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Oracle Database 11g: Performance Tuning

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DEMO VERSION (LIMITED CONTENT)

Questions & Answers

Question: 1

After running SQL Performance Analyzer (SPA), you observe a few regressed SQL statements in the SPA output. Identify the two actions that you would suggest for these regressed SQL statements. (Choose two.)

A. Running SQL Access Advisor
B. Adding them to SQL Plan Baseline
C. Submitting them to SQL Tuning Advisor
D. Running Automatic Database Diagnostic Monitor (ADDM)

Answer: BC

Question: 2

View the Exhibit exhibit1 to examine the series of SQL commands and parameter settings.

```
SQL> SHOW PARAMETER OPTIMIZER

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------
optimizer_capture_sql_plan_baselines boolean     TRUE
optimizer_dynamic_sampling           integer     2
optimizer_features_enable            string      11.1.0.6
optimizer_index_caching              integer     0
optimizer_index_cost_adj             integer     100
optimizer_mode                       string      ALL_ROWS
optimizer_secure_view_merging        boolean     TRUE
optimizer_use_invisible_indexes      boolean     FALSE
optimizer_use_pending_statistics     boolean     FALSE
optimizer_use_sql_plan_baselines     boolean     TRUE

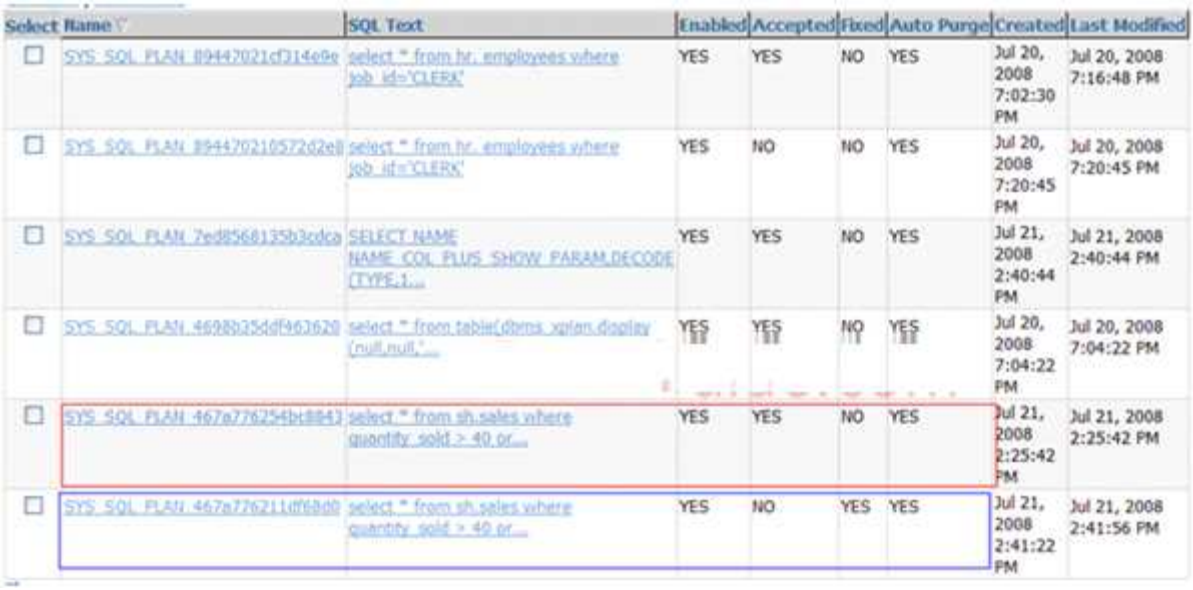
SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
SQL> ALTER SESSION SET OPTIMIZER_MODE=FIRST_ROWS;
SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
```

```
SQL> SHOW PARAMETER OPTIMIZER

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
optimizer_capture_sql_plan_baselines boolean     TRUE
optimizer_dynamic_sampling           integer     2
optimizer_features_enable            string      11.1.0.6
optimizer_index_caching              integer     0
optimizer_index_cost_adj             integer     100
optimizer_mode                       string      ALL_ROWS
optimizer_secure_view_merging        boolean     TRUE
optimizer_use_invisible_indexes      boolean     FALSE
optimizer_use_pending_statistics     boolean     FALSE
optimizer_use_sql_plan_baselines     boolean     TRUE

SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
SQL> ALTER SESSION SET OPTIMIZER_MODE=FIRST_ROWS;
SQL> SELECT * FROM sh.sales WHERE quantity_sold > 40 ORDER BY prod_id;
```

View the Exhibit exhibit2 to examine the plans available in the SQL plan baseline.



Select	Name	SQL Text	Enabled	Accepted	Fixed	Auto Purge	Created	Last Modified
☐	SYS_SQL_PLAN_89447021cf314e9e	select * from hr. employees where job_id='CLERK'	YES	YES	NO	YES	Jul 20, 2008 7:02:30 PM	Jul 20, 2008 7:16:48 PM
☐	SYS_SQL_PLAN_894470210572d2e8	select * from hr. employees where job_id='CLERK'	YES	NO	NO	YES	Jul 20, 2008 7:20:45 PM	Jul 20, 2008 7:20:45 PM
☐	SYS_SQL_PLAN_7ed8568135b3cdca	SELECT NAME NAME_COL_PLUS_SHOW_PARAM,DECODE (TYPE,1,...	YES	YES	NO	YES	Jul 21, 2008 2:40:44 PM	Jul 21, 2008 2:40:44 PM
☐	SYS_SQL_PLAN_4698b35ddf963620	select * from table(dbms_xplan.display (null,null,'...	YES	YES	NO	YES	Jul 20, 2008 7:04:22 PM	Jul 20, 2008 7:04:22 PM
☐	SYS_SQL_PLAN_467a776254bc8843	select * from sh.sales where quantity_sold > 40 or...	YES	YES	NO	YES	Jul 21, 2008 2:25:42 PM	Jul 21, 2008 2:25:42 PM
☐	SYS_SQL_PLAN_467a776211df6b00	select * from sh.sales where quantity_sold > 40 or...	YES	NO	YES	YES	Jul 21, 2008 2:41:22 PM	Jul 21, 2008 2:41:56 PM

The first plan (in red) is created when OPTIMIZER_MODE is set to ALL_ROWS and the second plan (in blue) is created when OPTIMIZER_MODE is set to FIRST_ROWS. Which SQL plan baseline would be used if the SQL query in exhibit1 is executed again when the value of OPTIMIZER_MODE is set to FIRST_ROWS?

A. the second plan, because it is a fixed plan
B. the first plan, because it is an accepted plan
C. the second plan, because it is the latest generated plan in FIRST_ROW mode
D. A new plan, because the second plan in FIRST_ROW mode is not an accepted plan

Answer: B

Question: 3

You work as a DBA for a company and you have the responsibility of managing one of its online transaction processing (OLTP) systems. The database encountered performance-related problems

and you generated an Automatic Workload Repository (AWR) report to investigate it further. View the Exhibits and examine the AWR report.

Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
DB CPU		584		29.08	
library cache: mutex X	14,721	71	5	3.53	Concurrency
latch: shared pool	1,158	55	48	2.76	Concurrency
cursor: pin S wait on X	3,777	50	13	2.50	Concurrency
log file sync	672	17	25	0.83	Commit

Time Model Statistics

- Total time in database user-calls (DB Time): 2008.5s
- Statistics including the word "background" measure background process time, and so do not contribute to the DB time statistic
- Ordered by % or DB time desc, Statistic name

Statistic Name	Time (s)	% of DB Time
sql execute elapsed time	1,731.94	86.23
DB CPU	584.11	29.08
parse time elapsed	533.72	26.57
hard parse elapsed time	416.43	20.73
connection management call elapsed time	33.26	1.66
PL/SQL compilation elapsed time	10.58	0.53
Java execution elapsed time	8.01	0.40
failed parse elapsed time	5.20	0.26
PL/SQL execution elapsed time	3.66	0.18
hard parse (sharing criteria) elapsed time	1.94	0.10
hard parse (bind mismatch) elapsed time	1.33	0.07
sequence load elapsed time	0.41	0.02
repeated bind elapsed time	0.05	0.00
DB time	2,008.48	
background elapsed time	32.06	
background cpu time	4.79	

Load Profile

	Per Second	Per Transaction	Per Exec	Per Call
DB Time(s):	3.8	12.6	0.01	0.00
DB CPU(s):	1.1	3.7	0.00	0.00
Redo size:	6,062.3	20,190.1		
Logical reads:	5,982.5	19,924.3		
Block changes:	25.5	84.9		
Physical reads:	2,778.2	9,252.7		
Physical writes:	2.9	9.7		
User calls:	1,263.4	4,207.7		
Parses:	506.6	1,687.3		
Hard parses:	53.3	177.5		
W/A MB processed:	726,646.9	2,420,040.5		
Logons:	1.1	3.5		
Executes:	513.1	1,708.9		
Rollbacks:	0.1	0.3		
Transactions:	0.3			

Dictionary Cache Stats

- "Pct Misses" should be very low (< 2% in most cases)
- "Final Usage" is the number of cache entries being used

Cache	Get Requests	Pct Miss	Scan Reqs	Pct Miss	Mod Reqs	Final Usage
dc_awr_control	13	69.23	0		2	1
dc_database_links	1,074	0.56	0		0	0
dc_global_oids	15,419	2.87	0		0	13
dc_histogram_data	77,565	21.21	0		0	571
dc_histogram_defs	168,045	23.16	0		0	1,014
dc_object_grants	44,042	4.17	0		0	59
dc_objects	358,789	3.30	0		0	396
dc_profiles	548	2.19	0		0	1
dc_rollback_segments	230	0.00	0		0	38
dc_segments	99,805	15.72	0		5	279
dc_sequences	25	100.00	0		25	0
dc_tablespaces	85,969	0.04	0		0	5
dc_users	179,387	0.35	0		0	20
global database name	927	0.11	0		0	1
kqlsubheap_object	197	30.46	0		0	0
outstanding_alerts	19	94.74	0		0	1

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Library Cache Activity

- "Pct Misses" should be very low

Namespace	Get Requests	Pct Miss	Pin Requests	Pct Miss	Reloads	Invali- dations
BODY	1,832	1.36	3,673	1.55	23	0
CLUSTER	2,761	1.81	1,590	3.14	0	0
INDEX	947	35.59	947	35.80	1	0
JAVA DATA	4	75.00	873	0.69	0	0
SQL AREA	340,330	23.79	602,683	12.78	22,142	5,231
TABLE/PROCEDURE	145,469	2.49	191,059	8.55	5,812	0
TRIGGER	5,539	0.23	5,539	0.29	0	0

What could be the problem in this database?

A. Java pool is not configured.
B. The CPU in the system is slow.
C. The shared pool size is inadequate.
D. The database buffer cache is inadequate.
E. The OPEN_CURSORS parameter is set to a small value.

Answer: C

Question: 4

You are working on an online transaction processing (OLTP) system. You detected free buffer waits events for your database instance running in a machine that has multiple CPUs. You increased the database buffer cache size as the first step. After a few hours of work on the database, further investigation shows that the same event is being recorded.
What would be your next step to avoid this event in future?

A. Decrease the value of the DBWR_IO_SLAVES parameter.
B. Set the USE_INDIRECT_DATA_BUFFERS parameter to TRUE.
C. Increase the value of the DB_WRITER_PROCESSES parameter.
D. Increase the value of the DB_FILE_MULTIBLOCK_READ_COUNT parameter.

Answer: C

Question: 5

You are working on a development database that was upgraded to Oracle Database 11g from Oracle Database 9i. An ADDM finding in this database says that the shared pool is inadequately sized, as shown in the Exhibit.



You diagnosed that this is due to different kinds of workloads and this occurs only during peak hours. You tried to resize this by shrinking the database buffer cache but that caused inadequate buffer cache problems. The following are the related parameter settings:

```
SQL> show parameter sga
name                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
lock_sga                             boolean     FALSE
pre_page_sga                         boolean     FALSE
sga_max_size                         big integer 300M
sga_target                           big integer 0
SQL> show parameter target
name                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
.....
fast_start_mttr_target               integer     0
memory_max_target                    big integer 0
memory_target                        big integer 0
pga_aggregate_target                 big integer 100M
sga_target                           big integer 0
```

You want to balance the memory between the System Global Area (SGA) components within SGA without affecting the size of the Program Global Area (PGA).
Which action would solve this problem?

A. Set the SGA_TARGET parameter to 300M.
B. Set the SGA_MAX_SIZE parameter to 400M.
C. Set the MEMORY_TARGET parameter to 100M.
D. Set the MEMORY_MAX_TARGET parameter to 300M.

Answer: A

Question: 6

You observed that some of the queries are performing poorly on the SALES_RECORDS table in your database. On further investigation, you find that at the end of each day the contents of the SALES_RECORDS table are transferred to the SALES table and deleted from the SALES_RECORDS table. The deleted operations cause the table to be sparsely populated.
You decided to use the ALTER TABLE...SHRINK SPACE COMPACT command to shrink the table. Why would you choose this method? (Choose all that apply.)

A. because it can be used during peak hours
B. because it avoids unnecessary cursor invalidation
C. because it adjusts the high-water mark (HWM) immediately
D. because you have long-running queries that might span the shrink operation
E. because it does not allow any data manipulation language (DML) operations, thereby making the shrink operation faster

Answer: ABD

Question: 7

View the Exhibit and examine a portion of the output obtained from the following query:

STAT_ID	STAT_NAME	VALUE
3649082374	DB time	61021783
2748282437	DB CPU	3890625
4157170894	background elapsed time	42472524
2451517896	background cpu time	2796875
4127043053	sequence load elapsed time	0
1431595225	parse time elapsed	10983653
372226525	hard parse elapsed time	10480831
2821698184	sql execute elapsed time	50353110
1990024365	connection management call elapsed time	855906

SQL> SELECT * FROM v$sys_time_model; Select three correct interpretations of the time model statistics. (Choose three.)

A. DB time includes the wait time of all the nonidle and idle user sessions.
B. SQL execute elapsed time includes the time spent in performing fetches of query results.
C. DB CPU includes the CPU time spent on database user-level calls and background CPU time.
D. SQL execute elapsed time includes components of the hard parse elapsed time like bind elapsed time.
E. DB time includes the connection management call elapsed time excluding the background process time.

Answer: BDE

Question: 8

A batch workload that historically completed in the maintenance window between 10:00 PM and midnight is currently showing poor performance and completing at 2 AM. To help in the diagnosis of the performance degradation, the senior DBA in your organization asks you to execute the awrddrpt.sql script to produce a Compare Periods report.
Which two statements are true about the report produced by this script? (Choose two.)

A. It is refreshed automatically based on the moving window baseline.
B. It compares details between any two selected time periods of the same duration.
C. It normalizes the statistics by the amount of time spent on the database for each time period.
D. It compares details between two consecutive time periods of the same or different durations and is refreshed every 60 minutes.

Answer: BC

Question: 9

You plan to use adaptive thresholds as part of the performance tuning activity. You decide to increase the window size of the default moving window baseline for all metric observations and comparisons in your database. The following error occurs when you try to increase the window size through Enterprise Manager: Failed to commit: ORA-13541: system moving window baseline size (1296000) greater than retention (1036800) ORA-06512: at "SYS.DBMS_WORKLOAD_REPOSITORY", line 601 ORA-06512: at line 2 Which action would allow you to perform the preceding task successfully?

A. increasing the flashback retention period
B. increasing the retention period for SQL Management Base
C. increasing the undo retention period for the database instance
D. increasing the Automatic Workload Repository (AWR) retention period

Answer: D

Question: 10

Identify two correct statements about the Active Session History (ASH) data. (Choose two.)

A. A part of SGA memory is used to store ASH data as rolling buffer.
B. The ASH data can be analyzed between any two small time intervals.
C. All ASH data in memory are flushed to disk by MMON in every 3 seconds.
D. All ASH data in memory are flushed to disk by MMNL process whenever the buffer is full.

Answer: AB

Question: 11

A user in a session executed the following SQL statement to set the optimizer mode:
ALTER SESSION SET OPTIMIZER_MODE = ALL_ROWS What impact would it have on the goal of the optimizer for that session? (Choose all that apply.)

A. Statement level OPTIMIZER_MODE hints take precedence over the session-level setting.
B. The OPTIMIZER_MODE parameter set at instance level takes precedence over the session-level value.
C. The optimizer uses a cost-based approach, regardless of the presence of statistics; it optimizes with a goal of best response time.

D. The optimizer uses a cost-based approach for all SQL statements in the session, regardless of the presence of statistics; it optimizes with a goal of best throughput.

Answer: AD

Question: 12

You are working on an online transaction processing (OLTP) system. By day most of the application users perform queries accessing the most recently added or modified rows. The applications have most of the queries based on multiple tables. But at night, some batch processing is also done. Which two actions would you recommend to choose a goal for the optimizer based on the needs of your application? (Choose two.)

A. setting the OPTIMIZER_MODE parameter to ALL_ROWS at the instance level
B. setting the OPTIMIZER_MODE parameter to FIRST_ROWS_n at the instance level
C. asking the developer to add a hint /*ALL_ROWS*/ in the long-running batch processing queries
D. asking the developer to add a hint /*FIRST_ROWS_n*/ in the long-running batch processing queries

Answer: BC

Question: 13

Which three factors influence the optimizer's behavior while choosing an optimization approach and goal for a SQL statement? (Choose three.)

A. parsing of a SQL statement
B. operating system (OS) statistics
C. object statistics in the data dictionary
D. the OPTIMIZER_MODE initialization parameter
E. optimizer SQL hints for changing the query optimizer goal

Answer: CDE

Question: 14

Examine the initialization parameter values for the instance given below:

name	TYPE	VALUE
optimizer_capture_sql_plan_baselines	boolean	FALSE
optimizer_dynamic_sampling	integer	2
optimizer_features_enable	string	11.1.0.6
optimizer_index_caching	integer	0
optimizer_index_cost_adj	integer	100
optimizer_mode	string	ALL_ROWS
db_file_multiblock_read_count	integer	64

,

The index created on the column used in the WHERE clause of the query. You notice that the query is not using the index. Instead of an index scan, a full table scan is used.
View the Exhibit and examine the autotrace output for a query.

```
select * from employees where employee_id=107;

Execution Plan
----------------------------------------------------------
Plan hash value: 1601196873

--------------------------------------------------------------------------------
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time     |
--------------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |      |     1 |    71 |     3   (0)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| T    |     1 |    71 |     3   (0)| 00:00:01 |
--------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("EMPLOYEE_ID"=107)
```

What could be the reason for it? (Choose all that apply.)

A. The OPTIMIZER_INDEX_COST_ADJ initialization parameter has a low value.
B. The DB_FILE_MULTIBLOCK_READ_COUNT initialization parameter has a low value.
C. The statistics for the table and all the indexes associated with the table are not current.
D. The table has less than DB_FILE_MULTIBLOCK_READ_COUNT blocks under the high-water mark.

Answer: CD

Question: 15

Examine the initialization parameter values for the instance given below:

name	TYPE	VALUE
optimizer_capture_sql_plan_baselines	boolean	FALSE
optimizer_dynamic_sampling	integer	2
optimizer_features_enable	string	11.1.0.6
optimizer_index_caching	integer	0
optimizer_index_cost_adj	integer	100
optimizer_mode	string	ALL_ROWS
db_file_multiblock_read_count	integer	64

You notice that the one of the queries is using a full table scan (view Exhibit1) instead of index unique scan (view Exhibit2). The index is present on the column that is accessed in the WHERE clause of the query. The cost for a full table scan is more than that for an index unique scan.

```
Execution Plan
----------------------------------------------------------
Plan hash value: 1601196873

--------------------------------------------------------------------------------
| Id  | Operation          | Name | Rows  | Bytes | Cost (%CPU)| Time     |
--------------------------------------------------------------------------------
|   0 | SELECT STATEMENT   |      |     1 |    71 |     3   (0)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| T    |     1 |    71 |     3   (0)| 00:00:01 |
--------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("EMPLOYEE_ID"=107)



----------------------------------------------------------
Plan hash value: 1076294677

-----------------------------------------------------------------------------------------
| Id  | Operation                    | Name   | Rows  | Bytes | Cost (%CPU)| Time     |
-----------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |        |     1 |    71 |     1   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| T      |     1 |    71 |     1   (0)| 00:00:01 |
|*  2 |   INDEX UNIQUE SCAN          | EMP PK |     1 |       |     1   (0)| 00:00:01 |
-----------------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("EMPLOYEE_ID"=107)
```

Why would the optimizer choose full table scan over index unique scan? (Choose all that apply.)

A. The OPTIMIZER_INDEX_COST_ADJ initialization parameter is set to a low value.
B. The OPTIMIZER_INDEX_COST_ADJ initialization parameter is set to a high value.
C. The DB_FILE_MULTIBLOCK_READ_COUNT initialization parameter is set to a low value.
D. The statistics for the table and all the indexes associated with the table are not current.

Answer: BD

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