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Oracle Database 11g Release 2: SQL Tuning Exam

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QUESTION 1

Which three statements are true the Automatic Tuning Optimizer (ATO)?

- A. It identifies the objects with stale or missing statistics and gathers statistics automatically.
- B. It investigates the effect of new or modified indexes on the access paths for a workload and recommends running that statistics through the SQL Access Advisor.
- C. It recommends a SQL profile to help create a better execution plan.
- D. It picks up resource-intensive SQL statements from the ADDM and recommends the use of materialized views to improve query performance.
- E. It identifies the syntactic, semantic, or design problems with structure of SQL statements leading to poor performance and suggests restricting the statements.
- F. It identifies resource-intensive SQL statements, runs them through the SQL Tuning Advisor, and implements the recommendations automatically.

Correct Answer: ADF

Under tuning mode, the optimizer can take several minutes to tune a single statement. It is both time and resource intensive to invoke Automatic Tuning Optimizer every time a query must be hard-parsed. Automatic Tuning Optimizer is meant for complex and high-load SQL statements that have nontrivial impact on the database.

Automatic Database Diagnostic Monitor (ADDM) proactively identifies high-load SQL statements that are good candidates for SQL tuning. The automatic SQL tuning feature also automatically identifies problematic SQL statements and implements tuning recommendations during system maintenance windows as an automated maintenance task.

The Automatic Tuning Optimizer performs the following types of tuning analysis:

Statistics Analysis SQL Profiling Access Path Analysis SQL Structure Analysis Alternative Plan Analysis

Note:

* Oracle Database uses the optimizer to generate the execution plans for submitted SQL statements. The optimizer operates in the following modes:

Normal mode The optimizer compiles the SQL and generates an execution plan. The normal mode generates a reasonable plan for the vast majority of SQL statements. Under normal mode, the optimizer operates with very strict time constraints, usually a fraction of a second.

Tuning mode

The optimizer performs additional analysis to check whether it can further improve the plan produced in normal mode. The optimizer output is not an execution plan, but a series of actions, along with their rationale and expected benefit for producing a significantly better plan. When running in tuning mode, the optimizer is known as the Automatic Tuning Optimizer.

QUESTION 2

You identified some DSS queries that perform expensive join and aggregation operations.



The queries access historical data from noncurrent partition of the fact tables.

What three actions could you perform to improve the response time of the queries without modifying the SQL statements?

- A. Set the QUERY_REWRITE_ENABLED to TRUE at the session level.
- B. Create an STS for the statements, run SQL Tuning Advisor for the STS, and implement any generated recommendations for materialized views.
- C. Set QUERY_REWRITE_ENABLED to TRUE at the instance level.
- D. Create an STS for the statements, run SQL Access Advisor for the STS, and implement any generated recommendations for materialized views.
- E. Set QUERY_REWRITE_INTEGRITY to ENFORCED at the instance level.

Correct Answer: BCD

A: * QUERY_REWRITE_ENABLED allows you to enable or disable query rewriting globally for the database. Values:

false

Oracle does not use rewrite.

true

Oracle costs the query with rewrite and without rewrite and chooses the method with the lower cost.

force

Oracle always uses rewrite and does not evaluate the cost before doing so. Use force when you know that the query will always benefit from rewrite and when

reduction in compile time is important.

To take advantage of query rewrite for a particular materialized view, you must enable query rewrite for that materialized view, and you must enable cost-based

optimization.

C: You can use SQL Tuning Advisor to tune one or more SQL statements

D: Using the SQL Access Advisor Wizard or API, you can do the following:

Recommend materialized views and indexes based on collected or hypothetical workload information.

Manage workloads.

Mark, update, and remove recommendations.

Note:

*

STS SQL tuning set.



*

A SQL Tuning Set is a database object that includes one or more SQL statements and their execution statistics and execution context. You can use the set as an input source for various advisors, such as SQL Tuning Advisor, SQL Access Advisor, and SQL Performance Analyzer.

Incorrect:

E: QUERY_REWRITE_INTEGRITY determines the degree to which Oracle must enforce query rewriting. At the safest level, Oracle does not use query rewrite transformations that rely on unenforced relationships.

Values:

enforced

Oracle enforces and guarantees consistency and integrity.

trusted

Oracle allows rewrites using relationships that have been declared, but that are not enforced by Oracle.

stale_tolerated

Oracle allows rewrites using unenforced relationships. Materialized views are eligible for rewrite even if they are known to be inconsistent with the underlying detail

data

QUESTION 3

You enabled auto degree of parallelism (DOP) for your instance.

Examine the query:

```
SQL> SELECT /*+PARALLEL (AUTO)*/ customers.cust_first_name,  
Customers.cust_last_name,  
MAX (QUANTITY_SOLD), AVG(QUANTITY_SOLD)  
FROM mysales, customers  
WHERE mysales.cust_id=customer.cust_id  
GROUP BY customers.cust_first_name, customers.cust_last_name;
```

Which two are true about the execution of this query?

- A. Dictionary DOP will be used, if present, on the tables referred in the query.
- B. DOP is calculated if the calculated DOP is 1.
- C. DOP is calculated automatically.
- D. Calculated DOP will always be 2 or more.
- E. The statement will execute with auto DOP only when PARALLEL_DEGREE_POLICY is set to AUTO.



Correct Answer: AC

*

PARALLEL (AUTO): The database computes the degree of parallelism (C), which can be 1 or greater (not D). If the computed degree of parallelism is 1, then the statement runs serially.

*

You can use the PARALLEL hint to force parallelism. It takes an optional parameter: the DOP at which the statement should run. In addition, the NO_PARALLEL hint overrides a PARALLEL parameter in the DDL that created or altered the table.

The following example illustrates computing the DOP the statement should use: `SELECT /*+ parallel(auto) */ ename, dname FROM emp e, dept d`

`WHERE e.deptno=d.deptno;`

* When the parameter PARALLEL_DEGREE_POLICY is set to AUTO, Oracle Database automatically decides if a statement should execute in parallel or not and what DOP it should use. Oracle Database also determines if the statement can be executed immediately or if it is queued until more system resources are available. Finally, Oracle Database decides if the statement can take advantage of the aggregated cluster memory or not.

QUESTION 4

Your instance has these parameter settings:

```
PARALLEL_DEGREE_POLICY=AUTO
PARALLEL_SERVERS_TARGET=64
PARALLEL_MIN_PERCENT=25
PARALLEL_MAX_SERVERS=128
PARALLEL_MIN_SERVERS=0
PARALLEL_MIN_TIME_THRESHOLD=10
PARALLEL_DEGREE_LIMIT=8
```

Which three statements are true about these settings if no hints are used in a SQL statement?

- A. A statement estimated for more than 10 seconds always has its degree of parallelism computed automatically.
- B. A statement with a computed degree of parallelism greater than 8 will be queued for a maximum of 10 seconds.
- C. A statement that executes for more than 10 seconds always has its degree of parallelism computed automatically.
- D. A statement with a computed degree of parallelism greater than 8 will raise an error.
- E. A statement with any computed degree of parallelism will be queued if the number of busy parallel execution processes exceeds 64.
- F. A statement with a computed degree of parallelism of 20 will be queued if the number of available parallel execution processes is less than 5.

Correct Answer: CEF



C (not A): 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.

: PARALLEL_DEGREE_LIMIT integer

A numeric value for this parameter specifies the maximum degree of parallelism the optimizer can choose for a SQL statement when automatic degree of parallelism is active. Automatic degree of parallelism is only enabled if PARALLEL_DEGREE_POLICY is set to AUTO or LIMITED.

E: 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.

F: PARALELL_MIN_MINPERCENT

PARALLEL_MIN_PERCENT operates in conjunction with PARALLEL_MAX_SERVERS and PARALLEL_MIN_SERVERS. It lets you specify the minimum percentage of parallel execution processes (of the value of PARALLEL_MAX_SERVERS) required for parallel execution. Setting this parameter ensures that parallel operations will not execute sequentially unless adequate resources are available. The default value of 0 means that no minimum percentage of processes has been set.

Consider the following settings: PARALLEL_MIN_PERCENT = 50 PARALLEL_MIN_SERVERS = 5
PARALLEL_MAX_SERVERS = 10

If 8 of the 10 parallel execution processes are busy, only 2 processes are available. If you then request a query with a degree of parallelism of 8, the minimum 50% will not be met.

Note: With automatic degree of parallelism, Oracle automatically decides whether or not a statement should execute in parallel and what degree of parallelism the statement should use. The optimizer automatically determines the degree of parallelism for a statement based on the resource requirements of the statement.

However, the optimizer will limit the degree of parallelism used to ensure parallel server processes do not flood the system. This limit is enforced by PARALLEL_DEGREE_LIMIT.

Values:

CPU

IO

integer

A numeric value for this parameter specifies the maximum degree of parallelism the optimizer can choose for a SQL statement when automatic degree of parallelism is active. Automatic degree of parallelism is only enabled if PARALLEL_DEGREE_POLICY is set to AUTO or LIMITED.

Reference: PARALLEL_MIN_TIME_THRESHOLD PARALLEL_DEGREE_LIMIT PARALELL_MIN_MINPERCENT
PARALELL_SERVERS_TARGET

QUESTION 5

Which statement is true about an automatic SQL task?



- A. It will attempt to tune the currently running SQL statements that are highly resource intensive.
- B. It will automatically implement new SQL profiles for the statements that have existing SQL profiles.
- C. It will attempt to tune all-long-running queries that have existing SQL profiles.
- D. It will automatically implement SQL profiles if a three-fold benefit can be achieved and automatic profile implementation is enabled.
- E. It will tune all the top SQL statements from AWR irrespective of the time it takes to complete the task in a maintenance window.

Correct Answer: D

Optionally, implements the SQL profiles provided they meet the criteria of threefold performance improvement

The database considers other factors when deciding whether to implement the SQL profile. For example, the database does not implement a profile when the objects referenced in the statement have stale optimizer statistics. SQL profiles that have been implemented automatically show type is AUTO in the DBA_SQL_PROFILES view. If the database uses SQL plan management, and if a SQL plan baseline exists for the SQL statement, then the database adds a new plan baseline when creating the SQL profile. As a result, the optimizer uses the new plan immediately after profile creation.

Incorrect:

E: Oracle Database automatically runs SQL Tuning Advisor on selected high-load SQL statements from the Automatic Workload Repository (AWR) that qualify as

tuning candidates. This task, called Automatic SQL Tuning, runs in the default maintenance windows on a nightly basis. By default, automatic SQL tuning runs for

at most one hour.

Note:

After automatic SQL tuning begins, the database performs the following steps:

1. Identifies SQL candidates in the AWR for tuning

Oracle Database analyzes statistics in AWR and generates a list of potential SQL statements that are eligible for tuning. These statements include repeating high-load statements that have a significant impact on the database.

The database tunes only SQL statements that have an execution plan with a high potential for improvement. The database ignores recursive SQL and statements that have been tuned recently (in the last month), parallel queries, DML, DDL, and SQL statements with performance problems caused by concurrency issues.

The database orders the SQL statements that are selected as candidates based on their performance impact. The database calculates the impact by summing the CPU time and the I/O times in AWR for the selected statement in the past week.

- 2.

Tunes each SQL statement individually by calling SQL Tuning Advisor

During the tuning process, the database considers and reports all recommendation types, but it can implement only SQL profiles automatically.

- 3.



Tests SQL profiles by executing the SQL statement

4.

Optionally, implements the SQL profiles provided they meet the criteria of threefold performance improvement. The database considers other factors when deciding whether to implement the SQL profile. For example, the database does not implement a profile when the objects referenced in the statement have stale optimizer statistics. SQL profiles that have been implemented automatically show type is AUTO in the

DBA_SQL_PROFILES view. If the database uses SQL plan management, and if a SQL plan baseline exists for the SQL statement, then the database adds a new plan baseline when creating the SQL profile. As a result, the optimizer uses the new plan immediately after profile creation.

Reference: Oracle Database Performance Tuning Guide, Automatic SQL Tuning

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