins>



Maris Elsins

Lead Database Consultant

At Pythian since 2011

500+ Technical Experts Helping Peers Globally





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- Oracle ACE Director
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ABOUT PYTHIAN

Pythian's 400+ IT professionals help companies adopt and manage disruptive technologies to better compete







EXPERIENCED

11,800

Systems currently managed by Pythian



GLOBAL



Pythian experts in 35 countries

EXPERTS

Millennia of experience gathered and shared over 19 years

2

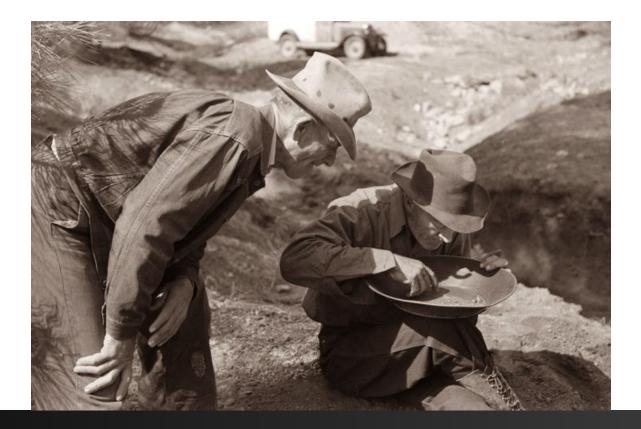


AGENDA A Serious Device





Agenda Panning





Demo







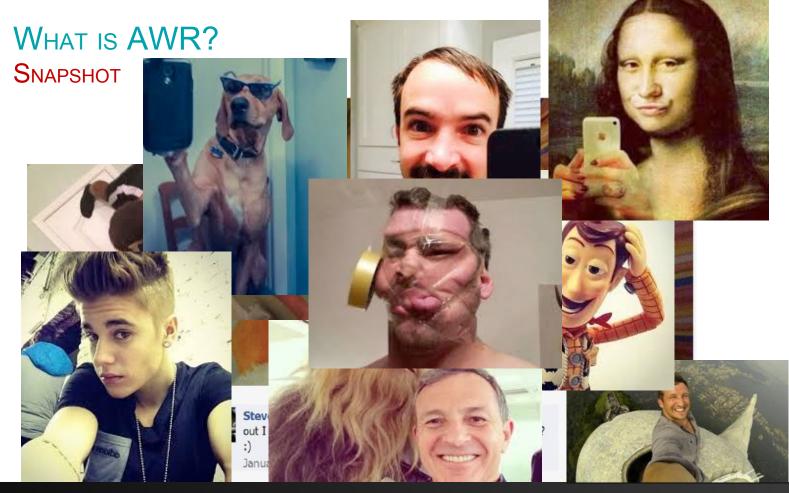




WHAT IS AWR? WORKLOAD









WHAT IS AWR? REPOSITORY





WHAT IS AWR? AWR REPORT



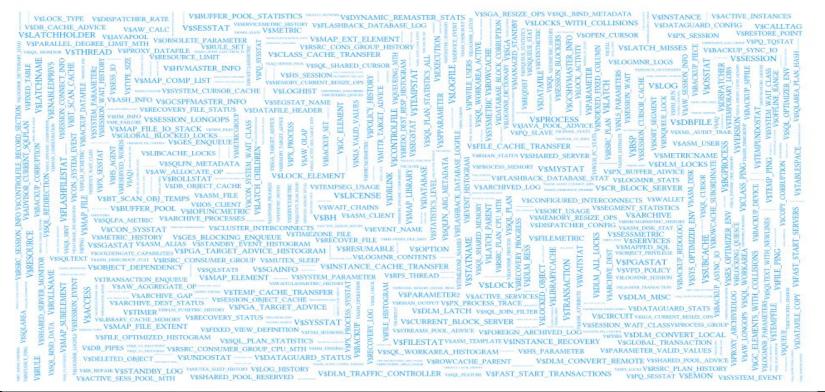


AWR

Automatic Workload Repository Let's try again ...



Workload 768 V\$ (12.1.0.2)





AWR SNAPSHOT 62+ V\$ & X\$

X\$KCBFWAIT **V**\$PROCESS MEMORY X\$KMMSASV\$TABLESPACE **V\$ROWCACHE X**\$KEWMFLMV X\$KEWPDBINSNAP **V\$SYS TIME MODEL** V\$SGASTAT x\$kewrsQlsum X\$KCFIO **V**\$DBFILE X\$KMGSOP V\$QUEUE X\$KEWMDRMV V\$ENQUEUE_STATISTICS V\$MTTR_TARGET_ADVICE X\$KCCTF x\$ksuxsinst x\$kccts v\$LOG x\$ksfQp v\$LATCH v\$wAitstat v\$sga_target_advice x\$kewrsolidtab v\$osstat x\$kcbsc v\$active_services v\$active_services X\$KMMDI V\$BUFFER_POOL_STATISTICS X\$KSPPI V\$PARAMETER X\$KCFTIO
 CMPFILE
 V\$SYSTEM_EVENT

 V\$DATAFILE
 x\$KCBWBPD

 X\$KMMHST
 X\$JAVA_POOL_ADVICE

 X\$KMMHST
 X\$KEWRTSQLTEXT
 V\$TEMPFILE V\$SQL_WORKAREA_HISTOGRAM V\$MEMORY TARGET ADVICE V\$INSTANCE_RECOVERY X\$KEWMEVMV **V**\$PGASTAT X\$KEWRTOPTENV V\$LATCH_MISSES X\$KTTEFINFO X\$KEWMSMDV X\$KCCFN X\$KEWRTSOLPLAN x\$ktusmst2V\$PGA TARGET ADVICE V\$SQL_BIND_CAPTUREX\$KSPPSV



WORKLOAD CAPTURED BY AWR

- <u>Object statistics</u> that determine both access and usage statistics of database segments
- <u>Time model statistics</u> based on time usage for activities, displayed in the V\$SYS_TIME_MODEL and V\$SESS_TIME_MODEL views
- Some of the <u>system and session statistics</u> collected in the V\$SYSSTAT and V\$SESSTAT views
- <u>SQL statements</u> that are producing the highest load on the system, based on criteria such as elapsed time and CPU time
- <u>Active Session History (ASH) statistics</u>, representing the history of recent sessions activity



AWR SNAPSHOT "THE SELFIE"

- MMON or dbms_workload_repository.create_snapshot()
- DBA HIST WR CONTROL

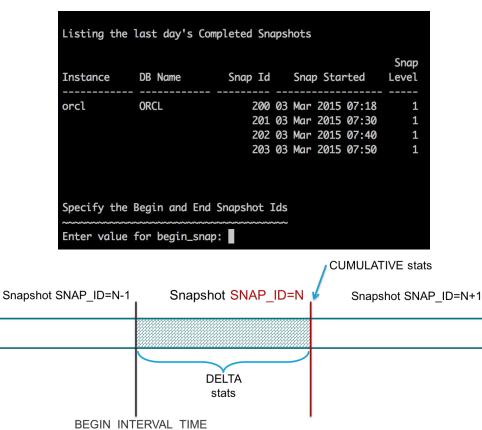
SQL> select * from dba_hist_wr_control;										
DBID	SNAP_INTERVAL	RETENTION	TOPNSQL	CON_ID						
1388947913	+00000 01:00:00.0	+00008 00:00:00.0	DEFAULT	1						

- TOPNSQL "DEFAULT" depends on the STATISTICS_LEVEL
 - TYPICAL => 30 (is this enough?)
 - ALL => 100
- DBMS_WORKLOAD_REPOSITORY
 - Modify settings: MODIFY_SNAPSHOT_SETTINGS
 - Colored SQL: ADD_COLORED_SQL



SNAPSHOT 2 WAYS OF COLLECTING STATISTICS

- DELTAs & TOTALs
 - Captures current values
 - Pre-calculates ∆values
 - DBA_HIST_SQLSTAT
 - DBA_HIST_SEG_STAT
- TOTALs
 - Captures current values
 - Similar to STATSPACK
 - DBA_HIST_IOSTAT_DETAIL and others







- DBA HIST OPTIMIZER ENV ٠
- DBA_HIST_METRIC_NAME ٠
- DBA HIST LATCH NAME ٠
- DBA HIST IOSTAT FUNCTION NAME ٠
- DBA HIST IOSTAT FILETYPE NAME •
- DBA HIST IM SEG STAT OBJ ٠
- DBA HIST EVENT NAME ٠
- DBA HIST DATAFILE ٠
- DBA HIST DATABASE INSTANCE ٠
- DBA HIST COLORED SQL ٠
- DBA HIST CELL METRIC DESC ٠
- DBA HIST CELL IOREASON NAME ٠
- DBA HIST BASELINE TEMPLATE • DBA HIST CELL CONFIG ٠
- DBA HIST BASELINE METADATA •
- DBA HIST BASELINE DETAILS •
- DBA HIST BASELINE •
- DBA HIST ASM DISKGROUP ٠
- REPOSITORY Metadata

- DBA HIST WR CONTROL ٠
- DBA HIST TOPLEVELCALL NAME •
- DBA HIST TEMPFILE •
- DBA HIST TABLESPACE •
- DBA HIST STAT NAME •
- DBA HIST SQL PLAN ٠
- DBA HIST SQL BIND METADATA •
- DBA HIST SQLTEXT •

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- DBA HIST SQLCOMMAND NAME •
- DBA HIST SERVICE NAME •
- DBA HIST SEG STAT OBJ •
- DBA HIST PLAN OPTION NAME • DBA HIST REPORTS CONTROL
- DBA HIST PLAN OPERATION NAME •
- DBA HIST PDB INSTANCE •
- DBA HIST PARAMETER NAME •
- DBA HIST OSSTAT NAME ٠

REPOSITORY SNAP_ID - BASED INFORMATION (105)









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WORKLOAD REPOSITORY report for

DB Name	DB Id	Instance	Inst num		Startup Time	Release	RAC
ORCL	1388947913	orcl		1 17-Oct	-14 08:10	12.1.0.1.0	NO
Host Name	e Pla	tform	CPUs	Cores	Sockets	Memor	y (GB)
DB12c.maris.lv	Linux x86 64	l-bit	4		4	1	7.80

	Snap Id	Snap Time	Sessions	Cursors/Session	Pluggable Databases Open
Begin Snap:	24	19-Oct-14 10:39:43	47	2.7	1
End Snap:	50	19-Oct-14 14:51:00	46	3.0	1
Elapsed:		251.29 (mins)			
DB Time:		136.69 (mins)			

Report Summary

Load Profile

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	0.5	0.0	0.00	0.00
DB CPU(s):	0.4	0.0	0.00	0.00
Redo size (bytes):	195,940.0	4,352.1		
Logical read (blocks):	4,327.6	96.1		
Block changes:	1,080.1	24.0		
Physical read (blocks):	10.9	0.2		
Physical write (blocks):	116.2	2.6		
Read IO requests:	10.1	0.2		
Write IO requests:	52.8	1.2		



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Main Report		
 Report Summary Wait Events Statistics SQL Statistics Instance Activity Statistics IO Stats Buffer Pool Statistics Advisory Statistics Vait Statistics Undo Statistics Undo Statistics Latch Statistics Segment Statistics Dictionary Cache Statistics Ibrary Cache Statistics Replication Statistics Resource Limit Statistics Shared Server Statistics ADDM Reports 		
Back to Top		
Wait Events Statistics		
 <u>Time Model Statistics</u> <u>Operating System Statistics</u> <u>Operating System Statistics - Detail</u> <u>Foreground Wait Class</u> <u>Foreground Wait Events</u> <u>Background Wait Events</u> 		
		Dythia



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SQL Statistics

- SQL ordered by Elapsed Time
- SQL ordered by CPU Time
- SQL ordered by User I/O Wait Time
- SQL ordered by Gets
- SQL ordered by Reads
- SQL ordered by Physical Reads (UnOptimized)
- SQL ordered by Executions
- SQL ordered by Parse Calls
- SQL ordered by Sharable Memory
- SQL ordered by Version Count
- Complete List of SQL Text

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SQL ordered by Elapsed Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- % Total DB Time is the Elapsed Time of the SQL statement divided into the Total Database Time multiplied by 100
- %Total Elapsed Time as a percentage of Total DB time
- %CPU CPU Time as a percentage of Elapsed Time
- %IO User I/O Time as a percentage of Elapsed Time
- Captured SQL account for 23.6% of Total DB Time (s): 8,202
- Captured PL/SQL account for 52.2% of Total DB Time (s): 8,202

Elapsed Time (s)	Executions	Elapsed Time per Exec (s)	%Total	%CPU	%IO	SQL Id	SQL Module	PDB Name	SQL Text
2,517.16	231,889	0.01	30.69	117.85	0.08	0w2qpuc6u2zsp		SAMPLE	BEGIN :1 := orderentry.neworde
1,260.33	290,416	0.00	15.37	117.13	0.01	147a57cxq3w5y	Swingbench User Thread	SAMPLE	BEGIN :1 := orderentry.browsep
579.62	695,504	0.00	7.07	107.77	0.01	c13sma6rkr27c	New Order	SAMPLE	SELECT PRODUCTS.PRODUCT_ID, PR
298.92	86,872	0.00	3.64	95.37	0.24	01jzc2mg6cg92	Update Customer Details	SAMPLE	BEGIN :1 := orderentry.newcust
177.66	595,365	0.00	2.17	103.29	0.53	f7rxuxzt64k87	New Order	SAMPLE	INSERT INTO ORDER_ITEMS (ORDE
127.14	638,465	0.00	1.55	69.59	0.00	gzhkw1qu6fwxm	Browse Products	SAMPLE	INSERT INTO LOGON (LOGON_ID, C



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SQL ordered by CPU Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- %Total CPU Time as a percentage of Total DB CPU
- %CPU CPU Time as a percentage of Elapsed Time
- %IO User I/O Time as a percentage of Elapsed Time
- Captured SQL account for 26.0% of Total CPU Time (s): 6,611
- Captured PL/SQL account for 74.7% of Total CPU Time (s): 6,611

CPU Time (s)	Executions	CPU per Exec (s)	%Total	Elapsed Time (s)	%CPU	%IO	SQL Id	SQL Module	PDB Name	SQL Text
2,966.52	231,889	0.01	44.87	2,517.16	117.85	0.08	0w2qpuc6u2zsp		SAMPLE	BEGIN :1 := orderentry.neworde
1,476.17	290,416	0.01	22.33	1,260.33	117.13	0.01	147a57cxq3w5y	Swingbench User Thread	SAMPLE	BEGIN :1 := orderentry.browsep
624.63	695,504	0.00	9.45	579.62	107.77	0.01	c13sma6rkr27c	New Order	SAMPLE	SELECT PRODUCTS.PRODUCT_ID, PR
285.07	86,872	0.00	4.31	298.92	95.37	0.24	01jzc2mg6cg92	Update Customer Details	SAMPLE	BEGIN :1 := orderentry.newcust
183.50	595,365	0.00	2.78	177.66	103.29	0.53	f7rxuxzt64k87	New Order	SAMPLE	INSERT INTO ORDER_ITEMS (ORDE
90.75	231,877	0.00	1.37	122.99	73.79	0.05	3fw75k1snsddx	New Order	SAMPLE	INSERT INTO ORDERS (ORDER_ID,
88.48	638,465	0.00	1.34	127.14	69.59	0.00	gzhkw1qu6fwxm	Browse Products	SAMPLE	INSERT INTO LOGON (LOGON_ID, C
85.47	29,082	0.00	1.29	83.98	101.78	1.48	apgb2g9q2zjh1		SAMPLE	BEGIN :1 := orderentry.browsea
68.70	57,765	0.00	1.04	64.34	106.77	0.15	cmndgkbkcz5s9		SAMPLE	BEGIN :1 := orderentry.updateC
58.68	86,873	0.00	0.89	54.87	106.94	0.92	gh2g2tynpcpv1	Update Customer Details	SAMPLE	INSERT INTO CUSTOMERS (CUSTOM

Back to SQL Statistics

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SQL ordered by User I/O Wait Time

- Resources reported for PL/SQL code includes the resources used by all SQL statements called by the code.
- %Total User I/O Time as a percentage of Total User I/O Wait time
- %CPU CPU Time as a percentage of Elapsed Time
- %IO User I/O Time as a percentage of Elapsed Time
- Captured SOL account for 46 0% of Total Llear I/O Mait Time (c): 11



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SQL ordered by Reads

- %Total Physical Reads as a percentage of Total Disk Reads
- %CPU CPU Time as a percentage of Elapsed Time
- %IO User I/O Time as a percentage of Elapsed Time
- Total Disk Reads: 164,118
- Captured SQL account for 82.6% of Total

Physical Reads	Executions	Reads per Exec	%Total	Elapsed Time (s)	%CPU	%IO	SQL Id	SQL Module	PDB Name	SQL Text
58,971	231,889	0.25	35.93	2,517.16	117.85	0.08	0w2qpuc6u2zsp		SAMPLE	BEGIN :1 := orderentry.neworde
38,878	29,082	1.34	23.69	83.98	101.78	1.48	apgb2g9q2zjh1		SAMPLE	BEGIN :1 := orderentry.browsea
26,787	595,365	0.04	16.32	177.66	103.29	0.53	f7rxuxzt64k87	New Order	SAMPLE	INSERT INTO ORDER_ITEMS (ORDE
24,590	29,081	0.85	14.98	8.57	61.02	9.75	7t0959msvyt5g	Browse and Update Orders	SAMPLE	SELECT ORDER_ID, ORDER_DATE, O
22,116	86,872	0.25	13.48	298.92	95.37	0.24	01jzc2mg6cg92	Update Customer Details	SAMPLE	BEGIN :1 := orderentry.newcust
18,987	260,969	0.07	11.57	29.34	80.77	1.98	g81cbrq5yamf5	New Order	SAMPLE	SELECT ADDRESS_ID, CUSTOMER_ID
15,273	86,873	0.18	9.31	54.87	106.94	0.92	gh2g2tynpcpv1	Update Customer Details	SAMPLE	INSERT INTO CUSTOMERS (CUSTOM
10,522	13,459	0.78	6.41	3.36	104.01	8.88	<u>1qf3b7a46jm3u</u>	Browse and Update Orders	SAMPLE	SELECT ORDER_ID, LINE_ITEM_ID,
8,142	231,903	0.04	4.96	21.61	99.31	1.18	7ws837zynp1zv	New Order	SAMPLE	SELECT CARD_ID, CUSTOMER_ID, C
6,981	29,213	0.24	4.25	53.92	97.47	0.46	a9gvfh5hx9u98	Swingbench User Thread	SAMPLE	BEGIN :1 := orderentry.process
4,454	638,509	0.01	2.71	73.01	73.04	0.21	5ckxyqfvu60pj	Browse Products	SAMPLE	SELECT CUSTOMER_ID, CUST_FIRST
4,249	29,209	0.15	2.59	16.18	67.91	1.06	f9u2k84v884y7	Process Orders	SAMPLE	UPDATE /*+ index(orders, order
3,644	96,723	0.04	2.22	29.14	100.77	0.41	9t3n2wpr7my63	Update Customer Details	SAMPLE	INSERT INTO ADDRESSES (ADDRES
3,609	86,873	0.04	2.20	30.22	91.02	0.35	budtrjayjnvw3	Update Customer Details	SAMPLE	INSERT INTO CARD_DETAILS (CAR
3,449	290,416	0.01	2.10	1,260.33	117.13	0.01	147a57cxq3w5y	Swingbench User Thread	SAMPLE	BEGIN :1 := orderentry.browsep
2,811	57,765	0.05	1.71	64.34	106.77	0.15	cmndgkbkcz5s9		SAMPLE	BEGIN :1 := orderentry.updateC
2,733	29,213	0.09	1.67	7.58	77.23	1.05	7hk2m2702ua0g	Process Orders	SAMPLE	WITH NEED_TO_PROCESS AS (SELEC
2,319	695,504	0.00	1.41	579.62	107.77	0.01	c13sma6rkr27c	New Order	SAMPLE	SELECT PRODUCTS.PRODUCT_ID, PR
2,304	57,755	0.04	1.40	7.33	69.36	1.03	8zz6y2yzdqjp0	Update Customer Details	SAMPLE	SELECT CUSTOMER_ID, CUST_FIRST
1,734	231,877	0.01	1.06	122.99	73.79	0.05	<u>3fw75k1snsddx</u>	New Order	SAMPLE	INSERT INTO ORDERS (ORDER_ID,



() ()

AWR REPORT

- "SQL Statistics" section is aggregated by SQL_ID
- Do you know what's cost about SQL_ID?
 It uniquely identifies a SQL conternent
- Do you know what's bad about SQL_ID?
 - It uniquely identifies a SQL statement



SQL ID AND OTHER IDENTIFICATION METHODS

DEMO - identification_demo.sql



0 0 0 [oracle@DB12c AWR MINING3]\$ [oracle@DB12c AWR MINING3]\$ sqlplus / as sysdba SQL*Plus: Release 12.1.0.1.0 Production on Thu Oct 22 05:33:53 2015 Copyright (c) 1982, 2013, Oracle. All rights reserved. Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options SQL> @identification demo.sql SQL> SQL> SQL> alter system flush shared_pool; System altered. SQL> / System altered. SQL> /

System altered.

SQL> alter session set container = sample;

Session altered.

SQL>
SQL> -- Take a look at different SQL_IDs!
SQL> pause



```
0 0 0
                                                         melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35
Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
SQL> @identification_demo.sql
SQL>
SQL>
SQL> alter system flush shared pool;
System altered.
SQL> /
System altered.
SQL> /
System altered.
SQL> alter session set container = sample;
Session altered.
SQL>
SQL> -- Take a look at different SQL_IDs!
SQL> pause
SQL>
SQL> select /*testquery*/ count(*) from oe.orders;
  COUNT(*)
-----
       105
SQL> pause
```



0 • •	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35
SQL> /	
System altered.	
SQL> /	
System altered.	
SQL> alter session set container = sample;	
Session altered.	
SQL> SQL> Take a look at different SQL_IDs! SQL> pause	
<pre>SQL> SQL> select /*testquery*/ count(*) from oe.orders;</pre>	
COUNT(*)	
105	
SQL> pause	
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_len	gth from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.or	ders 44
SQL> pause	



0 0	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
SQL> alter session set container = sample;		
Session altered.		
SQL> SQL> Take a look at different SQL_IDs! SQL> pause		
SQL> SQL> select /*testquery*/ count(*) from oe.orders;		
COUNT(*)		
105		
SQL> pause		
SQL>		
SQL> select sql_id, sql_text, length(sql_text) sql_leng	th from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_L	OAD_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.ord	ers 44	
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;		
COUNT(*)		
105		
SQL> pause		



0 😐 🔍	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170	×35	
COUNT(*) 105			
SQL> pause			
SQL> SQL> select	<pre>sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%'</pre>	order by LAST_LOAD_TIME;	
SQL_ID	SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dc	/ select /*testquery*/ count(*) from oe.orders	44	
SQL> pause			
SQL> SQL> SELECT	/*testquery*/ COUNT(*) FROM OE.ORDERS;		
COUNT(*) 105			
SQL> pause			
SQL> SQL> select	sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%'	order by LAST_LOAD_TIME;	
SQL_ID	SQL_TEXT	SQL_LENGTH	
	/ select /*testquery*/ count(*) from oe.orders 3 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44 44	

SQL> pause



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SQL_ID	SQL_TEXT		SQL_LENGTH
f3jjwdqz71dcy	<pre>select /*testquery*/ count(*) from oe.ord</pre>		44
SQL> pause			
SQL> SQL> SELECT ,	<pre>*testquery*/ COUNT(*) FROM OE.ORDERS;</pre>		
COUNT(*) 105			
SQL> pause			
SQL> SQL> select s	ql_id, sql_text, length(sql_text) sql_leng	th from v\$sql where sql_text like '%/*test' 'query%*/%' or	rder by LAST_LOAD_TIME;
SQL_ID	SQL_TEXT		SQL_LENGTH
	<pre>select /*testquery*/ count(*) from oe.ord SELECT /*testquery*/ COUNT(*) FROM OE.ORD</pre>	ers	44 44
SQL> pause			
SQL> SQL> SELECT ,	<pre>*testquery*/ COUNT(*) FROM OE.ORDERS</pre>	;	
COUNT(*)			
105			
SQL> pause			



● ● ● @ ① melsins — oracle@DB12c:~/AWR_MINING3 — ssh ora	acle@199.199.56.111 — 170×35	
105		
SQL> pause		
SQL>		
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*t	test' 'query%*/%' order by LAST_LOAD_TIME;	
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders	44	
<pre>fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS</pre>	44	
SQL> pause		
Sec. Pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS ;		
COUNT(*)		
105		
SQL> pause		
SQL>		
SQL> select sql id, sql text, length(sql text) sql length from v\$sql where sql text like '%/*t	test' 'query%*/%' order by LAST LOAD TIME;	
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders	44	
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44	
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54	
SQL> pause		



f3jjwdqz7ldcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqawd553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 SQL> pause 5QL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS ;		melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35
SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS ; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_ength from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_Select sql_id, sql_text, length(sql_text) sql_ength from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 73jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 SQL> pause SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;		44
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS ; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 SQL> pause SQL> pause SQL> pause SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;	SQL> pause	
105 SQL> pause SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwldqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 SQL> pause SQL> SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS; 54		;
SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT	COUNT(*)	
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 	105	
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_LENGTH f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders f44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS SQL> pause SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;	SQL> pause	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 SQL> pause SQL> select /*testquery*/ COUNT(*) FROM OE.ORDERS;		from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME;
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders44fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS447ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS54SQL> pauseSQL>SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;54	SQL_ID SQL_TEXT	SQL_LENGTH
SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;	f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44 44
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;	SQL> pause	
	•	
COUNT(*)	COUNT(*)	
105	105	
SQL> pause	SQL> pause	



	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
SQL> pause		
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length	rfrom v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD المعالية المعالية المعالية المعالية ا	D_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.order fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDER 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDER	rs 44 IS 44	
SQL> pause		
SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;		
COUNT(*)		
105		
SQL> pause		
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length	a from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD	D_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.order fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDER 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDER 5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.OR	Ys 44 VS 44 VS 54	



0 • •	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
<pre>fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE</pre>	RS 44	
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE	RS 54	
•		
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS;		
COUNT(*)		
105		
105		
SQL> pause		
SQL> pause		
SQL>		
	h = 1	OAD TIME.
SOLS RELECT RATTA' RATTERY TENRILLAND ATTENRI	h from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_U	LOAD_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orde		
<pre>fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE</pre>		
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE		
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.C	RDERS 47	
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE	1=1;	
COUNT(*)		
105		
SQL> pause		



SQL>

SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test'||'query%*/%' order by LAST_LOAD_TIME;

SQL_ID	SQL_TEXT	SQL_LENGTH
fh24xkqaw055 7ufgv9vacpz8	y select /*testquery*/ count(*) from oe.orders 3 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44 44 54
5r3bkn8z76sq	5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47

SQL> pause

SQL>

SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1;

COUNT(*)

105

SQL> pause

SQL>

SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test'||'query%*/%' order by LAST_LOAD_TIME;

SQL_ID	SQL_TEXT	SQL_LENGTH
fh24xkqaw055 7ufgv9vacpz8 5r3bkn8z76sq	/ select /*testquery*/ count(*) from oe.orders 3 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS L SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	44 44 54 47 54



O T medias — oracle@DB12c=/AWR_MINING3 — sub oracle@193.199.56.111 — 170-35 SQL> pause 47 SQL> pause 50.5 SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1; 50.5 COUNT(*)				
SQL> pause SQL> SQL> SQL> SQL>SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1; COUNT(*) 105 SQL>pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_ength from v\$sql where sql_text like '%/*test' 'query%/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdq271dcy select /*testquery*/ count(*) from 0e.orders f44 f124xKqaw0533 SELECT /*testquery*/ count(*) from 0e.ORDERS SGL=S SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS SGL=S SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS SGL=SQL_SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 SQL_SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 SQL> pause SQL> SQL> SQL=CT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 SQL> pause				
SQL> SQL>SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL> SQL>Select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 73j]Wq271dcy select /*testquery*/ COUNT(*) from 0e.orders 44 71dfgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 573bKR276sq5 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE order_id>-1; COUNT(*) 	5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM	OE.ORDERS	47	
SQL> SQL>SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL> SQL>Select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 73j]Wq271dcy select /*testquery*/ COUNT(*) from 0e.orders 44 71dfgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 573bKR276sq5 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE order_id>-1; COUNT(*) 				
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_ength from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_ENOTH f3j]Wdq27Idcy select /*testquery*/ count(*) from oe.orders f44 f42x4kqaw653 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS SQL> pause SQL> pause	SQL> pause			
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1; COUNT(*) 105 SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_ength from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_ENOTH f3j]Wdq27Idcy select /*testquery*/ count(*) from oe.orders f44 f42x4kqaw653 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS SQL> pause SQL> pause				
COUNT(*) 105 SQL> pause SQL> SQL_status SQL_ID SQL_TEXT SQL_SS SELECT /*testquery*/ count(*) from oe.orders 44 f3jjwdq271dcy select /*testquery*/ count(*) FROM 0E.ORDERS 44 f24/synapse SSLECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 50L> pause SQL> pause SQL> SQL> pause SQL> COUNT(*) FROM 0E.ORDERS 50L> SQL> pause SQL> SQL> SQL> SQL> SQL> SQL> SQL SQL SQL SQL SQL> SQ	•			
105 SQL> pause SQL> SQL_select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT	SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	S WHERE 1=1;		
105 SQL> pause SQL> SQL_select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT				
SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdq271dcy select /*testquery*/ count(*) from oe.orders 44 7ufgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 Sr3bkm8276sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 	COUNT(*)			
SQL> pause SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdq271dcy select /*testquery*/ count(*) from oe.orders 44 7ufgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 Sr3bkm8276sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 				
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 	105			
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH 	501			
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqawe553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 Jrufgv9vacz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 Sr3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 	SQL> pause			
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME; SQL_ID SQL_TEXT SQL_LENGTH f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 Jrufgv9vacz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 Sr3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 	SOL			
SQL_ID SQL_TEXT SQL_LENGTH f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 f424xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 7ufgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 5r3bn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; 105		-] length (new ofter] there are the		
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 44 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 573bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> pause SQL> select /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE order_id>-1; COUNT(*) 	SUL> SELECT SQL_10, SQL_TEXT, LENGTH(SQL_TEXT) SC	qi_iength from v\$sqi where sql_text	like %/"test query%*/%" order by LASI_LUAD_IIME;	
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 44 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 573bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> pause SQL> select /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE order_id>-1; COUNT(*) 				
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders 44 fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 44 7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 54 5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE 1=1 54 SQL> pause SQL> pause SQL> SELECT /*testquery*/ COUNT(*) FROM 0E.ORDERS WHERE order_id>-1; 	ZÁRTIN ZÁRTIEXI			
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44 7ufgv9vacp285 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause 52 SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; 54	f3ijwdaz71dcv select /*testquerv*/ count(*) from			
7/ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54 5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause 54 SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) FROM OE.ORDERS WHERE order_id>-1;				
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47 bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause 52 SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; 50 COUNT(*) FROM OE.ORDERS WHERE order_id>-1; 105 105				
<pre>bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54 SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*)</pre>				
SQL> pause SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 105				
<pre>SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 105</pre>	DCr3qj4vmuzji Seleci /*testquery*/ COUNI(*) FROM	UE. OKDERS WHERE I=I	54	
<pre>SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 105</pre>				
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 105	SQL> pause			
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1; COUNT(*) 105	SOLN			
COUNT(*) 105	-	C WEDE onder id. 1.		
105	SULA SELECT / "TESTQUERY"/ COUNT(") FROM DE.ORDERS	S WHERE Order_10>-1;		
105	COUNT(*)			
	105			
SQL> pause	102			
	Ser pause			



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SQL_ID	SQL_TEXT	SQL_LENGTH
	cy select /*testquery*/ count(*) from oe.orders	44
	53 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
U 1	85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
	q5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
bcr3qj4vmuz	j1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
SQL> pause		
SQL>		
-	<pre>/*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1;</pre>	
COUNT(*)		
105		
102		
SQL> pause		
SQL>	sql id, sql text, length(sql text) sql length from v\$sql where sql text like '%	/*test'll'auenv%*/%' order by LAST LOAD TIME.
JALN PETECC	sqr_rd, sqr_text, rength(sqr_text) sqr_rength from vasqr where sqr_text rike %	These is query with order by LAST_LOAD_TIME,
SQL_ID	SQL_TEXT	SQL_LENGTH
f3iiwdaz71d	cy select /*testquery*/ count(*) from oe.orders	44
55 1	53 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
•	85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76s	q5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
	A CELECE (4) A A COUNT(4) FROM OF ORDERS AND A	
bcr3qj4vmuz	j1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54



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The sins — oracle@DB12C:~/AWR_MINING3 — ss	n oracle@199.199.56.111 — 170×35
SQL> SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1;	
COUNT(*)	
105	
SQL> pause	
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '9	%/*test' 'query%*/%' order by LAST_LOAD_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders	44
<pre>fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS</pre>	44
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
<pre>bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order id>-1</pre>	54 62
by pucket debut select / testquery (count() PROM be.orders where of def_id>-i	62
6 rows selected.	
SQL> pause	
SQL>	
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000;	
COUNT(*)	
105	
SQL> pause	



• • • • • • • • • • • • • • • • • • •	
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
6 rows selected.	
SQL> pause	
SQL>	
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000;	
COUNT(*)	
105	
SQL> pause	
SQL>	LACT LOAD TINE.
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by	LASI_LOAD_TIME;
SQL ID SQL TEXT SQL	LENGTH
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders	44
fh24xkgaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
<pre>byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order id>-1</pre>	62
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order id>-1000	65



● ●	
105	
SQL> pause	
SQL> SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_LOAD_TIME;	
SQL_ID SQL_TEXT SQL_LENGTH	
f3jjwdgz71dcy select /*testquery*/ count(*) from oe.orders 44	
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 44	
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 54	
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 47	
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 54	
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1 62	
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000 65	
7 rows selected.	
SQL7 hause	
S0L>	
SQL> var a number	
SQL> var b number	
SQL> exec :a:=-1	
PL/SQL procedure successfully completed.	
SQL> exec :b:=-1	
PL/SQL procedure successfully completed.	
SQL> pause	



0 0 0

f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orders	44
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65

7 rows selected.

SQL> pause

SQL> SQL> var a number SQL> var b number SQL> exec :a:=-1

PL/SQL procedure successfully completed.

SQL> exec :b:=-1

PL/SQL procedure successfully completed.

SQL> pause

SQL>

SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a;

COUNT(*)

105



0 • •	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
PL/SQL procedure successfully completed.		
SQL> exec :b:=-1		
PL/SQL procedure successfully completed.		
PL/SQL procedure successfully completed.		
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHER	E order_id>:a;	
COUNT(*)		
COUNT(*)		
105		
SQL> pause		
SQL>		
SQL> select sql_id, sql_text, length(sql_text) sql_len	gth from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_	LOAD_TIME;
SQL ID SQL TEXT	SQL LENGTH	4
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.or	ders 44	L
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.OR	DERS 44	L
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.OR		
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE		
<pre>bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.OR</pre>		
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.OR	—	
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.OR 2jxwr5vdfp1zv SELECT /*testquery*/ COUNT(*) FROM OE.OR		
2JAW Starpize Select / Lestquery / Count(*) FROM DE.OR		



0 🛛 🗶	The melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHEF		
COUNT(*)		
105		
105		
SQL> pause		
SQL>	gth from v\$sql where sql_text like '%/*test' 'query%*/%' order by LAST_	LOAD TIME
SQL Select Sql_iu, Sql_text, length(sql_text) sql_ier	gth from vasdi where sdi_text like %/ test [] duery%//% order by tAST_	LOAD_TIME,
SQL_ID SQL_TEXT	SQL_LENGTH	
<pre>f3jjwdqz71dcy select /*testquery*/ count(*) from oe.or fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.OF</pre>		
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.OF		
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OF		
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.OF		
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.OF		
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.OF		
2jxwr5vdfp1zv SELECT /*testquery*/ COUNT(*) FROM OE.OF	DERS WHERE order_id>:a 62	
8 rows selected.		
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHEE	E order_id>:b;	
COUNT(*)		
105		
105		
SQL> pause		



0 • •	nelsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE	RS WHERE order_id>-1000	65
2jxwr5vdfp1zv SELECT /*testquery*/ COUNT(*) FROM OE.ORDE	RS WHERE order_id>:a	62
8 rows selected.		
SQL> pause		
SQL>		
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE	order_id>:b;	
COUNT(*)		
105		
SQL> pause		
SQL>	h from v\$sql where sql text like '%/*test' 'query%*/%' order by L	ACT LOAD TIME.
SQL> Select Sql_id, Sql_text, length(sql_text) sql_tengt	n from v\$sqi where sqi_text like %/*test query%*/% order by L	ASI_LOAD_TIME;
SQL_ID SQL_TEXT	SQL LE	NGTH
f3jjwdqz71dcy select /*testquery*/ count(*) from oe.orde	rs	44
fh24xkgaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE		44
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORD		54
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.C		47
<pre>bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE</pre>		54
<pre>byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDE</pre>	RS WHERE order_id>-1	62
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDE	RS WHERE order_id>-1000	65
2jxwr5vdfp1zv SELECT /*testquery*/ COUNT(*) FROM OE.ORDE	RS WHERE order_id>:a	62
f90ycm0wk1urp SELECT /*testquery*/ COUNT(*) FROM OE.ORDE		62



0 • •	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170	×35
SQL> pause		
SQL> SQL> SELECT	/*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b;	
COUNT(*)		
105		
SQL> pause		
SQL> SQL> select	sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*/%'	order by LAST_LOAD_TIME;
SQL_ID	SQL_TEXT	SQL_LENGTH
f3jjwdqz71dc	y select /*testquery*/ count(*) from oe.orders	44
fh24xkqaw055	3 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz8	5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
	5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
	1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
	r SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
	5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65
	<pre>v SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a</pre>	62
+90ycm0wk1ur	p SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
9 rows selec	ted.	
SQL> pause		
SOL>		
•	ou know of any other SQL identification methods?	
SQL> pause		



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SQL>	
SQL> SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b;	
COUNT(*)	
105	
SQL> pause	
SOL>	
SQL> select sql_id, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%	/*test' 'query%*/%' order by LAST_LOAD_TIME;
SQL_ID SQL_TEXT	SQL_LENGTH
f3ijwdaz71dcy select /*testquery*/ count(*) from oe.orders	44
fh24xkqaw0553 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz85 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
byypbc0t7q2br SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
5r3bkn8z76sq5 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
bcr3qj4vmuzj1 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
9kj5umranz695 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65
2jxwr5vdfp1zv SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a	62
f90ycm0wk1urp SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
9 rows selected.	
S TOWS SElected.	
SQL> pause	
SQL>	
SQL> Do you know of any other SQL identification methods?	
SQL> pause	
SQL> What about EXACT MATCHING SIGNATURE?	
SQL> What about EXACT_MATCHING_SIGNATORE?	
Jer pause	



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SQL> pause	
SQL> SQL> Do you know of any other SQL identification methods? SQL> pause	
SQL> What about EXACT_MATCHING_SIGNATURE? SQL> pause	
SQL> SQL> break on EXACT MATCHING SIGNATURE duplicates skip 1	
SQL> select sql id, exact matching signature, sql text, length(sql text) sql length from v\$sql where sql text like '%/*test'	'querv%*/%' order by 2. AST LOAD TIME:
SQL_ID EXACT_MATCHING_SIGNATURE SQL_TEXT	SQL_LENGTH
bcr3qj4vmuzj1 1917735050037348462 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
f90ycm0wk1urp 5642286950026349691 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
9kj5umranz695 6861089955825787148 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order id>-1000	65
	05
f3jjwdqz71dcy 7560235921535299854 select /*testquery*/ count(*) from oe.orders	44
fh24xkqaw0553 7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz85 7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5 7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
2jxwr5vdfp1zv 13805308688061585668 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a	62
byypbc0t7q2br 15411379419093560071 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62



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0 0 0	👚 melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
SQL> pause		
SOLS What about	t EXACT MATCHING SIGNATURE?	
SQL> pause		
SQL>		
	CT_MATCHING_SIGNATURE duplicates skip 1	
SQL> select sql_1	d, exact_matching_signature, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'q	uery%*/%' order by 2, LAST_LOAD_TIME;
SQL_ID EX	ACT_MATCHING_SIGNATURE SQL_TEXT	SQL_LENGTH
bcr3qj4vmuzj1	1917735050037348462 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
f90ycm0wk1urp	5642286950026349691 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
9kj5umranz695	6861089955825787148 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65
5		
f3jjwdqz71dcy	7560235921535299854 select /*testquery*/ count(*) from oe.orders	44
fh24xkqaw0553	7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	44
7ufgv9vacpz85	7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	54
5r3bkn8z76sq5	7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47
2jxwr5vdfp1zv	13805308688061585668 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order id>:a	62
byypbc0t7q2br	15411379419093560071 SELECT /*testquery*/ COUN⊤(*) FROM OE.ORDERS WHERE order_id>-1	62
9 rows selected.		
SQL> pause		
SQL>	have beard of FORCE MATCHING STONATURE too	
SQL> pause	have heard of FORCE_MATCHING_SIGNATURE too	
Ser pause		



0 0 0	👚 melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
9 rows selected.		
SQL> pause		
SQL> SQL> You must ha SQL> pause	ve heard of FORCE_MATCHING_SIGNATURE too	
-	_MATCHING_SIGNATURE duplicates skip 1; force_matching_signature, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'que	ery%*/%' order by 2, 3, LAST_LOAD_TIME;
SQL_ID FORC	E_MATCHING_SIGNATURE_SQL_TEXT	SQL_LENGTH
f90ycm0wk1urp	5642286950026349691 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
5r3bkn8z76sq5 fh24xkqaw0553 7ufgv9vacpz85	7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 7560235921535299854 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS	47 44 54 44
f3jjwdqz71dcy byypbc0t7q2br	7560235921535299854 select /*testquery*/ count(*) from oe.orders 8639627088589992892 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
9kj5umranz695	8639627088589992892 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65
	13805308688061585668 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a	62 54



0 •	melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35	
SQL> SQL> You must have heard of FORCE_MATCHING_SIGNATUR SQL> pause	E too	
SQL>		
SQL> clear breaks		
SQL> break on FORCE_MATCHING_SIGNATURE duplicates skip SOL> select sal id. force matching signature. sal text]; , length(sql text) sql length from v\$sql where sql text like '%/*test' 'qu	uerv%*/%' order by 2. 3. LAST LOAD TIME:
	,	
SQL_ID FORCE_MATCHING_SIGNATURE SQL_TEXT		SQL_LENGTH
f90ycm0wk1urp 5642286950026349691 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b	62
5r3bkn8z76sq5 7560235921535299854 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS	47
fh24xkqaw0553 7560235921535299854 SELECT /*testq		44
7ufgv9vacpz85 7560235921535299854 SELECT /*testq		54
f3jjwdqz71dcy 7560235921535299854 select /*testq	uery*/ count(*) from oe.orders	44
byypbc0t7q2br 8639627088589992892 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1	62
9kj5umranz695 8639627088589992892 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1000	65
2jxwr5vdfp1zv 13805308688061585668 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS WHERE order id>:a	62
2JXWr5vdTp12v 13805308688061585668 SELECT /*testq	uery (COUNT(*) FROM DE.ORDERS WHERE Order_10>:a	62
bcr3qj4vmuzj1 15184701051591850165 SELECT /*testq	uery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1	54
9 rows selected.		
SQL> pause		
SQL>		

SQL> SQL> -- This doesn't really identify the SQL statement, but take a look what happens if we group them by PLAN_HASH_VALUE SQL> pause



0 😐	↑ melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35		
bcr3qj4vmuzj1	15184701051591850165 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1		54
9 rows selected.			
SQL> pause			
SQL> SQL> This doe SQL> pause	esn't really identify the SQL statement, but take a look what happens if we group them by PLAN_HASH_VAL	UE	
	ks _AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'd	query%*/%' order by 2, 4, L	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_	_AN_HASH_VALUE duplicates skip 1;	query%*/%' order by 2, 4, L SQL_LENGTH	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL	_AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'o _AN_HASH_VALUE SQL_TEXT		AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL F3jjwdqz71dcy	_AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'o	SQL_LENGTH	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL 	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL 	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH 44 44 47 54	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL F3jjwdqz71dcy Fh24xkqaw0553 Sr3bkn8z76sq5 Zufgv9vacpz85	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH 44 44 47	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL F3jjwdqz71dcy fh24xkqaw0553 5r3bkn8z76sq5 7ufgv9vacpz85 bcr3qj4vmuzj1	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH 44 44 47 54	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_ SQL_ID PL 	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH 44 44 47 54 54	AST_LOAD_TIM
SQL> clear break SQL> break on PL SQL> select sql_	<pre>AN_HASH_VALUE duplicates skip 1; _id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'e _AN_HASH_VALUE SQL_TEXT </pre>	SQL_LENGTH 44 44 47 54 54 54	AST_LOAD_TIM

SQL> pause



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SQL> pause	
SQL> SQL> This doesn't really identify the SQL statement, but take a look what happens if we group them by PLAN_HASH_VALUE SQL> pause	
SQL> SQL> clear breaks SQL> break on PLAN_HASH_VALUE duplicates skip 1; SQL> select sql_id, plan_hash_value, sql_text, length(sql_text) sql_length from v\$sql where sql_text like '%/*test' 'query%*	/%' order by 2, 4, LAST_LOAD_TIME;
SQL_ID PLAN_HASH_VALUE SQL_TEXT	SQL_LENGTH
<pre>f3jjwdqz71dcy 2738315105 select /*testquery*/ count(*) from oe.orders fh24xkqaw0553 2738315105 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 5r3bkn8z76sq5 2738315105 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS 7ufgv9vacpz85 2738315105 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS bcr3qj4vmuzj1 2738315105 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE 1=1 byypbc0t7q2br 4223739315 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>-1 2jxwr5vdfp1zv 4223739315 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a f90ycm0wk1urp 4223739315 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:b 9kj5umranz695 4223739315 SELECT /*testquery*/ COUNT(*) FROM OE.ORDERS WHERE order_id>:a</pre>	44 44 47 54 54 62 62 62 62 65
9 rows selected.	
SQL> pause	
SQL> SQL> exit Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options [oracle@DB12c AWR_MINING3]\$	



CHALLENGES WITH UNIQUE IDENTIFICATION

- Different formatting of a SQL statement
- Misuse of constants in SQL statements
- Use of constants in semantically equivalent statements (should these be separated?)
- Different names for bind variables in equivalent SQL statements
- Does EXACT_MATCHING_SIGNATURE help?
- Does FORCE_MATCHING_SIGNATURE help?
- Does PLAN_HASH_VALUE help?



LET'S MINE THE AWR!

DEMO - awr_top_sqlid_demo.sql



0 0 0

[oracle@DB12c AWR_MINING3]\$ sqlplus / as sysdba

SQL*Plus: Release 12.1.0.1.0 Production on Thu Oct 22 05:47:16 2015

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Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

SQL> @awr_top_sqlid_demo.sql SQL> alter session set container = sample;

Session altered.

SQL> SQL> -- if you want to stat digging into AWR you don't have to know all the tables - 2 is enough! SQL> pause



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Connected to:

Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

SQL> @awr_top_sqlid_demo.sql SQL> alter session set container = sample;

Session altered.

SQL>

SQL> -- if you want to stat digging into AWR you don't have to know all the tables - 2 is enough! SQL> pause

SQL>

SQL> desc dba_hist_snapshot

Name	Null?	Туре
SNAP_ID	NOT NULL	NUMBER
DBID	NOT NULL	NUMBER
INSTANCE_NUMBER	NOT NULL	NUMBER
STARTUP_TIME	NOT NULL	TIMESTAMP(3)
BEGIN_INTERVAL_TIME	NOT NULL	TIMESTAMP(3)
END_INTERVAL_TIME	NOT NULL	TIMESTAMP(3)
FLUSH_ELAPSED		INTERVAL DAY(5) TO SECOND(1)
SNAP_LEVEL		NUMBER
ERROR_COUNT		NUMBER
SNAP_FLAG		NUMBER
SNAP_TIMEZONE		INTERVAL DAY(0) TO SECOND(0)
CON_ID		NUMBER





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SQL> desc dba_hist_sqlstat			
Name	Null	?	Туре
SNAP_ID	NOT	NULL	NUMBER
DBID	NOT	NULL	NUMBER
INSTANCE_NUMBER	NOT	NULL	NUMBER
SQL_ID	NOT	NULL	VARCHAR2(13)
PLAN_HASH_VALUE	NOT	NULL	NUMBER
OPTIMIZER_COST			NUMBER
OPTIMIZER_MODE			VARCHAR2(10)
OPTIMIZER_ENV_HASH_VALUE			NUMBER
SHARABLE_MEM			NUMBER
LOADED_VERSIONS			NUMBER
VERSION_COUNT			NUMBER
MODULE			VARCHAR2(64)
ACTION			VARCHAR2(64)
SQL_PROFILE			VARCHAR2(64)
FORCE_MATCHING_SIGNATURE			NUMBER
PARSING_SCHEMA_ID			NUMBER
PARSING_SCHEMA_NAME			VARCHAR2(128)
PARSING_USER_ID			NUMBER
FETCHES_TOTAL			NUMBER
FETCHES_DELTA			NUMBER
END_OF_FETCH_COUNT_TOTAL			NUMBER
END_OF_FETCH_COUNT_DELTA			NUMBER
SORTS_TOTAL			NUMBER
SORTS_DELTA			NUMBER
EXECUTIONS_TOTAL			NUMBER
EXECUTIONS_DELTA			NUMBER
PX_SERVERS_EXECS_TOTAL			NUMBER
PX_SERVERS_EXECS_DELTA			NUMBER
LOADS_TOTAL			NUMBER
LOADS_DELTA			NUMBER
INVALIDATIONS_TOTAL			NUMBER
INVALIDATIONS_DELTA			NUMBER



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PHYSICAL_READ_BYTES_DELTANUMBERPHYSICAL_WRITE_REQUESTS_TOTALNUMBERPHYSICAL_WRITE_REQUESTS_DELTANUMBERPHYSICAL_WRITE_BYTES_TOTALNUMBERPHYSICAL_WRITE_BYTES_DELTANUMBEROPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBERID_OFFLOAD_RETURN_BYTES_DELTANUMBER	PHYSICAL_READ_REQUESTS_DELTA	NUMBER
PHYSICAL_WRITE_REQUESTS_TOTALNUMBERPHYSICAL_WRITE_REQUESTS_DELTANUMBERPHYSICAL_WRITE_BYTES_TOTALNUMBERPHYSICAL_WRITE_BYTES_DELTANUMBEROPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_READ_BYTES_TOTAL	NUMBER
PHYSICAL_WRITE_REQUESTS_DELTANUMBERPHYSICAL_WRITE_BYTES_TOTALNUMBERPHYSICAL_WRITE_BYTES_DELTANUMBEROPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_READ_BYTES_DELTA	NUMBER
PHYSICAL_WRITE_BYTES_TOTALNUMBERPHYSICAL_WRITE_BYTES_DELTANUMBEROPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_WRITE_REQUESTS_TOTAL	NUMBER
PHYSICAL_WRITE_BYTES_DELTANUMBEROPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_WRITE_REQUESTS_DELTA	NUMBER
OPTIMIZED_PHYSICAL_READS_TOTALNUMBEROPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_WRITE_BYTES_TOTAL	NUMBER
OPTIMIZED_PHYSICAL_READS_DELTANUMBERCELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	PHYSICAL_WRITE_BYTES_DELTA	NUMBER
CELL_UNCOMPRESSED_BYTES_TOTALNUMBERCELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	OPTIMIZED_PHYSICAL_READS_TOTAL	NUMBER
CELL_UNCOMPRESSED_BYTES_DELTANUMBERIO_OFFLOAD_RETURN_BYTES_TOTALNUMBERIO_OFFLOAD_RETURN_BYTES_DELTANUMBERBIND_DATARAW(2000)FLAGNUMBERCON_DBIDNUMBER	OPTIMIZED_PHYSICAL_READS_DELTA	NUMBER
IO_OFFLOAD_RETURN_BYTES_TOTAL NUMBER IO_OFFLOAD_RETURN_BYTES_DELTA NUMBER BIND_DATA RAW(2000) FLAG NUMBER CON_DBID NUMBER	CELL_UNCOMPRESSED_BYTES_TOTAL	NUMBER
IO_OFFLOAD_RETURN_BYTES_DELTA NUMBER BIND_DATA RAW(2000) FLAG NUMBER CON_DBID NUMBER	CELL_UNCOMPRESSED_BYTES_DELTA	NUMBER
BIND_DATA RAW(2000) FLAG NUMBER CON_DBID NUMBER	IO_OFFLOAD_RETURN_BYTES_TOTAL	NUMBER
FLAG NUMBER CON_DBID NUMBER	IO_OFFLOAD_RETURN_BYTES_DELTA	NUMBER
CON_DBID NUMBER	BIND_DATA	RAW(2000)
	FLAG	NUMBER
CON_ID NUMBER	CON_DBID	NUMBER
	CON_ID	NUMBER

0 0 0

col elapsed time s for 9999999.999 col cpu time s for 9999999.999 col iowait s for 9999999.999 col clwait s for 9999999.999 col apwait s for 9999999.999 col ccwait s for 9999999.999 col buffer gets for 9999999999999999 col disk reads for 9999999999999999 col direct writes for 9999999999999999 col diff plan for a10 col diff fms for a20 select * from (select hss.sql_id, decode(count(unique(plan hash value)),1,to_char(max(plan hash value)), '#'||count(unique(plan hash value))) diff_plan, decode(count(unique(force_matching_signature)),1,to_char(max(force_matching_signature)),'#'||count(unique(force_matching_signature))) diff_fms, sum(hss.executions delta) executions, round(sum(hss.elapsed time delta)/1000000,3) elapsed time s, round(sum(hss.cpu time delta)/1000000,3) cpu time s, round(sum(hss.iowait delta)/1000000,3) iowait s, round(sum(hss.clwait delta)/1000000,3) clwait s, round(sum(hss.apwait_delta)/1000000,3) apwait_s, - round(sum(hss.ccwait_delta)/1000000,3) ccwait_s, round(sum(hss.rows_processed_delta),3) rows_processed, round(sum(hss.buffer gets delta),3) buffer gets, round(sum(hss.disk reads delta),3) disk reads, round(sum(hss.direct writes delta),3) direct writes from dba hist sqlstat hss, dba hist snapshot hs where hss.snap id=hs.snap id and hs.snap id between &snap id from and &snap id to group by sql_id order by &sort_col_nr desc nulls last) where rownum<=&top n;



0 0 0

- -- round(sum(hss.clwait_delta)/1000000,3) clwait_s,
- -- round(sum(hss.apwait_delta)/1000000,3) apwait_s,
- -- round(sum(hss.ccwait_delta)/1000000,3) ccwait_s,
- round(sum(hss.rows processed delta),3) rows processed,
- round(sum(hss.buffer gets delta),3) buffer gets,
- round(sum(hss.disk_reads_delta),3) disk_reads,
- round(sum(hss.direct writes delta),3) direct writes
- from dba_hist_sqlstat hss, dba_hist_snapshot hs
- where hss.snap_id=hs.snap_id and hs.snap_id between &snap_id_from and &snap_id_to
- group by sql_id order by &sort_col_nr desc nulls last)
- where rownum<=&top_n;

```
SQL> pause
```

SQL>

- SQL> @awr_top_by_sqlid_snaps.sql 25 50 5 10
- SQL> set ver off pages 50000 lines 260 tab off echo off

SQL_ID	DIFF_PLAN	DIFF_FMS	EXECUTIONS EL	APSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0w2qpuc6u2zs	р 0	0	231889	2517.160	2966.522	1.957	231889.000	45060626	58971	0
147a57cxq3w5	y 0	0	290416	1260.332	1476.165	.119	290432.000	10062391	3449	0
c13sma6rkr27	c #3	18298161888330075667	695504	579.615	624.629	.068	3141269.000	19270840	2319	0
01jzc2mg6cg9	20	0	86872	298.917	285.065	.715	86872.000	3726085	22116	0
f7rxuxzt64k8	70	0	595365	177.662	183.504	.940	595368.000	9466095	26787	0
gzhkw1qu6fwxr	m 3241608609	9 0	638465	127.138	88.481	.006	638463.000	2052941	58	0
3fw75k1snsdd:	x 494735477	0	231877	122.990	90.754	.065	231876.000	3933240	1734	0
5mddt5kt45rg	3 1628223527	14366533292145951164	231905	88.169	50.906	.030	231904.000	2234211	743	0
apgb2g9q2zjh:	10	0	29082	83.980	85.473	1.244	29082.000	644899	38878	0
8z3542ffmp56	2 1655552467	7 17991828121679737456	666150	75.843	39.644	.009	602153.000	3805721	296	0

10 rows selected.



0 0 0			🏦 m	melsins — oracle@DB12	2c:~/AWR_MINING3 -	– ssh oracle@199.	199.56.111 — 170×35			
147a57cxq3w5y	0	0	290416	1260.332	1476.165	.119	290432.000	10062391	3449	0
c13sma6rkr27c	#3	18298161888330075667	695504	579.615	624.629	.068	3141269.000	19270840	2319	0
01jzc2mg6cg92	0	0	86872	298.917	285.065	.715	86872.000	3726085	22116	0
f7rxuxzt64k87	0	0	595365	177.662	183.504	.940	595368.000	9466095	26787	0
gzhkw1qu6fwxm	3241608609	0	638465	127.138	88.481	.006	638463.000	2052941	58	0
3fw75k1snsddx	494735477	0	231877	122.990	90.754	.065	231876.000	3933240	1734	0
5mddt5kt45rg3	1628223527	14366533292145951164	231905	88.169	50.906	.030	231904.000	2234211	743	0
apgb2g9q2zjh1	0	0	29082	83.980	85.473	1.244	29082.000	644899	38878	0
8z3542ffmp562	1655552467	17991828121679737456	666150	75.843	39.644	.009	602153.000	3805721	296	0
10 rows selec	ted.									
		naps.sql 25 50 7 10 0000 lines 260 tab off	echo off							
SQL> SQL> @awr_top		0000 lines 260 tab off		ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
SQL> SQL> @awr_top SQL> set ver	off pages 5	0000 lines 260 tab off		ELAPSED_TIME_S 2517.160	CPU_TIME_S 	IOWAIT_S 	ROWS_PROCESSED	BUFFER_GETS 	DISK_READS	DIRECT_WRITES
SQL> SQL> @awr_top SQL> set ver SQL_ID	Off pages 5	0000 lines 260 tab off	EXECUTIONS E							
SQL> SQL> @awr_top SQL> set ver SQL_ID 0w2qpuc6u2zsp	Off pages 50 DIFF_PLAN 0 0 0 0	0000 lines 260 tab off	EXECUTIONS E 	2517.160	2966.522	1.957	231889.000	45060626	 58971	
SQL> SQL> @awr_top SQL> set ver SQL_ID Øw2qpuc6u2zsp apgb2g9q2zjh1	DIFF_PLAN 00 00 00 00 00 00 00 00	0000 lines 260 tab off	EXECUTIONS E 	2517.160 83.980	2966.522 85.473	1.957 1.244	 231889.000 29082.000	 45060626 644899		
SQL> SQL> @awr_top SQL> set ver SQL_ID Øw2qpuc6u2zsp apgb2g9q2zjh1 f7rxuxzt64k87	Off pages 5 DIFF_PLAN 0 0 0 0 0 0 0 3 856749079	0000 lines 260 tab off DIFF_FMS 0 0 0	EXECUTIONS E 231889 29082 595365	2517.160 83.980 177.662	2966.522 85.473 183.504	1.957 1.244 .940	231889.000 29082.000 595368.000			0 0 0
SQL> SQL> @awr_top SQL> set ver SQL_ID Øw2qpuc6u2zsp apgb2g9q2zjh1 f7rxuxzt64k87 7t0959msvyt5g	Off pages 5 DIFF_PLAN 0 0 0 0 0 3 856749079 0 0	0000 lines 260 tab off DIFF_FMS 0 0 0 4574318657274276452	EXECUTIONS E 231889 29082 595365 29081	2517.160 83.980 177.662 8.571	2966.522 85.473 183.504 5.230	1.957 1.244 .940 .836		45060626 644899 9466095 133222		- 0 0 0 0
SQL> SQL> @awr_top SQL> set ver SQL_ID Øw2qpuc6u2zsp apgb2g9q2zjh1 f7rxuxzt64k87 7t0959msvyt5g 16bb7yq3ps4f9 01jzc2mg6cg92	Off pages 5 DIFF_PLAN 0 0 0 0 3 856749079 0 0 2 0	0000 lines 260 tab off DIFF_FMS 0 0 0 4574318657274276452	EXECUTIONS E 231889 29082 595365 29081 2	2517.160 83.980 177.662 8.571 2.810	2966.522 85.473 183.504 5.230 2.154	1.957 1.244 .940 .836 .763				
SQL> SQL> @awr_top SQL> set ver SQL_ID Øw2qpuc6u2zsp apgb2g9q2zjh1 f7rxuxzt64k87 7t0959msvyt5g 16bb7yq3ps4f9 01jzc2mg6cg92	Off pages 5 DIFF_PLAN 0 0 0 3 856749079 0 0 0 0 0 2 0 3 2 480532011	00000 lines 260 tab off DIFF_FMS 0 0 0 4574318657274276452 0 0	EXECUTIONS E 231889 29082 595365 29081 2 86872	2517.160 83.980 177.662 8.571 2.810 298.917	2966.522 85.473 183.504 5.230 2.154 285.065	1.957 1.244 .940 .836 .763 .715	231889.000 29082.000 595368.000 45474.000 2.000 86872.000	45060626 644899 9466095 133222 121068 3726085		
SQL> SQL> @awr_top SQL> set ver SQL_ID 	Off pages 5 DIFF_PLAN 0 0 0 3 856749079 0 0 2 0 2 485632011 0	00000 lines 260 tab off DIFF_FMS 0 0 4574318657274276452 0 0 15722349611718065978 0	EXECUTIONS E 231889 29082 595365 29081 2 86872 260969	2517.160 83.980 177.662 8.571 2.810 298.917 29.337	2966.522 85.473 183.504 5.230 2.154 285.065 23.695		231889.000 29082.000 595368.000 45474.000 2.000 86872.000 393409.000	45060626 644899 9466095 133222 121068 3726085 1177450		- 0 0 0 791 0 0
SQL> SQL> @awr_top SQL> set ver SQL_ID 	Off pages 5 DIFF_PLAN 0 0 0 3 856749079 0 0 2 4856749079 0 2 4856749079 0 2 4856749079 0 2 4856749079 0 2 485532011 0 1404293401	00000 lines 260 tab off DIFF_FMS 0 0 0 4574318657274276452 0 0	EXECUTIONS E 231889 29082 595365 29081 2 86872 260969 86873	2517.160 83.980 177.662 8.571 2.810 298.917 29.337 54.870	2966.522 85.473 183.504 5.230 2.154 285.065 23.695 58.681		231889.000 29082.000 595368.000 45474.000 2.000 86872.000 393409.000 86873.000	45060626 644899 9466095 133222 121068 3726085 1177450 1668076		



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		n 👔	nelsins — oracle@DB1	2c:~/AWR_MINING3	— ssh oracle@199.	199.56.111 — 170×35			
apgb2g9q2zjh1 0	0	29082	83.980	85.473	1.244	29082.000	644899	38878	0
f7rxuxzt64k87 0	0	595365	177.662	183.504	.940	595368.000	9466095	26787	0
7t0959msvyt5g 856749	9079 4574318657274276452	29081	8.571	5.230	.836	45474.000	133222	24590	0
16bb7yq3ps4f9 0	0	2	2.810	2.154	.763	2.000	121068	372	791
01jzc2mg6cg92 0	0	86872	298.917	285.065	.715	86872.000	3726085	22116	0
g81cbrq5yamf5 248053	32011 15722349611718065978	260969	29.337	23.695	.582	393409.000	1177450	18987	0
gh2g2tynpcpv1 0	0	86873	54.870	58.681	.507	86873.000	1668076	15273	0
buw7nxuggu81s 140429	3401 17230481863806651164	18	37.235	35.943	.407	507204.000	815703	384	0
1qf3b7a46jm3u 132238	80957 17373762679661231169	13459	3.358	3.493	.298	39773.000	55391	10522	0
<pre>10 rows selected. SQL> pause SQL> SQL> SQL> @awr_top_by_sql SQL> set ver off pag</pre>	lid_snaps.sql 25 50 9 10 zes 50000 lines 260 tab off	i ocho off							
SQL_ID DIFF_F	PLAN DIFF_FMS		ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
SQL_ID DIFF_F 			ELAPSED_TIME_S	CPU_TIME_S 2966.522	IOWAIT_S 	ROWS_PROCESSED	BUFFER_GETS 	DISK_READS	DIRECT_WRITES
	PLAN DIFF_FMS	EXECUTIONS E							DIRECT_WRITES 0 0
0w2qpuc6u2zsp 0	PLAN DIFF_FMS 0	EXECUTIONS E	2517.160	2966.522	1.957	231889.000	45060626	 58971	DIRECT_WRITES 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3	PLAN DIFF_FMS 0 18298161888330075667	EXECUTIONS E 231889 695504	2517.160 579.615	2966.522 624.629		 231889.000 3141269.000	45060626 19270840		DIRECT_WRITES 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0	PLAN DIFF_FMS 0 18298161888330075667 0 0	EXECUTIONS E 231889 695504 290416	2517.160 579.615 1260.332	2966.522 624.629 1476.165	1.957 .068 .119	 231889.000 3141269.000 290432.000	45060626 19270840 10062391		DIRECT_WRITES 0 0 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735	PLAN DIFF_FMS 0 18298161888330075667 0 0	EXECUTIONS E 231889 695504 290416 595365	2517.160 579.615 1260.332 177.662	2966.522 624.629 1476.165 183.504	1.957 .068 .119 .940	231889.000 3141269.000 290432.000 595368.000	45060626 19270840 10062391 9466095		DIRECT_WRITES 0 0 0 0 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735	PLAN DIFF_FMS 0 18298161888330075667 0 0 5477 0	EXECUTIONS E 231889 695504 290416 595365 231877	2517.160 579.615 1260.332 177.662 122.990	2966.522 624.629 1476.165 183.504 90.754	1.957 .068 .119 .940 .065	231889.000 3141269.000 290432.000 595368.000 231876.000	45060626 19270840 10062391 9466095 3933240		DIRECT_WRITES 0 0 0 0 0 0 0 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735 8z3542ffmp562 165555 01jzc2mg6cg92 0	PLAN DIFF_FMS 0 18298161888330075667 0 0 5477 0 52467 17991828121679737456	EXECUTIONS E 231889 695504 290416 595365 231877 666150	2517.160 579.615 1260.332 177.662 122.990 75.843	2966.522 624.629 1476.165 183.504 90.754 39.644	1.957 .068 .119 .940 .065 .009	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000	45060626 19270840 10062391 9466095 3933240 3805721		DIRECT_WRITES 0 0 0 0 0 0 0 0 0 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735 8z3542ffmp562 165555 01jzc2mg6cg92 0 5ckxyqfvu60pj 900611	PLAN DIFF_FMS 0 18298161888330075667 0 0 5477 0 52467 17991828121679737456 0	EXECUTIONS E 231889 695504 290416 595365 231877 666150 86872	2517.160 579.615 1260.332 177.662 122.990 75.843 298.917	2966.522 624.629 1476.165 183.504 90.754 39.644 285.065	1.957 .068 .119 .940 .065 .009 .715	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000 86872.000	45060626 19270840 10062391 9466095 3933240 3805721 3726085		DIRECT_WRITES 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735 8z3542ffmp562 165555 01jzc2mg6cg92 0 5ckxyqfvu60pj 900611 7r7636982atn9 214186	PLAN DIFF_FMS 0 18298161888330075667 0 0 5477 0 52467 17991828121679737456 0 1645 6486229150489758732	EXECUTIONS E 231889 695504 290416 595365 231877 666150 86872 638509	2517.160 579.615 1260.332 177.662 122.990 75.843 298.917 73.013	2966.522 624.629 1476.165 183.504 90.754 39.644 285.065 53.327	1.957 .068 .119 .940 .065 .009 .715 .150	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000 86872.000 638514.000	45060626 19270840 10062391 9466095 3933240 3805721 3726085 2554314	58971 2319 3449 26787 1734 296 22116 4454	DIRECT_WRITES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



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01jzc2mg6cg92 0	0	86872	298.917	285.065	.715	86872.000	3726085	22116	0										
g81cbrq5yamf5 2480532011	. 15722349611718065978	260969	29.337	23.695	.582	393409.000	1177450	18987	0										
gh2g2tynpcpv1 0	0	86873	54.870	58.681	.507	86873.000	1668076	15273	0										
buw7nxuggu81s 1404293401	. 17230481863806651164	18	37.235	35.943	.407	507204.000	815703	384	0										
1qf3b7a46jm3u 1322380957	17373762679661231169	13459	3.358	3.493	.298	39773.000	55391	10522	0										
10 rows selected. SQL> pause																			
SQL> SQL> Gawr ton by solid s	snaps.sql 25 50 9 10																		
SQL> set ver off pages 5																			
			ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES										
SQL> set ver off pages 5			ELAPSED_TIME_S 	CPU_TIME_S 2966.522	IOWAIT_S 	ROWS_PROCESSED	BUFFER_GETS 	DISK_READS	DIRECT_WRITES										
SQL> set ver off pages 5 SQL_ID DIFF_PLAN	DIFF_FMS	EXECUTIONS E																	
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0	DIFF_FMS 0	EXECUTIONS E	2517.160	2966.522	1.957	231889.000	45060626	 58971											
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3	DIFF_FMS 0 18298161888330075667	EXECUTIONS E 231889 695504	2517.160 579.615	2966.522 624.629	1.957 .068	 231889.000 3141269.000	45060626 19270840	 58971 2319											
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0	DIFF_FMS 0 18298161888330075667 0 0	EXECUTIONS 8 231889 695504 290416	2517.160 579.615 1260.332	2966.522 624.629 1476.165	1.957 .068 .119	231889.000 3141269.000 290432.000	45060626 19270840 10062391												
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0	DIFF_FMS 0 18298161888330075667 0 0	EXECUTIONS 6 231889 695504 290416 595365	2517.160 579.615 1260.332 177.662	2966.522 624.629 1476.165 183.504	1.957 .068 .119 .940	231889.000 3141269.000 290432.000 595368.000	45060626 19270840 10062391 9466095												
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735477	DIFF_FMS 0 18298161888330075667 0 0	EXECUTIONS 6 231889 695504 290416 595365 231877	2517.160 579.615 1260.332 177.662 122.990	2966.522 624.629 1476.165 183.504 90.754	1.957 .068 .119 .940 .065	231889.000 3141269.000 290432.000 595368.000 231876.000	45060626 19270840 10062391 9466095 3933240												
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735477 8z3542ffmp562 1655552467	DIFF_FMS 0 18298161888330075667 0 0 0 7 17991828121679737456 0	EXECUTIONS F 231889 695504 290416 595365 231877 666150	2517.160 579.615 1260.332 177.662 122.990 75.843	2966.522 624.629 1476.165 183.504 90.754 39.644	1.957 .068 .119 .940 .065 .009	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000	45060626 19270840 10062391 9466095 3933240 3805721												
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735477 8z3542ffmp562 1655552467 01jzc2mg6cg92 0	DIFF_FMS 0 18298161888330075667 0 0 7 17991828121679737456 0 6486229150489758732	EXECUTIONS F 231889 695504 290416 595365 231877 666150 86872	2517.160 579.615 1260.332 177.662 122.990 75.843 298.917	2966.522 624.629 1476.165 183.504 90.754 39.644 285.065	1.957 .068 .119 .940 .065 .009 .715	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000 86872.000	45060626 19270840 10062391 9466095 3933240 3805721 3726085												
SQL> set ver off pages 5 SQL_ID DIFF_PLAN 0w2qpuc6u2zsp 0 c13sma6rkr27c #3 147a57cxq3w5y 0 f7rxuxzt64k87 0 3fw75k1snsddx 494735477 8z3542ffmp562 1655552467 01jzc2mg6cg92 0 5ckxyqfvu60pj 900611645	DIFF_FMS 0 18298161888330075667 0 0 7 17991828121679737456 0 6486229150489758732 8080224161820109919	EXECUTIONS F 231889 695504 290416 595365 231877 666150 86872 638509	2517.160 579.615 1260.332 177.662 122.990 75.843 298.917 73.013	2966.522 624.629 1476.165 183.504 90.754 39.644 285.065 53.327	1.957 .068 .119 .940 .065 .009 .715 .150	231889.000 3141269.000 290432.000 595368.000 231876.000 602153.000 86872.000 638514.000	45060626 19270840 10062391 9466095 3933240 3805721 3726085 2554314												

SQL> pause

SQL> SQL> -- Why is it good to see DIFF_PLANS? SQL> pause



0 • •				🏠 melsins — oracle@D						
		17230481863806651164	18	37.235	35.943	.407	507204.000	815703	384	e
1qf3b7a46jm3u	1322380957	17373762679661231169	13459	3.358	3.493	.298	39773.000	55391	10522	e
10 rows selec	ted.									
SQL> pause										
	_ / _ /	naps.sql 25 50 9 10 0000 lines 260 tab off	echo off							
SQL_ID	DIFF_PLAN	DIFF_FMS	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0w2qpuc6u2zsp	0	0	231889	2517.160	2966.522	1.957	231889.000	45060626	58971	6
c13sma6rkr27c		18298161888330075667	695504	579.615	624.629	.068	3141269.000	19270840	2319	e
147a57cxq3w5y		0	290416	1260.332	1476.165	.119	290432.000	10062391	3449	e
f7rxuxzt64k87		0	595365	177.662	183.504	.940	595368.000	9466095	26787	e
3fw75k1snsddx		0	231877	122.990	90.754	.065	231876.000	3933240	1734	e
		17991828121679737456	666150	75.843	39,644	.009	602153.000	3805721	296	e
01jzc2mg6cg92		0	86872	298.917	285.065	.715	86872.000	3726085	22116	e
		6486229150489758732	638509	73.013	53.327	.150	638514.000	2554314	4454	e
		8080224161820109919	220567	42.672	50.602	.001	602140.000	2421991	41	e
		14366533292145951164	231905	88.169	50.906	.030	231904.000	2234211	743	e
10 rows selec	ted.									
SQL> pause										
SQL> SQL> Why i SQL> pause	s it good t	o see DIFF_PLANS?								

SQL> -- Look at the row for sql_id = c13sma6rkr27c SQL> pause



0 . .

SQL> pause

SQL> @awr_sqlid_perf_trend_by_plan.sql 25 50 c13sma6rkr27c SQL> set ver off pages 50000 lines 260 tab off echo off

TIME	PLAN_HASH_VALUE	EXECUTIONS	ELAPSED_TIME_S_1E	CPU_TIME_S_1E	IOWAIT_S_1E	ROWS_PROCESSED_1E	BUFFER_GETS_1E	DISK_READS_1E	DIRECT_WRITES_1E
19.10.2014 10:39:43		29559	.001	.001	.000	4.531	27.113	.075	.000
19.10.2014 10:50:11		30005	.001	.001	.000	4.521	27.124	.000	.000
19.10.2014 11:00:14	725271039	30097	.001	.001	.000	4.508	27.003	.000	.000
19.10.2014 11:10:16	725271039	29691	.001	.001	.000	4.531	27.139	.000	.000
19.10.2014 11:20:17	725271039	30228	.001	.001	.000	4.531	27.106	.000	.000
19.10.2014 11:30:19	725271039	30514	.001	.001	.000	4.505	27.069	.000	.000
19.10.2014 11:40:21	725271039	29676	.001	.001	.000	4.543	27.163	.000	.000
19.10.2014 11:50:23	725271039	29144	.001	.001	.000	4.511	27.081	.000	.000
19.10.2014 12:00:25	725271039	29151	.001	.001	.000	4.525	27.090	.000	.000
19.10.2014 12:10:26	725271039	29531	.001	.001	.000	4.513	27.012	.000	.000
19.10.2014 12:20:30	725271039	29266	.001	.001	.000	4.517	27.039	.000	.000
19.10.2014 12:30:31	725271039	29094	.001	.001	.000	4.521	27.107	.000	.000
19.10.2014 12:40:34	725271039	29233	.001	.001	.000	4.509	27.031	.000	.000
19.10.2014 12:50:35	725271039	29709	.001	.001	.000	4.503	27.008	.000	.000
19.10.2014 13:00:37	725271039	29428	.001	.001	.000	4.541	27.174	.000	.000
19.10.2014 13:10:38	725271039	29508	.001	.001	.000	4.517	27.058	.000	.000
19.10.2014 13:20:42	725271039	28915	.001	.001	.000	4.504	26.980	.000	.000
19.10.2014 13:30:43	725271039	29960	.001	.001	.000	4.518	27.088	.000	.000
19.10.2014 13:40:45	725271039	29613	.001	.001	.000	4.531	27.109	.000	.000
19.10.2014 13:50:46	725271039	29585	.001	.001	.000	4.497	27.028	.000	.000
19.10.2014 14:00:51	725271039	45763	.001	.001	.000	4.507	27.021	.000	.000
19.10.2014 14:10:54	214043693	49428	.001	.001	.000	4.505	27.426	.001	.000
19.10.2014 14:20:56	3004904301	8406	.001	.001	.000	4.485	77.567	.009	.000

23 rows selected.



0 0 0		🏫 melsins — oracl	e@DB12c:~/A	WR_MINING3	— ssh ora	cle@199.19	99.56.111 — 170×3	15		
SQL>let's look at two of the plans										
SQL> select * from table(dbms_xplan.display_awr('c13sma6rkr27c',725271039));										
PLAN_TABLE										
SQL_ID c13	sma6rkr27c									
	DUCTS.PRODUCT_ID, PRODUCT_NAME, PRODUC	_								
	D, WEIGHT_CLASS, WARRANTY_PERIOD, SUPP									
	ATUS, LIST_PRICE, MIN_PRICE, CATALOG_U									
	CTS, INVENTORIES WHERE PRODUCTS.CATEGO									
	S.PRODUCT_ID = PRODUCTS.PRODUCT_ID AND	0								
INVENTORIE	S.WAREHOUSE_ID = :B2 AND ROWNUM < :B1									
	2 212221022									
Plan hash	value: 725271039									
		News	L Davie			(%CDU)	т:	-		
Id Op	eration	Name	ROWS	Bytes	Cost	(%CPU)	Time			
0 SE	LECT STATEMENT	· · · · · · · · · · · · · · · · · · ·	 I	 I	 l 22	(100)		-		
	OUNT STOPKEY		1		55	(100)				
	NESTED LOOPS		14	5670	 33	(0)	00:00:01			
	HASH JOIN OUTER		9	3519	15		00:00:01	1		
	TABLE ACCESS BY INDEX ROWID BATCHED		9	1584	10		00:00:01			
	INDEX RANGE SCAN	PRODUCT_INFORMATION PROD_CATEGORY_IX	9	1 1 2 0 4			00:00:01			
6	TABLE ACCESS BY INDEX ROWID BATCHED		2	430	I 1		00:00:01			
	INDEX SKIP SCAN	PRD DESC PK	2	450	1 4		00:00:01			
8	TABLE ACCESS BY INDEX ROWID	INVENTORIES	2	28	1 4		00:00:01			
	TABLE ACCESS BY INDEX ROWID	INVENTORIES	2		2		00.00.01			

2 | 1 |

1 (0) 00:00:01

INVENTORY_PK

Note

9 |

- this is an adaptive plan

INDEX UNIQUE SCAN



0 0 0

SQL> select * from table(dbms_xplan.display_awr('c13sma6rkr27c',3004904301));

PLAN_TABLE_OUTPUT

SQL_ID c13sma6rkr27c

SELECT PRODUCTS.PRODUCT_ID, PRODUCT_NAME, PRODUCT_DESCRIPTION, CATEGORY_ID, WEIGHT_CLASS, WARRANTY_PERIOD, SUPPLIER_ID, PRODUCT_STATUS, LIST_PRICE, MIN_PRICE, CATALOG_URL, QUANTITY_ON_HAND FROM PRODUCTS, INVENTORIES WHERE PRODUCTS.CATEGORY_ID = :B3 AND INVENTORIES.PRODUCT_ID = PRODUCTS.PRODUCT_ID AND INVENTORIES.WAREHOUSE_ID = :B2 AND ROWNUM < :B1</pre>

Plan hash value: 3004904301

1	Id	Ι	Operation	Name	Rov	ws	Bytes	Cost (%CPU)	Time	I
T	0	I	SELECT STATEMENT		I			33	(100)		T
	1		COUNT STOPKEY		1				1		
T	2	T	NESTED LOOPS		1	14	5670	33	(0)	00:00:01	
T	3	Τ	NESTED LOOPS OUTER		1	9	3519	15	(0)	00:00:01	T
1	4	1	TABLE ACCESS BY INDEX ROWID BATCHED	PRODUCT_INFORMATION	1	9	1584	10	(0)	00:00:01	
1	5	T	INDEX RANGE SCAN	PROD_CATEGORY_IX	1	9		1	(0)	00:00:01	
T	6		TABLE ACCESS BY INDEX ROWID	PRODUCT_DESCRIPTIONS	1	1	215	5	(0)	00:00:01	
1	7	1	INDEX UNIQUE SCAN	PRD_DESC_PK	1	2		4	(0)	00:00:01	L
1	8	1	TABLE ACCESS BY INDEX ROWID	INVENTORIES	1	2	28	2	(0)	00:00:01	I
1	9	Ì	INDEX UNIQUE SCAN	INVENTORY_PK	1	1		1	(0)	00:00:01	I

Note

- this is an adaptive plan



0 0 0

INVENTORIES.PRODUCT_ID = PRODUCTS.PRODUCT_ID AND INVENTORIES.WAREHOUSE_ID = :B2 AND ROWNUM < :B1

Plan hash value: 3004904301

Id	Operation	Name	Rows	Bytes	Cost ((%CPU)	Time
0	SELECT STATEMENT		1		33	(100)	
2	NESTED LOOPS		14	5670	33	(0)	00:00:01
3	NESTED LOOPS OUTER		9	3519	15	(0)	00:00:01
4	TABLE ACCESS BY INDEX ROWID BATCHED	PRODUCT_INFORMATION	9	1584	10	(0)	00:00:01
5	INDEX RANGE SCAN	PROD_CATEGORY_IX	9		1	(0)	00:00:01
6	TABLE ACCESS BY INDEX ROWID	PRODUCT_DESCRIPTIONS	1	215	5	(0)	00:00:01
7	INDEX UNIQUE SCAN	PRD_DESC_PK	2		4	(0)	00:00:01
8	TABLE ACCESS BY INDEX ROWID	INVENTORIES	2	28	2	(0)	00:00:01
9	INDEX UNIQUE SCAN	INVENTORY_PK	1		1	(0)	00:00:01

Note

- this is an adaptive plan

30 rows selected.

SQL> pause

SQL>

SQL> -- Querying the AWR tables directy gives more flexibility, but provides basically the same results as THe AWR report. SQL> exit

Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options [oracle@DB12c AWR_MINING3]\$

Pythian

LET'S MINE THE AWR!

DEMO - awr_top_fms_demo.sql



0 0 0

[oracle@DB12c AWR_MINING3]\$ sqlplus / as sysdba

SQL*Plus: Release 12.1.0.1.0 Production on Thu Oct 22 05:55:48 2015

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Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

SQL> @awr_top_fms_demo.sql SQL> alter session set container = sample;

Session altered.

SQL> SQL> -- Let's see how sorting by elapsed time looks when we aggregate by FORCE_MATCHING_SIGNATURE SQL> pause



0 0 0

col iowait s for 9999999.999 col clwait s for 9999999.999 col apwait s for 9999999.999 col ccwait s for 9999999.999 col buffer gets for 9999999999999999 col disk reads for 9999999999999999 col direct writes for 9999999999999999 col diff_sqlid for a13 col diff_plan for a10 col diff fms for a20 select * from (select to_char(force_matching_signature) diff_fms, decode(count(unique(plan hash value)),1,to char(max(plan hash value)),'#'||count(unique(plan hash value))) diff plan, decode(count(unique(sql id)),1,max(sql id),'#'||count(unique(sql id))) diff sqlid, sum(hss.executions delta) executions, round(sum(hss.elapsed_time_delta)/1000000,3) elapsed_time_s, round(sum(hss.cpu time delta)/1000000,3) cpu time s, round(sum(hss.iowait_delta)/1000000,3) iowait_s, round(sum(hss.clwait delta)/1000000,3) clwait s, - round(sum(hss.apwait_delta)/1000000,3) apwait_s, - round(sum(hss.ccwait delta)/1000000,3) ccwait s, - round(sum(hss.rows_processed_delta),3) rows_processed, round(sum(hss.buffer gets delta),3) buffer gets, round(sum(hss.disk_reads_delta),3) disk_reads, round(sum(hss.direct_writes_delta),3) direct_writes from dba_hist_sqlstat hss, dba_hist_snapshot hs where hss.snap id=hs.snap id and hs.snap id between &snap id from and &snap id to group by force_matching_signature order by &sort col nr desc) where rownum<=&top n;



-- round(sum(hss.ccwait_delta)/1000000,3) ccwait_s, round(sum(hss.rows_processed_delta),3) rows_processed, round(sum(hss.buffer_gets_delta),3) buffer_gets, round(sum(hss.disk_reads_delta),3) disk_reads, round(sum(hss.direct_writes_delta),3) direct_writes from dba_hist_sqlstat hss, dba_hist_snapshot hs where hss.snap_id=hs.snap_id and hs.snap_id between &snap_id_from and &snap_id_to group by force_matching_signature order by &sort_col_nr desc)

where rownum<=&top_n;

SQL> pause

SQL>

SQL> @awr_top_by_fms_snaps.sql 25 50 5 10 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_FMS	DIFF_PLAN	DIFF_SQLID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	#23	#57	2462768	4825.257	5416.525	6.905	2462955	79731662	185393	791
18298161888330075667	#3	c13sma6rkr27c	695504	579.615	624.629	.068	3141269	19270840	2319	0
5985318870031566873	1081153563	#999	835562	306.699	253.610	.034	11697868	7571650	1029	0
14366533292145951164	1628223527	5mddt5kt45rg3	231905	88.169	50.906	.030	231904	2234211	743	0
17991828121679737456	1655552467	8z3542ffmp562	666150	75.843	39.644	.009	602153	3805721	296	0
6486229150489758732	900611645	5ckxyqfvu60pj	638509	73.013	53.327	.150	638514	2554314	4454	0
2672114946588399948	1388734953	c749bc43qqfz3	638186	47.942	16.981	.000	638465	3	0	0
8080224161820109919	2141863993	7r7636982atn9	220567	42.672	50.602	.001	602140	2421991	41	0
17230481863806651164	1404293401	buw7nxuggu81s	18	37.235	35.943	.407	507204	815703	384	0
15722349611718065978	2480532011	g81cbrq5yamf5	260969	29.337	23.695	.582	393409	1177450	18987	0

10 rows selected.



round(sum(hss.direct_writes_delta),3) direct_writes from dba_hist_sqlstat hss, dba_hist_snapshot hs where hss.snap_id=hs.snap_id and hs.snap_id between &snap_id_from and &snap_id_to group by force_matching_signature order by &sort_col_nr desc) where rownum<=&top_n;</pre>

SQL> pause

SQL>

SQL> @awr_top_by_fms_snaps.sql 25 50 5 10 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_FMS	DIFF_PLAN	DIFF_SQLID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	#23	#57	2462768	4825.257	5416.525	6.905	2462955	79731662	185393	791
18298161888330075667	#3	c13sma6rkr27c	695504	579.615	624.629	.068	3141269	19270840	2319	0
5985318870031566873	1081153563	#999	835562	306.699	253.610	.034	11697868	7571650	1029	0
14366533292145951164	1628223527	5mddt5kt45rg3	231905	88.169	50.906	.030	231904	2234211	743	0
17991828121679737456	1655552467	8z3542ffmp562	666150	75.843	39.644	.009	602153	3805721	296	0
6486229150489758732	900611645	5ckxyqfvu60pj	638509	73.013	53.327	.150	638514	2554314	4454	0
2672114946588399948	1388734953	c749bc43qqfz3	638186	47.942	16.981	.000	638465	3	0	0
8080224161820109919	2141863993	7r7636982atn9	220567	42.672	50.602	.001	602140	2421991	41	0
17230481863806651164	1404293401	buw7nxuggu81s	18	37.235	35.943	.407	507204	815703	384	0
15722349611718065978	2480532011	g81cbrq5yamf5	260969	29.337	23.695	.582	393409	1177450	18987	0

10 rows selected.

SQL> pause

SQL> SQL> -- What is FMS=0? SQL> pause



0 • •				🏠 melsins — oracle@Dl						
15722349611718065978	2480532011	g81cbrq5yamf5	260969	29.337	23.695	.582	393409	1177450	18987	0
10 rows selected.										
SQL> pause										
SQL>										
SQL> What is FMS=	0?									
SQL> pause										
501 > Pour ton by fmg	dotail coa		15 0							
SQL> @awr_top_by_fms SQL> set ver off pag										
SQLY SEC VELOTT Pag	23 50000 11		echo orr							
DIFF_FMS	DIFF_PLAN	SQL_ID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	0	0w2qpuc6u2zsp	231889	2517.160	2966.522	1.957	231889	45060626	58971	0
0	0	147a57cxq3w5y	290416	1260.332	1476.165	.119	290432	10062391	3449	0
0	0	01jzc2mg6cg92	86872		285.065	.715	86872	3726085	22116	0
0	0	f7rxuxzt64k87	595365	177.662	183.504	.940	595368	9466095	26787	0
0		gzhkw1qu6fwxm	638465	127.138	88.481	.006	638463	2052941	58	0
0	494735477	3fw75k1snsddx	231877	122.990	90.754	.065	231876	3933240	1734	0
0	0	apgb2g9q2zjh1	29082	83.980	85.473	1.244	29082	644899	38878	0
0	0	cmndgkbkcz5s9	57765		68.699	.096	57765	414169	2811	0
0	0	gh2g2tynpcpv1	86873	54.870	58.681	.507	86873	1668076	15273	0
0	0	a9gvfh5hx9u98	29213	53.916	52.549	.251	29213	847081	6981	0
0	0	budtrjayjnvw3	86873	30.219	27.506	.106	86873	658802	3609	0
0	0	9t3n2wpr7my63	96723	29.138	29.363	.119	96723	1057785	3644	0
0	0	16bb7yq3ps4f9	2	2.810	2.154	.763	2	121068	372	791
0	0	39k4gf5t0831y	55	.370	.353	.002	0	1615	72	0
0	0	adzjh275fvvx4	8	.324	.309	.004	0	3237	160	0

15 rows selected.



0 • •

SQL> pause

SQL>

SQL> -- What is FMS=0?

SQL> pause

SQL> @awr_top_by_fms_detail_snaps.sql 25 50 5 15 0 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_FMS	DIFF_PLAN	SQL_ID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	0	0w2qpuc6u2zsp	231889	2517.160	2966.522	1.957	231889	45060626	58971	0
0	0	147a57cxq3w5y	290416	1260.332	1476.165	.119	290432	10062391	3449	0
0	0	01jzc2mg6cg92	86872	298.917	285.065	.715	86872	3726085	22116	0
0	0	f7rxuxzt64k87	595365	177.662	183.504	.940	595368	9466095	26787	0
0	3241608609	gzhkw1qu6fwxm	638465	127.138	88.481	.006	638463	2052941	58	0
0	494735477	3fw75k1snsddx	231877	122.990	90.754	.065	231876	3933240	1734	0
0	0	apgb2g9q2zjh1	29082	83.980	85.473	1.244	29082	644899	38878	0
0	0	cmndgkbkcz5s9	57765	64.341	68.699	.096	57765	414169	2811	0
0	0	gh2g2tynpcpv1	86873	54.870	58.681	.507	86873	1668076	15273	0
0	0	a9gvfh5hx9u98	29213	53.916	52.549	.251	29213	847081	6981	0
0	0	budtrjayjnvw3	86873	30.219	27.506	.106	86873	658802	3609	0
0	0	9t3n2wpr7my63	96723	29.138	29.363	.119	96723	1057785	3644	0
0	0	16bb7yq3ps4f9	2	2.810	2.154	.763	2	121068	372	791
0	0	39k4gf5t0831y	55	.370	.353	.002	0	1615	72	0
0	0	adzjh275fvvx4	8	.324	.309	.004	0	3237	160	0

melsins — oracle@DB12c:~/AWR MINING3 — ssh oracle@199.199.56.111 — 170×35

15 rows selected.

SQL> pause

SQL>

SQL> -- Let's look at some of these queries



0 • •					2c:~/AWR_MINING3 - se							
0	0	a9gvfh5hx9u98	29213	53.916	52.549	.251	29213	847081	6981	0		
0	0	budtrjayjnvw3	86873	30.219	27.506	.106	86873	658802	3609	0		
0	0	9t3n2wpr7my63	96723	29.138	29.363	.119	96723	1057785	3644	0		
0	0	16bb7yq3ps4f9	2	2.810	2.154	.763	2	121068	372	791		
0	0	39k4gf5t0831y	55	.370	.353	.002	0	1615	72	0		
0	0	adzjh275fvvx4	8	.324	.309	.004	0	3237	160	0		
15 rows selec	ted.											
SQL> pause												
SQL> SQL> Let's look at some of these queries SQL> pause												
SQL> @awr_show_sqlid.sql 0w2qpuc6u2zsp SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):												
SQL_ID	PROGRAM	MOD	ULE		ACTION		CLIENT_ID		COUNT(*)			
0w2qpuc6u2zsp	JDBC Thin Client	t New	Order				Swingbench		220			
0w2qpuc6u2zsp	JDBC Thin Client	t New	Order		getProductQuar	ntity	Swingbench		24			
0w2qpuc6u2zsp	JDBC Thin Client	t New	Order		logon		Swingbench		19			
0w2qpuc6u2zsp	JDBC Thin Client	t New	Order		getProductDeta	ailsByCategory	Swingbench		18			
	JDBC Thin Client				6. 		Swingbench		9			
	JDBC Thin Client		Order		getCardDetails	ByCustomerID	Swingbench		1			
							5					

6 rows selected.

```
### The Statement (DBA_HIST_SQLTEXT):
BEGIN :1 := orderentry.neworder(:2 ,:3 ,:4 ); END;
```



170×35 melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35

SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

SQL_ID	PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
0w2qpuc6u2zsp	JDBC Thin Client	New Order		Swingbench	220
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getProductQuantity	Swingbench	24
0w2qpuc6u2zsp	JDBC Thin Client	New Order	logon	Swingbench	19
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getProductDetailsByCategory	Swingbench	18
0w2qpuc6u2zsp	JDBC Thin Client			Swingbench	9
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getCardDetailsByCustomerID	Swingbench	1

6 rows selected.

```
### The Statement (DBA_HIST_SQLTEXT):
BEGIN :1 := orderentry.neworder(:2 ,:3 ,:4 ); END;
```

SQL> pause

SQL> @awr_show_sqlid.sql gzhkw1qu6fwxm SQL> set ver off pages 50000 lines 32000 tab off long 99999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

SQ	L_ID	PROGRAM	MODULE	ACTION	CLIENT_ID CO	OUNT(*)	
gz	hkw1qu6fwxm	JDBC Thin Client	Update Customer Details	logon	Swingbench	4	
gz	hkw1qu6fwxm	JDBC Thin Client	Browse Products	logon	Swingbench	2	
gz	hkw1qu6fwxm	JDBC Thin Client	New Order	logon	Swingbench	2	
gz	hkw1qu6fwxm	JDBC Thin Client	Browse and Update Orders	logon	Swingbench	2	

The Statement (DBA_HIST_SQLTEXT):

INSERT INTO LOGON (LOGON_ID,CUSTOMER_ID, LOGON_DATE) VALUES (LOGON_SEQ.NEXTVAL, :B2 , :B1)

SQL> pause

LOAD TABLE CONVENTIONAL



```
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```

0w2qpuc6u2zsp	JDBC Thin Client	New Order		Swingbench	220
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getProductQuantity	Swingbench	24
0w2qpuc6u2zsp	JDBC Thin Client	New Order	logon	Swingbench	19
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getProductDetailsByCategory	Swingbench	18
0w2qpuc6u2zsp	JDBC Thin Client			Swingbench	9
0w2qpuc6u2zsp	JDBC Thin Client	New Order	getCardDetailsByCustomerID	Swingbench	1

6 rows selected.

```
### The Statement (DBA_HIST_SQLTEXT):
BEGIN :1 := orderentry.neworder(:2 ,:3 ,:4 ); END;
```

```
SQL> pause
```

SQL> @awr_show_sqlid.sql gzhkw1qu6fwxm SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

SQL_ID	PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
gzhkw1qu6fwxr	m JDBC Thin Client	Update Customer Details	logon	Swingbench	4
gzhkw1qu6fwxr	n JDBC Thin Client	Browse Products	logon	Swingbench	2
gzhkw1qu6fwxr	n JDBC Thin Client	New Order	logon	Swingbench	2
gzhkw1qu6fwxr	n JDBC Thin Client	Browse and Update Orders	logon	Swingbench	2

The Statement (DBA_HIST_SQLTEXT): INSERT INTO LOGON (LOGON_ID,CUSTOMER_ID, LOGON_DATE) VALUES (LOGON_SEQ.NEXTVAL, :B2 , :B1)

SQL> pause

SQL> SQL> -- Let's take a closer look at these 999 queries in the TOP 3rd place. SQL> pause



The Statement (DBA_HIST_SQLTEXT): INSERT INTO LOGON (LOGON_ID,CUSTOMER_ID, LOGON_DATE) VALUES (LOGON_SEQ.NEXTVAL, :B2 , :B1)

SQL> pause

SQL>

SQL> -- Let's take a closer look at these 999 queries in the TOP 3rd place. SQL> pause

SQL> @awr_top_by_fms_detail_snaps.sql 25 50 5 15 5985318870031566873 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_FMS	DIFF_PLAN	SQL_ID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
5985318870031566873	1081153563	2y383xj04ztf6	812	4.587	4.544	.000	11368	7319	1	0
5985318870031566873	1081153563	dra5rjs03kmad	891	.447	.354	.000	12474	8461	9	0
5985318870031566873	1081153563	4v95sjusy6ba3	822	.394	.308	.000	11508	8465	3	0
5985318870031566873	1081153563	6j47tkwf6as3j	824	.365	.261	.000	11536	7509	3	0
5985318870031566873	1081153563	535x28j7nyrr2	940	.362	.315	.000	13160	8468	1	0
5985318870031566873	1081153563	0ab0gy4bczs5b	886	.362	.300	.000	12404	7982	1	0
5985318870031566873	1081153563	agb1t4y0yaqgn	983	.361	.306	.000	13762	8871	1	0
5985318870031566873	1081153563	fh5pm06vpmr94	816	.356	.275	.000	11424	7359	1	0
5985318870031566873	1081153563	80jvzncm78pvc	916	.353	. 303	.000	12824	8252	1	0
5985318870031566873	1081153563	6hkpgmmcft2k1	899	.353	.291	.000	12586	9897	2	0
5985318870031566873	1081153563	57m0ndunjn7nr	912	.350	.296	.000	12768	8216	1	0
5985318870031566873	1081153563	6d2mtjqhduv5y	882	.350	.315	.000	12348	8831	2	0
5985318870031566873	1081153563	b3mnsjcwsa39x	830	.349	.321	.000	11620	8323	2	0
5985318870031566873	1081153563	7kd85hj9xp0vs	950	.348	.306	.000	13300	8558	1	0
5985318870031566873	1081153563	1wjyhzcswq737	931	.346	.273	.000	13034	8387	1	0

15 rows selected.



0 . .

melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35

SQL> pause

SQL> SQL> -- Let's take a closer look at these 999 queries in the TOP 3rd place. SQL> pause

SQL> @awr_top_by_fms_detail_snaps.sql 25 50 5 15 5985318870031566873

SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_FMS	DIFF_PLAN	SQL_ID	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
5985318870031566873	1081153563	2y383xj04ztf6	812	4.587	4.544	.000	11368	7319	1	0
5985318870031566873	1081153563	dra5rjs03kmad	891	.447	.354	.000	12474	8461	9	0
5985318870031566873	1081153563	4v95sjusy6ba3	822	.394	.308	.000	11508	8465	3	0
5985318870031566873	1081153563	6j47tkwf6as3j	824	.365	.261	.000	11536	7509	3	0
5985318870031566873	1081153563	535x28j7nyrr2	940	.362	.315	.000	13160	8468	1	0
5985318870031566873	1081153563	0ab0gy4bczs5b	886	.362	.300	.000	12404	7982	1	0
5985318870031566873	1081153563	agb1t4y0yaqgn	983	.361	.306	.000	13762	8871	1	0
5985318870031566873	1081153563	fh5pm06vpmr94	816	.356	.275	.000	11424	7359	1	0
5985318870031566873	1081153563	80jvzncm78pvc	916	.353	.303	.000	12824	8252	1	0
5985318870031566873	1081153563	6hkpgmmcft2k1	899	.353	.291	.000	12586	9897	2	0
5985318870031566873	1081153563	57m0ndunjn7nr	912	.350	.296	.000	12768	8216	1	0
5985318870031566873	1081153563	6d2mtjqhduv5y	882	.350	.315	.000	12348	8831	2	0
5985318870031566873	1081153563	b3mnsjcwsa39x	830	.349	.321	.000	11620	8323	2	0
5985318870031566873	1081153563	7kd85hj9xp0vs	950	.348	.306	.000	13300	8558	1	0
5985318870031566873	1081153563	1wjyhzcswq737	931	.346	.273	.000	13034	8387	1	0

15 rows selected.

SQL> pause

SQL> SQL> -- Let's look at some of these queries SQL> pause



SQL> pause

```
SQL>
SQL> -- Let's look at some of these queries
SQL> pause
```

SQL> @awr_show_sqlid.sql 2y383xj04ztf6 SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

no rows selected

```
### The Statement (DBA_HIST_SQLTEXT):
SELECT products.PRODUCT_ID,
PRODUCT NAME,
PRODUCT_DESCRIPTION,
CATEGORY ID,
WEIGHT CLASS,
WARRANTY_PERIOD,
SUPPLIER_ID,
PRODUCT STATUS,
LIST PRICE,
MIN_PRICE,
CATALOG URL,
QUANTITY_ON_HAND
FROM products,
inventories
WHERE products.product id = 782
AND inventories.product_id = products.product_id
AND rownum < 15
```



0 . .

```
AND inventories.product_id = products.product_id
AND rownum < 15
```

SQL> pause

SQL>

SQL> @awr_show_sqlid.sql dra5rjs03kmad SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

no rows selected

```
### The Statement (DBA_HIST_SQLTEXT):
SELECT products.PRODUCT_ID,
PRODUCT NAME,
PRODUCT_DESCRIPTION,
CATEGORY ID,
WEIGHT CLASS,
WARRANTY_PERIOD,
SUPPLIER_ID,
PRODUCT STATUS,
LIST PRICE,
MIN_PRICE,
CATALOG URL,
QUANTITY_ON_HAND
FROM products,
inventories
WHERE products.product_id = 195
AND inventories.product_id = products.product_id
AND rownum < 15
```



0 0 0

SQL> @awr_show_sqlid.sql dra5rjs03kmad SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_HISTORY):

no rows selected

```
### The Statement (DBA HIST SQLTEXT):
SELECT products.PRODUCT_ID,
PRODUCT_NAME,
PRODUCT_DESCRIPTION,
CATEGORY ID,
WEIGHT CLASS,
WARRANTY_PERIOD,
SUPPLIER ID,
PRODUCT STATUS,
LIST PRICE,
MIN_PRICE,
CATALOG URL,
QUANTITY ON HAND
FROM products,
inventories
WHERE products.product id = 195
AND inventories.product_id = products.product_id
AND rownum < 15
SQL> pause
SQL>
SQL> -- Sorting by FORCE_MATCHING_SIGNATURE allowed me to identify a significant consumer query that doesn't utilize binds
SQL>
SQL> exit
Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
[oracle@DB12c AWR_MINING3]$
```



LET'S MINE THE AWR!

DEMO - awr_top_plan_demo.sql



0 • •

[oracle@DB12c AWR_MINING3]\$ sqlplus / as sysdba

SQL*Plus: Release 12.1.0.1.0 Production on Fri Oct 23 10:41:14 2015

Copyright (c) 1982, 2013, Oracle. All rights reserved.

Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

SQL> @awr_top_plan_demo.sql SQL> alter session set container = sample;

Session altered.

SQL> SQL> -- Let's see how sorting by elapsed time looks when we aggregate by PLAN_HASH_VALUE SQL> pause



0 0 0

col iowait s for 9999999.999 col clwait s for 9999999.999 col apwait s for 9999999.999 col ccwait s for 9999999.999 col buffer gets for 9999999999999999 col disk reads for 9999999999999999 col direct writes for 9999999999999999 col diff salid for a13 col diff_plan for a10 col diff fms for a20 select * from (select to_char(plan_hash_value) diff_plan, decode(count(unique(sql id)),1,max(sql id),'#'||count(unique(sql id))) diff sqlid, decode(count(unique(force matching signature)),1,to char(max(force matching signature)),'#'||count(unique(force matching signature))) diff fms, sum(hss.executions delta) executions, round(sum(hss.elapsed_time_delta)/1000000,3) elapsed_time_s, round(sum(hss.cpu time delta)/1000000,3) cpu time s, round(sum(hss.iowait delta)/1000000,3) iowait s, round(sum(hss.clwait_delta)/1000000,3) clwait_s, - round(sum(hss.apwait_delta)/1000000,3) apwait_s, - round(sum(hss.ccwait delta)/1000000,3) ccwait s, - round(sum(hss.rows_processed_delta),3) rows_processed, round(sum(hss.buffer gets delta),3) buffer gets, round(sum(hss.disk_reads_delta),3) disk_reads, round(sum(hss.direct_writes_delta),3) direct_writes from dba_hist_sqlstat hss, dba_hist_snapshot hs where hss.snap id=hs.snap id and hs.snap id between &snap id from and &snap id to group by plan_hash_value order by &sort col nr desc) where rownum<=&top n;



```
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```

```
-- round(sum(hss.ccwait_delta)/1000000,3) ccwait_s,
round(sum(hss.rows_processed_delta),3) rows_processed,
round(sum(hss.buffer_gets_delta),3) buffer_gets,
round(sum(hss.disk_reads_delta),3) disk_reads,
round(sum(hss.direct_writes_delta),3) direct_writes
from dba_hist_sqlstat hss, dba_hist_snapshot hs
where hss.snap_id=hs.snap_id
and hs.snap_id between &snap_id_from and &snap_id_to
group by plan_hash_value
order by &sort_col_nr desc)
```

where rownum<=&top n;

SQL> pause

SQL>

SQL> @awr_top_by_plan_snaps.sql 25 50 5 10 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_PLAN	DIFF_SQLID	DIFF_FMS	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	#32	0	1591480	4574.840	5237.021	6.831	1591422	73737483	183290	791
725271039	c13sma6rkr27c	18298161888330075667	637670	521.987	571.116	.063	2880918	17263182	2209	0
1081153563	#999	5985318870031566873	835562	306.699	253.610	.034	11697868	7571650	1029	0
3241608609	gzhkw1qu6fwxm	0	638465	127.138	88.481	.006	638463	2052941	58	0
494735477	3fw75k1snsddx	0	231877	122.990	90.754	.065	231876	3933240	1734	0
1628223527	#3	#3	274516	106.226	63.743	.201	274515	2667630	4995	0
1655552467	8z3542ffmp562	17991828121679737456	666150	75.843	39.644	.009	602153	3805721	296	0
900611645	5ckxyqfvu60pj	6486229150489758732	638509	73.013	53.327	.150	638514	2554314	4454	0
214043693	c13sma6rkr27c	18298161888330075667	49428	52.195	48.078	.003	222650	1355632	36	0
1388734953	#2	#2	638196	47.943	16.982	.000	638475	3	0	0

10 rows selected.



round(sum(hss.direct_writes_delta),3) direct_writes from dba_hist_sqlstat hss, dba_hist_snapshot hs where hss.snap_id=hs.snap_id and hs.snap_id between &snap_id_from and &snap_id_to group by plan_hash_value order by &sort_col_nr desc) where rownum<=&top_n;</pre>

SQL> pause

```
SQL>
```

SQL> @awr_top_by_plan_snaps.sql 25 50 5 10 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_PLAN	DIFF_SQLID	DIFF_FMS	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	#32	0	1591480	4574.840	5237.021	6.831	1591422	73737483	183290	791
725271039	c13sma6rkr27c	18298161888330075667	637670	521.987	571.116	.063	2880918	17263182	2209	0
1081153563	#999	5985318870031566873	835562	306.699	253.610	.034	11697868	7571650	1029	0
3241608609	gzhkw1qu6fwxm	0	638465	127.138	88.481	.006	638463	2052941	58	0
494735477	3fw75k1snsddx	0	231877	122.990	90.754	.065	231876	3933240	1734	0
1628223527	#3	#3	274516	106.226	63.743	.201	274515	2667630	4995	0
1655552467	8z3542ffmp562	17991828121679737456	666150	75.843	39.644	.009	602153	3805721	296	0
900611645	5ckxyqfvu60pj	6486229150489758732	638509	73.013	53.327	.150	638514	2554314	4454	0
214043693	c13sma6rkr27c	18298161888330075667	49428	52.195	48.078	.003	222650	1355632	36	0
1388734953	#2	#2	638196	47.943	16.982	.000	638475	3	0	0

10 rows selected.

SQL> pause

SQL> SQL> -- What is plan 1628223527? SQL> pause



melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35

SQL> @awr_top_by_plan_snaps.sql 25 50 5 10 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_PLAN	DIFF_SQLID	DIFF_FMS	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
0	#32	0	1591480	4574.840	5237.021	6.831	1591422	73737483	183290	791
725271039	c13sma6rkr27c	18298161888330075667	637670	521.987	571.116	.063	2880918	17263182	2209	0
1081153563	#999	5985318870031566873	835562	306.699	253.610	.034	11697868	7571650	1029	0
3241608609	gzhkw1qu6fwxm	0	638465	127.138	88.481	.006	638463	2052941	58	0
494735477	3fw75k1snsddx	0	231877	122.990	90.754	.065	231876	3933240	1734	0
1628223527	#3	#3	274516	106.226	63.743	.201	274515	2667630	4995	0
1655552467	8z3542ffmp562	17991828121679737456	666150	75.843	39.644	.009	602153	3805721	296	0
900611645	5ckxyqfvu60pj	6486229150489758732	638509	73.013	53.327	.150	638514	2554314	4454	0
214043693	c13sma6rkr27c	18298161888330075667	49428	52.195	48.078	.003	222650	1355632	36	0
1388734953	#2	#2	638196	47.943	16.982	.000	638475	3	0	0

10 rows selected.

```
SQL> pause
```

```
SQL>
SQL> -- What is plan 1628223527?
SQL> pause
```

SQL> @awr_top_by_plan_detail_snaps.sql 25 50 5 15 1628223527 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_PLAN	DIFF_SQLID	DIFF_FMS	EXECUTIONS	ELAPSED_TIME_S	CPU_TIME_S	IOWAIT_S	ROWS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
and the second s		14366533292145951164	231905	88.169	50.906	.030	231904	2234211	743	0
1628223527	′ f9u2k84v884y7	2971448457592404441	29209	16.175	10.984	.171	29209	379803	4249	0
1628223527	' 3hatpjzrqvfn7	13119154137972506400	13402	1.882	1.853	.000	13402	53616	3	0



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0 #32	0	1591480	4574.840	5237.021	6.831	1591422	73737483	183290	791	
725271039 c13sma6rkr2	7c 18298161888330075667	637670	521.987	571.116	.063	2880918	17263182	2209	0	
1081153563 #999	5985318870031566873	835562	306.699	253.610	.034	11697868	7571650	1029	0	
3241608609 gzhkw1qu6fw	xm Ø	638465	127.138	88.481	.006	638463	2052941	58	0	
494735477 3fw75k1snsd	dx 0	231877	122.990	90.754	.065	231876	3933240	1734	0	
1628223527 #3	#3	274516	106.226	63.743	.201	274515	2667630	4995	0	
1655552467 8z3542ffmp5	62 17991828121679737456	666150	75.843	39.644	.009	602153	3805721	296	0	
900611645 5ckxyqfvu60	pj 6486229150489758732	638509	73.013	53.327	.150	638514	2554314	4454	0	
214043693 c13sma6rkr2	7c 18298161888330075667	49428	52.195	48.078	.003	222650	1355632	36	0	
1388734953 #2	#2	638196	47.943	16.982	.000	638475	3	0	0	
	528223527? detail_snaps.sql 25 50 5 50000 lines 260 tab off		,							
DIFF PLAN DIFF SQLID	DIFF FMS	EXECUTIONS EL	APSED TIME S	CPU TIME S	IOWAIT S R	OWS PROCESSED	BUFFER GETS	DISK READS	DIRECT WRITES	
1628223527 5mddt5kt45r	g3 14366533292145951164	231905	88.169	50.906	.030	231904	2234211	743	0	
1628223527 f9u2k84v884	y7 2971448457592404441	29209	16.175	10.984	.171	29209	379803	4249	0	
1628223527 3hatpjzrqvf	n7 13119154137972506400	13402	1.882	1.853	.000	13402	53616	3	0	
SQL> pause										

SQL> SQL> -- Let's look at some of these queries SQL> pause



SQL> pause

SQL> SQL> -- What is plan 1628223527? SQL> pause

SQL> @awr_top_by_plan_detail_snaps.sql 25 50 5 15 1628223527 SQL> set ver off pages 50000 lines 260 tab off echo off

DIFF_PLAN	DIFF_SQLID	DIFF_FMS	EXECUTIONS ELAPS	SED_TIME_S	CPU_TIME_S	IOWAIT_S ROU	WS_PROCESSED	BUFFER_GETS	DISK_READS	DIRECT_WRITES
	0	14366533292145951164	231905	88.169	50.906	.030	231904	2234211	743	0
		2971448457592404441 13119154137972506400	29209 13402	16.175 1.882	10.984 1.853	.171 .000	29209 13402	379803 53616	4249	0
1020223327	Shacpjziqvinv	1311913413/9/2300400	13402	1.002	1.055	.000	13402	55010	3	0

SQL> pause

SQL>

SQL> -- Let's look at some of these queries

SQL> pause

SQL> @awr_show_sqlid.sql 5mddt5kt45rg3 SQL> set ver off pages 50000 lines 32000 tab off long 9999999 timing off echo off #### Occurrences in ASH (DBA HIST ACTIVE SESS HISTORY):

SQL_ID	PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
5mddt5kt45rg3	JDBC Thin Client	New Order		Swingbench	18

The Statement (DBA_HIST_SQLTEXT):

UPDATE ORDERS SET ORDER_MODE = 'online', ORDER_STATUS = FLOOR(DBMS_RANDOM.VALUE(0, :B3)), ORDER_TOTAL = :B2 WHERE ORDER_ID = :B1



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1628223527 f9u2k84v884v7 2971448457592404441	29209	16.175	10.984	.171	29209	379803	4249	0
1628223527 3hatpjzrqvfn7 13119154137972506400	13402	1.882	1.853	.000	13402	53616	3	0
SQL> pause								
SQL> Let's look at some of these queries SQL> pause								
SQL> @awr_show_sqlid.sql 5mddt5kt45rg3 SQL> set ver off pages 50000 lines 32000 tab ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS_	0	timing off ech	no off					
SQL_ID PROGRAM	MODULE		ACTION		CLIENT_ID		COUNT(*)	
	New Order				Swingbench		18	
<pre>### The Statement (DBA_HIST_SQLTEXT): UPDATE ORDERS SET ORDER_MODE = 'online', ORDE</pre>	ER_STATUS = FLOOR(DBMS_RANDOM.VA	ALUE(0, :B3));	, ORDER_TOTAL	= :B2 WHERE ORDER	_ID = :B1		
SQL> pause								
SQL> @awr_show_sqlid.sql f9u2k84v884y7 SQL> set ver off pages 50000 lines 32000 tab ### Occurrences in ASH (DBA_HIST_ACTIVE_SESS	U	timing off ech	no off					
SQL_ID PROGRAM	MODULE		ACTION		CLIENT_ID		COUNT(*)	
	Process Orders				Swingbench		3	
<pre>### The Statement (DBA_HIST_SQLTEXT): UPDATE /*+ index(orders, order_pk) */ ORDERS</pre>	SET ORDER_STATUS =	= FLOOR(DBMS_F	RANDOM.VALUE(:E	33 + 1, :B2))	WHERE ORDER_ID =	:B1		
SQL> pause								



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SQL> SQL> Let's look at some of these SQL> pause SQL> @awr_show_sqlid.sql 5mddt5kt45m SQL> set ver off pages 50000 lines 3	rg3 32000 tab off long 9999999 tim	ming off echo off		
### Occurrences in ASH (DBA_HIST_ACT	TIVE_SESS_HISTORY):			
SQL_ID PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
5mddt5kt45rg3 JDBC Thin Client	New Order		Swingbench	18
### The Statement (DBA_HIST_SQLTEXT) UPDATE ORDERS SET ORDER_MODE = 'onli		MS_RANDOM.VALUE(0, :B3)), ORE	DER_TOTAL = :B2 WHERE ORDER_ID = :B1	
SQL> pause				
SQL> @awr_show_sqlid.sql f9u2k84v884 SQL> set ver off pages 50000 lines 3 ### Occurrences in ASH (DBA_HIST_AC	2000 tab off long 9999999 tim	ming off echo off		
SQL_ID PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
f9u2k84v884y7 JDBC Thin Client			Swingbench	3
<pre>### The Statement (DBA_HIST_SQLTEXT) UPDATE /*+ index(orders, order_pk) *</pre>		FLOOR(DBMS_RANDOM.VALUE(:B3 +	1, :B2)) WHERE ORDER_ID = :B1	
SQL> pause				
SQL> SQL> Is the plan the same, really	/?			

SQL> pause



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SQL_ID	PROGRAM	MODULE	ACTION	CLIENT_ID	COUNT(*)
f9u2k84v884y	7 JDBC Thin Client	Process Orders		Swingbench	3
	ement (DBA_HIST_SQLTEXT): ndex(orders, order_pk) */ ORDE	RS SET ORDER_STATUS	= FLOOR(DBMS_RANDOM.VALUE(:B3	+ 1, :B2)) WHERE ORDER_ID = :B1	
SQL> pause					
SQL> SQL> Is t SQL> pause	ne plan the same, really?				
SQL> select SQL_ID 5mddt	* from table(dbms_xplan.displa 5kt45rg3	y_awr('5mddt5kt45rg	3',1628223527));		
	S SET ORDER_MODE = 'online', O ANDOM.VALUE(0, :B3)), ORDER_T		DER_ID =		
Plan hash va	lue: 1628223527				
Id Opera	ation Name Ro	ws Bytes Cost	(%CPU) Time		
1 UPD/	TE STATEMENT ATE ORDERS DEX UNIQUE SCAN ORDER_PK	i i	(100) (0) 00:00:01		

16 rows selected.



0 . .

Id Operation	Name	Rows	Bytes	Cost	(%CPU)	Time
0 UPDATE STATEMENT 1 UPDATE 2 INDEX UNIQUE SCAN	ORDERS ORDER_PK	 1	 58		(100) (0)	00:00:01
16 rows selected.						
SQL> pause						
SQL> select * from table(dbm SQL_ID f9u2k84v884y7 JPDATE /*+ index(orders, ord FLOOR(DBMS_RANDOM.VALUE(:B3	 ler_pk) */ (ORDERS SE	T ORDER_	STATUS		223527));
SQL_ID f9u2k84v884y7 JPDATE /*+ index(orders, ord	 ler_pk) */ (ORDERS SE	T ORDER_	STATUS		223527));
SQL_ID f9u2k84v884y7 JPDATE /*+ index(orders, ord FLOOR(DBMS_RANDOM.VALUE(:B3	 ler_pk) */ (+ 1, :B2)	ORDERS SE) WHERE O	T ORDER_ RDER_ID	_STATUS = :B1	=	
SQL_ID f9u2k84v884y7 JPDATE /*+ index(orders, ord FLOOR(DBMS_RANDOM.VALUE(:B3 Plan hash value: 1628223527 Id Operation 0 UPDATE STATEMENT	 ler_pk) */ (+ 1, :B2)	ORDERS SE) WHERE O	T ORDER_ RDER_ID	STATUS = :B1	=	

15 rows selected.



O ● ● ● melsins — oracle@DB12c:~/AWR_MINING3 — ssh oracle@199.199.56.111 — 170×35
2 INDEX UNIQUE SCAN ORDER_PK 1 58 2 (0) 00:00:01
16 rows selected.
SQL> pause
Sér, hause
SQL> select * from table(dbms_xplan.display_awr('f9u2k84v884y7',1628223527));
SQL_ID f9u2k84v884y7
UPDATE /*+ index(orders, order_pk) */ ORDERS SET ORDER_STATUS =
FLOOR(DBMS_RANDOM.VALUE(:B3 + 1, :B2)) WHERE ORDER_ID = :B1
Plan hash value: 1628223527
Id Operation Name Rows Bytes Cost (%CPU) Time
0 UPDATE STATEMENT 3 (100)
1 UPDATE ORDERS 2 INDEX UNIQUE SCAN ORDER PK 1 39 2 (0) 00:00:01
2 INDEX UNIQUE SCAN ORDER_PK 1 39 2 (0) 00:00:01
15 rows selected.
SQL> pause
Solve Lacking at the ten execution plane in the sustam can help finding inefficient access with to the data
SQL> Looking at the top execution plans in the system can help finding inefficient access paths to the data SQL>
SQL> exit
Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
[oracle@DB12c AWR_MINING3]\$



SUMMARY

- AWR report is sufficient, except when it's not
 - No clear top consumer
 - Dynamic SQL
 - Combined reporting intervals
- Overhead of creating an AWR report
- TOPNSQL
- FORCE_MATCHING_SIGNATURE
- PLAN_HASH_VALUE
- Don't stop ! You decide how to filter and aggregate the data
 - Module
 - Action
 - ...





AWR is a complex beast, but it's not necessary to know much to start mining

Be Brave! But buy the "Diagnostics Pack" licenses first!



CONTACT INFORMATION



Demo scripts available here: <u>http://bit.ly/MiningAWRv1</u>

