

1Z0-117

Oracle

Oracle Database 11g Release 2- SQL Tuning

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QUESTION: 1

Examine the query and its execution plan:

```
SQL > SELECT cust_last_name, sum (nu12(o.customer_id, 0, 1)) "Count"
      FROM customer c, orders o
      WHERE c.credit_limit > 1000
      AND c.customer_id = o.customer_id(+)
      GROUP By cust_last_name;
```

ID	Operations	Name	Rows	Bytes	Cost (%CPU)
0	SELECT STATEMENT		168	3192	6 (17)
1	HASH GROUP BY		168	3192	6 (17)
* 2	NESTED LOOPS OUTER		260	4940	5 (0)
* 3	TABLE ACCESS FULL	CUSTOMER	260	3900	5 (0)
* 4	INDEX RANGE SCAN	ORD_CUSTOMER_IX	105	420	0 (0)

Predicate Information (identified by operation id):

```
-----
3 - filter ("C". "CREDIT_LIMIT"> 1000)
4 - access("C". "CUSTOMER_ID" = "0" "CUSTOMER_ID" (+)
      Filter ("0" "CUSTOMER_ID" (+)>0)
```

Which statement is true regarding the execution plan?

- A. This query first fetches rows from the CUSTOMERS table that satisfy the conditions, and then the join return NULL from the CUSTOMER_ID column when it does not find any corresponding rows in the ORDERS table.
- B. The query fetches rows from CUSTOMERS and ORDERS table simultaneously, and filters the rows that satisfy the conditions from the resultset.
- C. The query first fetches rows from the ORDERS table that satisfy the conditions, and then the join returns NULL form CUSTOMER_ID column when it does not find any corresponding rows in the CUSTOMERS table.
- D. The query first joins rows from the CUSTOMERS and ORDERS tables and returns NULL for the ORDERS table columns when it does not find any corresponding rows in the ORDERS table, and then fetches the rows that satisfy the conditions from the result set.

Answer: A

QUESTION: 2

Which three statements are true about histograms?

- A. They capture the distribution of different values in an index for better selectivity estimates.
- B. They can be used only with indexed columns.
- C. They provide metadata about distribution of and occurrences of values in a table column.

- D. They provide improved selectivity estimates in the presence of data skew, resulting in execution plans with uniform distribution.
- E. They help the optimizer in deciding whether to use an index or a full table scan.
- F. They help the optimizer to determine the fastest table join order.

Answer: C, E, F

Explanation:

C:A histogram is a frequency distribution (metadata) that describes the distribution of data values within a table. E:It's well established that histograms are very useful for helping the optimizer choose between a full-scan and an index-scan. F:Histograms may help the Oracle optimizer in deciding whether to use an index vs. a full-table scan (where index values are skewed) or help the optimizer determine the fastest table join order. For determining the best table join order, the WHERE clause of the query can be inspected along with the execution plan for the original query. If the cardinality of the table is too-high, then histograms on the most selective column in the WHERE clause will tip-off the optimizer and change the table join order.

Note:

*The Oracle Query Optimizer uses histograms to predict better query plans. The ANALYZE command or DBMS_STATS package can be used to compute these histograms.

Incorrect:

B:Histograms are NOT just for indexed columns.

– Adding a histogram to an un-indexed column that is used in a where clause can improve performance.

D:Histograms Opportunities

Any column used in a where clause with skewed data

Columns that are not queried all the time

Reduced overhead for insert, update, delete

QUESTION: 3

```
SQL > EXPLAIN PLAN SET Statement_id = 'test' for
SELECT prod_category, avg(amount_sold)
FROM sales s, products p
WHERE p.prod_id = s.prod_id
GROUP BY prod_Category;
```

Explained.

```
SQL> SELECT id "id", parent_id, position "pos"
        lpad(' ', 2 level) || operations || decode(id, 0, 'cost' || POSITION) "operations"
Options "option" object_name "object"
FROM plan_table
Connect by prior id_parent_id START WITH id = 0
ORDER BY id;
```

id	PARENT_ID	POS	Operation	Option	Object
0		539	SELECT STATEMENT Cost = 539		
1	0	1	HASH	Group By	
2	1	1	HASH JOIN		
3	2	1	VIEW		
4	3	1	HASH	GROUP BY	
5	4	1	PARTITION RANGE	ALL	
6	5	1	TABLE ACCESS	FULL	SALES
7	2	2	VIEW		indep_joins_002
8	7	1	VIEW RANGE		
9	8	1	INDEX	FAST FULL SCAN	PRODUCTS_PK
10	8	2	INDEX	FAST FULL SCAN	PRODUCTS_PROD_CAT_IX

11 rows are selected

View the exhibit and examine the query and its execution plan from the PLAN_TABLE. Which statement is true about the execution?

- A. The row with the ID column having the value 0 is the first step execution plan.
- B. Rows are fetched from the indexes on the PRODUCTS table and from the SALES table using full table scan simultaneously, and then hashed into memory.
- C. Rows are fetched from the SALES table, and then a hash join operator joins with rows fetched from indexes on the PRODUCTS table.
- D. All the partitions of the SALES table are read in parallel.

Answer: C

QUESTION: 4

Which four statements are correct about communication between parallel execution process?

- A. The number of logical pathways between parallel execution producers and consumers depends on the degree parallelism.
- B. The shared pool can be used for parallel execution messages buffers.
- C. The large pool can be used for parallel execution messages buffers.
- D. The buffer cache can be used for parallel execution message buffers.
- E. Communication between parallel execution processes is never required if a query uses full partition-wise joins.

F. Each parallel execution process has an additional connection to the parallel execution coordinator.

Answer: A, B, E, F

Explanation:

A: Note that the degree of parallelism applies directly only to intra-operation parallelism. If inter-operation parallelism is possible, the total number of parallel execution servers for a statement can be twice the specified degree of parallelism. No more than two sets of parallel execution servers can run simultaneously. Each set of parallel execution servers may process multiple operations. Only two sets of parallel execution servers need to be active to guarantee optimal inter-operation parallelism.

B: By default, Oracle allocates parallel execution buffers from the shared pool.

F: When executing a parallel operation, the parallel execution coordinator obtains parallel execution servers from the pool and assigns them to the operation. If necessary, Oracle can create additional parallel execution servers for the operation. These parallel execution servers remain with the operation throughout job execution, then become available for other operations. After the statement has been processed completely, the parallel execution servers return to the pool.

Reference:

Oracle Database Data Warehousing Guide, Using Parallel Execution

QUESTION: 5

You have enabled DML by issuing: ALTER session ENABLE PARALLEL DML; The PARELLEL_DEGREE_POLICY initialization parameter is set to AUTO. Which two options true about DML statements for which parallel execution is requested?

A. Statements for which PDML is requested will execute serially estimated time is less than the time specified by the PARALLEL_MIN_THRESHOLD parameter.

B. Statements for which PDML is requested will be queued if the number of busy parallel execution servers greater than PARALLEL_MIN_SERVERS parameter.

C. Statements for which PDML is requested will always execute in parallel if estimated execution in parallel if estimated execution time is greater than the time specified by the PARELLEL_MIN_TIME_THRESHOLD parameter.

D. Statements for which PDML is requested will be queued if the number of busy parallel execution servers is greater than PARELLEL_SERVERS_TARGET parameter.

E. Statement for which PDML is requested will be queued if the number of busy parallel execution servers is greater than PARELLEL_DEGREE_LIMIT parameter.

Answer: C, D

Explanation:

C:PARALLEL_MIN_TIME_THRESHOLD specifies the minimum execution time a statement should have before the statement is considered for automatic degree of parallelism. By default, this is set to 30 seconds. Automatic degree of parallelism is only enabled if PARALLEL_DEGREE_POLICY is set to AUTO or LIMITED.

D:PARALLEL_SERVERS_TARGET specifies the number of parallel server processes allowed to run parallel statements before statement queuing will be used. When the parameter PARALLEL_DEGREE_POLICY is set to AUTO, Oracle will queue SQL statements that require parallel execution, if the necessary parallel server processes are not available. Statement queuing will begin once the number of parallel server processes active on the system is equal to or greater than PARALLEL_SERVER_TARGET.

Note:

*PARALLEL_DEGREE_POLICY specifies whether or not automatic degree of Parallelism, statement queuing, and in-memory parallel execution will be enabled.

AUTO

Enables automatic degree of parallelism, statement queuing, and in-memory parallel execution.

* PARALLEL_MIN_SERVERS specifies the minimum number of parallel execution processes for the instance. This value is the number of parallel execution processes Oracle creates when the instance is started.

Reference:

OracleDatabase Reference;PARALLEL_SERVERS_TARGET

QUESTION: 6

Examine Exhibit1 to view the query and its AUTOTRACE output.

```
SQL> SET AUTOTRACE TRACEONLY
SQL> SELECT prod_category, AVG(amount_sold)
FROM sales s, products P
WHERE P.prod_id = S.prod_id
GROUP BY prod_category;
```

Execution Plan

Plan hash value: 1197568639							
id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart
0	SELECT STATEMENT		5	255	639 (11)	00:00:07	
1	HASH GROUP BY		5	255	539 (11)	00:00:07	
2	HASH JOIN		72	3672	538 (11)	00:00:07	
3	VIEW	VW_GBC_5	72	2160	535 (11)	00:00:07	
4	HASH GROUP BY		72	648	535 (11)	00:00:07	
5	PARTITION TANGE ALL		918K	8075K	494 (3)	00:00:06	1
6	TABLE ACCESS FULL	SALES	918K	8075K	684 (3)	00:00:06	1
7	VIEW	INDEX\$_JOIN_002	72	1512	3 (34)	00:00:01	
8	HASH JOIN						
9	INDEX FAST FULL SCAN	PRODUCT_PK	72	1512	1 (0)	00:00:01	
10	INDEX FAST FULL SCAN	PRODUCT_PROD_CAT_IX	72	1512	1 (0)	00:00:01	

Predicate information (identified by operation id)"

```
2- access ("P". "PROD_ID" = "ITEM_1")
8- access (ROEID=ROWID)
```

Statistics

```
0 recursive calls
0 db block gets
1726 consistent gets
0 physical reads
0 Redo size
778 bytes sent via SQL "Net to client"
434 bytes received via SQL "Net from client"
2 SQL "Net roundtrips to/from client"
0 sorts (memory)
```

Which two statements are true about tracing?

- A. The displayed plan will be stored in PLAN_TABLE.
- B. Subsequent execution of this statement will use the displayed plan that is stored in v\$SQL.
- C. The displayed plan may not necessarily be used by the optimizer.
- D. The query will not fetch any rows; it will display only the execution plan and statistics.
- E. The execution plan generated can be viewed from v\$SQLAREA.

Answer: A, C

Explanation:

A: The PLAN_TABLE is automatically created as a public synonym to a global temporary table. This temporary table holds the output of EXPLAIN PLAN statements for all users. PLAN_TABLE is the default sample output table into which the EXPLAIN PLAN statement inserts rows describing execution plans

Incorrect:

B: V\$SQL lists statistics on shared SQL area without the GROUP BY clause and contains one row for each child of the original SQL text entered. Statistics displayed in V\$SQL are normally updated at the end of query execution. However, for long running queries, they are updated every 5 seconds. This makes it easy to see the impact of long running SQL statements while they are still in progress.

D:autotrace traceonly – Displays execution plan and statistics without displaying the returned rows. This option should be used when a large result set is expected.

E:V\$SQLAREA lists statistics on shared SQL area and contains one row per SQL string. It provides statistics on SQL statements that are in memory, parsed, and ready for execution.

Note:

*The autotrace provides instantaneous feedback including the returned rows, execution plan, and statistics. The user doesn't need to be concerned about trace file locations and formatting since the output is displayed instantly on the screen. This is very important data that can be used to tune the SQL statement.

*SET AUTOTRACE ON

The AUTOTRACE report includes both the optimizer execution path and the SQL statement execution statistics.

SET AUTOTRACE TRACEONLY

Similar to SET AUTOTRACE ON, but suppresses the printing of the user's query output, if any. If

STATISTICS is enabled, query data is still fetched, but not printed.

QUESTION: 7

Which two types of column filtering may benefit from partition pruning?

- A. Equality operators on range-partitioned tables.
- B. In-list operators on system-partitioned tables
- C. Equality operators on system-partitioned tables
- D. Operators on range-partitioned tables
- E. Greater than operators on hash-partitioned tables

Answer: A, D

Explanation:

The query optimizer can perform pruning whenever a WHERE condition can be reduced to either one of the following two cases:

partition_column = constant

partition_column IN (constant1, constant2, ..., constantN)

In the first case, the optimizer simply evaluates the partitioning expression for the value given, determines which partition contains that value, and scans only this partition. In many cases, the equal sign can be replaced with another arithmetic comparison, including <, >, <=, >=, and <>. Some queries using BETWEEN in the WHERE clause can also take advantage of partition pruning.

Note:

*The core concept behind partition pruning is relatively simple, and can be described as “Do not scan partitions where there can be no matching values”.

When the optimizer can make use of partition pruning in performing a query, execution of the query can be an order of magnitude faster than the same query against a nonpartitioned table containing the same column definitions and data.

* Example:

```
Suppose that you have a partitioned table t1 defined by this statement: CREATE
TABLE t1 (
fname VARCHAR(50) NOT NULL, lname VARCHAR(50) NOT NULL,
region_code TINYINT UNSIGNED NOT NULL, dob DATE NOT NULL
)
PARTITION BY RANGE( region_code ) ( PARTITION p0 VALUES LESS
THAN (64), PARTITION p1 VALUES LESS THAN (128), PARTITION p2
VALUES LESS THAN (192), PARTITION p3 VALUES LESS THAN
MAXVALUE
);
```

Consider the case where you wish to obtain results from a query such as this one:

```
SELECT fname, lname, region_code, dob
FROM t1
WHERE region_code > 125 AND region_code < 130;
```

It is easy to see that none of the rows which ought to be returned will be in either of the partitions p0 or p3; that is, we need to search only in partitions p1 and p2 to find matching rows. By doing so, it is possible to expend much less time and effort in finding matching rows than would be required to scan all partitions in the table. This “cutting away” of unneeded partitions is known as pruning.

QUESTION: 8

Which two statements about In-Memory Parallel Execution are true?

- A. It can be configured using the Database Resource Manager.
- B. It increases the number of duplicate block images in the global buffer cache.
- C. It requires setting PARALLEL_DEGREE_POLICY to LIMITED.
- D. Objects selected for In-Memory Parallel Execution have blocks mapped to specific RAC instances.
- E. It requires setting PARALLEL_DEGREE_POLICY to AUTO
- F. Objects selected for In-Memory Parallel Execution must be partitioned tables or indexes.

Answer: D, E

Explanation:

D, E: In-Memory Parallel Execution

When the parameter PARALLEL_DEGREE_POLICY is set to AUTO, Oracle Database decides if an object that is accessed using parallel execution would benefit from being cached in the SGA

(also called the buffer cache). The decision to cache an object is based on a well-defined set of heuristics including the size of the object and frequency on which it is accessed. In an Oracle RAC environment, Oracle Database maps pieces of the object into each of the buffer caches on the active instances. By creating this mapping, Oracle Database automatically knows which buffer cache to access to find different parts or pieces of the object. Using this information, Oracle Database prevents multiple instances from reading the same information from disk over and over again, thus maximizing the amount of memory that can cache objects. If the size of the object is larger than the size of the buffer cache (single instance) or the size of the buffer cache multiplied by the number of active instances in an Oracle RAC cluster, then the object is read using direct-path reads.

E:PARALLEL_DEGREE_POLICY specifies whether or not automatic degree of Parallelism, statement queuing, and in-memory parallel execution will be enabled.
AUTO

Enables automatic degree of parallelism, statement queuing, and in-memory parallel execution.

Incorrect: C: LIMITED

Enables automatic degree of parallelism for some statements but statement queuing and in-memory Parallel Execution are disabled. Automatic degree of parallelism is only applied to those statements that access tables or indexes decorated explicitly with the PARALLEL clause. Tables and indexes that have a degree of parallelism specified will use that degree of parallelism.

Reference:

Oracle Database VLDB and Partitioning Guide11g,How Parallel Execution Works

QUESTION: 9

Which two are benefits of In-Memory Parallel Execution?

- A. Reduction in the duplication of block images across multiple buffer caches
- B. Reduction in CPU utilization
- C. Reduction in the number of blocks accessed
- D. Reduction in physical I/O for parallel queries
- E. Ability to exploit parallel execution servers on remote instance

Answer: A, C

Explanation:

Note:In-Memory Parallel Execution

When the parameter PARALLEL_DEGREE_POLICY is set to AUTO, Oracle Database decides if an object that is accessed using parallel execution would benefit from being cached in the SGA



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