



Objectives

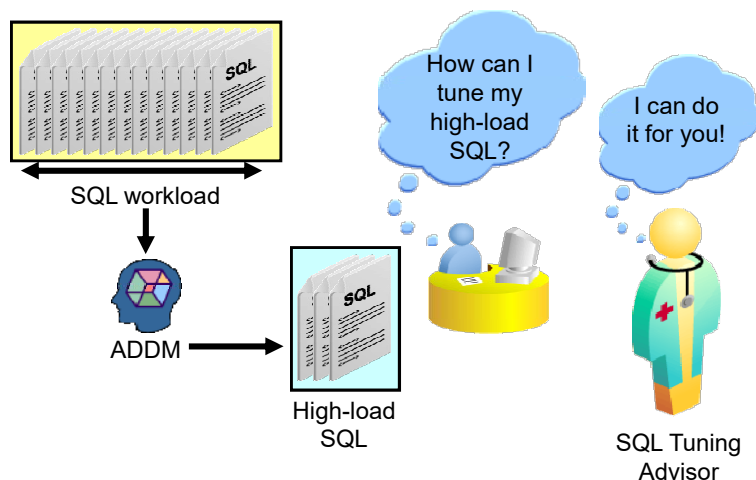
After completing this lesson, you should be able to:

- Describe statement profiling
- Use SQL Tuning Advisor

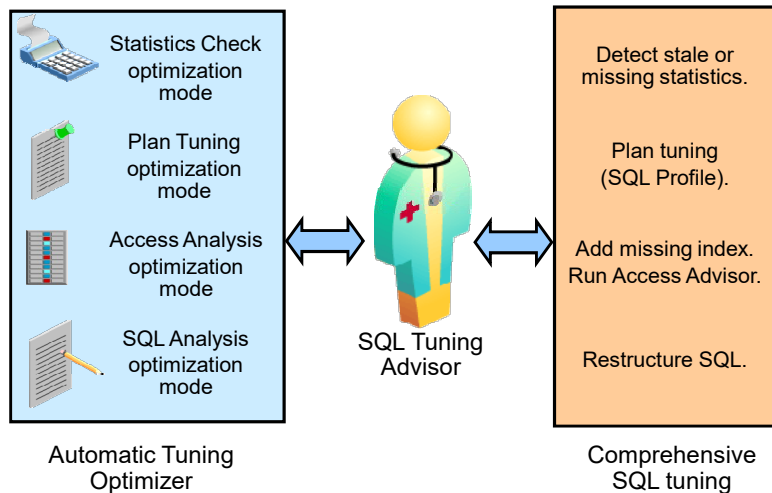
Tuning SQL Statements Automatically

- Tuning SQL statements automatically eases the entire SQL tuning process and replaces manual SQL tuning.
- The optimizer has two modes:
 - Normal mode
 - Tuning mode or Automatic Tuning Optimizer (ATO)
- You use SQL Tuning Advisor to access the tuning mode.
- You should use tuning mode only for high-load SQL statements.

Application Tuning Challenges



SQL Tuning Advisor: Overview



Stale or Missing Object Statistics

- Object statistics are key inputs to the optimizer.
- ATO verifies object statistics for each query object.
- ATO uses dynamic sampling and generates:
 - Auxiliary object statistics to compensate for missing or stale object statistics
 - Recommendations to gather object statistics where appropriate

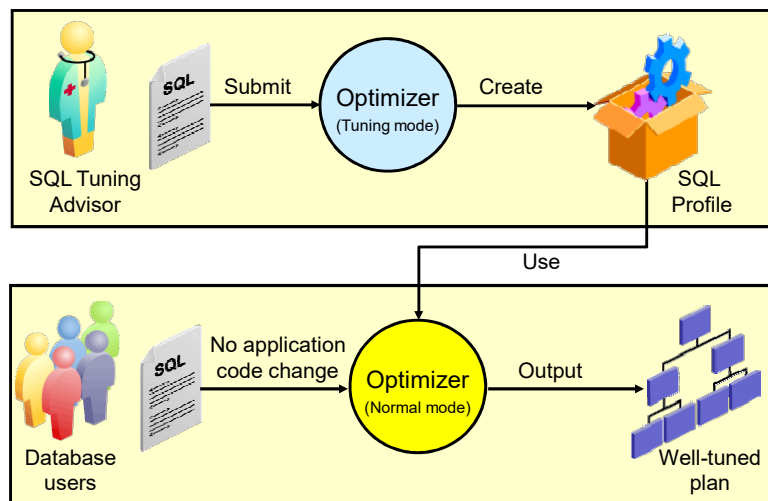
```
EXEC DBMS_STATS.GATHER_TABLE_STATS (  
    ownname=>'SH', tabname=>'CUSTOMERS',  
    estimate_percent=>DBMS_STATS.AUTO_SAMPLE_SIZE);
```

SQL Statement Profiling

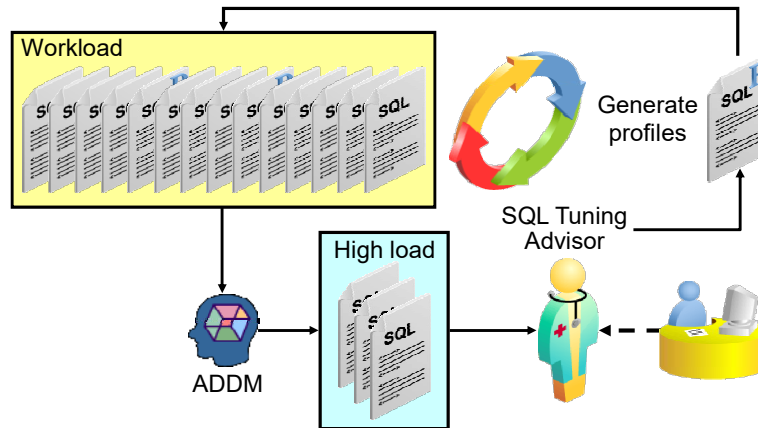
- Statement statistics are key inputs to the optimizer.
- ATO verifies statement statistics such as:
 - Predicate selectivity
 - Optimizer settings (FIRST_ROWS versus ALL_ROWS)
- ATO uses:
 - Dynamic sampling
 - Partial execution of the statement
 - Past execution history statistics of the statement
- ATO builds a profile if statistics were generated.

```
exec :profile_name :=  
dbms_sqltune.accept_sql_profile(  
task_name =>'my_sql_tuning_task');
```

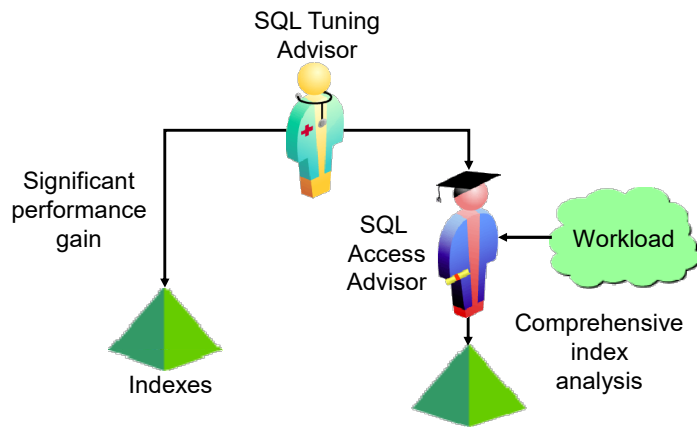
Plan Tuning Flow and SQL Profile Creation



SQL Tuning Loop

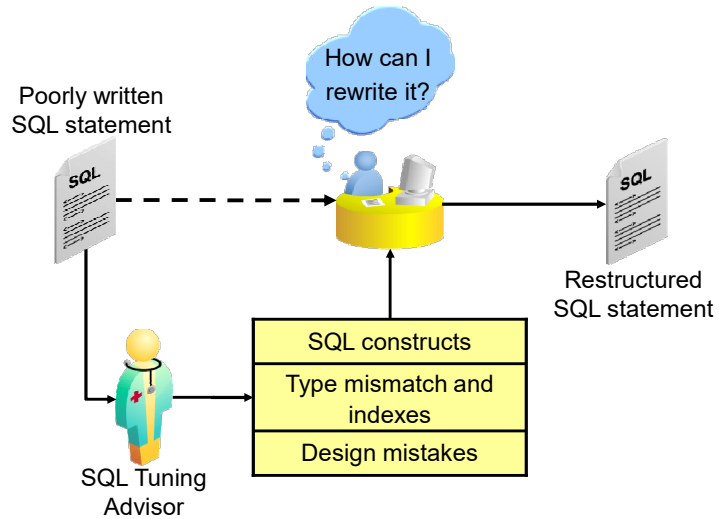


Access Path Analysis

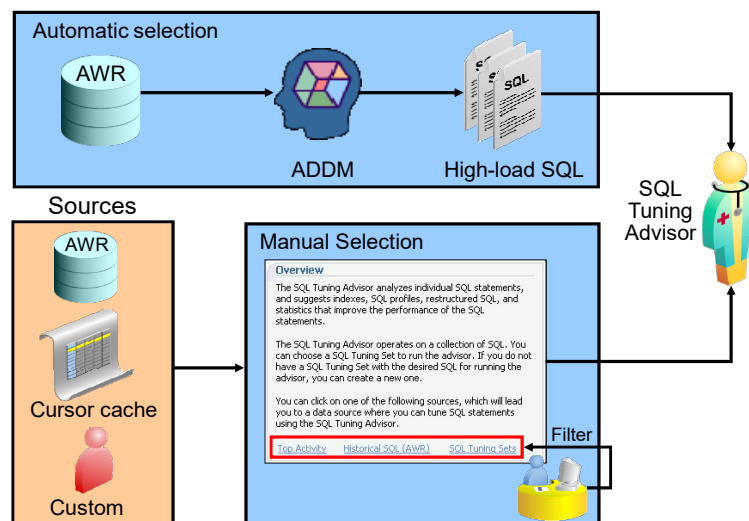


```
CREATE INDEX JFV.IDX$_00002 on JFV.TEST("C");
```

SQL Structure Analysis



SQL Tuning Advisor: Usage Model



Database Control and SQL Tuning Advisor

Advisor Central

Advisors Checkers View Data Real Time: 15 Second Refresh

Advisors

- ADDM
- Memory Advisors
- SQL Advisors**
- Automatic Undo Management
- MTTR Advisor
- SQL Performance Analyzer
- Data Recovery Advisor
- Segment Advisor
- Streams Performance Advisor

Schedule SQL Tuning Advisor

Specify the following parameters to schedule a job to run the SQL Tuning Advisor. Cancel Submit

SQL Advisors

The SQL Advisors address several important use cases having to do with SQL: identify physical structure, workload, tune individual statements with heavy execution plans, identify and correct result set divergences, failed SQL.

SQL Access Advisor

SQL Access Advisor Evaluate an entire workload of SQL and recommend indexes, partitions, and other database objects that will improve the collective performance of the SQL workload.

SQL Tuning Advisor

SQL Tuning Advisor Analyze individual SQL statements, and recommend SQL profiles, statistics, and other database objects to improve SQL performance.

Automatic SQL Tuning Results View the results of automated execution of SQL Tuning Advisor on observed SQL.

Overview

The SQL Tuning Advisor analyzes individual SQL statements, and suggests indexes, SQL profiles, restructured SQL, and statistics that improve the performance of the SQL statements.

The SQL Tuning Advisor operates on a collection of SQL. You can choose a SQL Tuning Set to run the advisor. If you do not have a SQL Tuning Set with the desired SQL for running the advisor, you can create a new one.

You can click on one of the following sources, which will lead you to a data source where you can tune SQL statements using the SQL Tuning Advisor.

Top Activity Historical SQL (AWR) SQL Tuning Sets

Running SQL Tuning Advisor: Example

ORACLE Enterprise Manager 11g Database Control

Database Instance: orcl.example.com > Logged in As SYS

Top Activity

Drag the shaded box to change the time period for the detail section below.

View Data Real Time: 15 Second Refresh

Detail for Selected 5 Minute Interval

Start Time Jul 21, 2010 2:22:56 PM UTC Run ASH Report

Top SQL

Actions Schedule SQL Tuning Advisor Go

Select All Select None

Select	Activity (%)	SQL ID	SQL Type
<input checked="" type="checkbox"/>	92.31	5mx0wvuf93vp	SELECT
<input type="checkbox"/>	2.46	gucabdydcfr2r	SELECT

Top Sessions

View Top Sessions

Activity (%)	Session ID	User Name	Program
90.6348	48	SH	sqlplus@EDBVR4P2 (TNS V1-V3)
4.23	40	SYS	oracle@EDBVR4P2 (J000)

Schedule SQL Tuning Advisor

Database Instance: orcl.example.com > Logged in As SYS

Schedule SQL Tuning Advisor

Specify the following parameters to schedule a job to run the SQL Tuning Advisor.

Name:

Description:

SQL Statements

Scope

Total Time Limit (minutes):

Scope of Analysis: ☐ Limited ☒ Comprehensive

The analysis is done without SQL Profile recommendation and takes about 1 second per statement.

This analysis includes SQL Profile recommendation.

Time Limit per Statement (minutes):

Schedule

Time Zone:

☒ Immediately ☐ Later

Date: (example: Jul 21, 2010)

Time: AM ☒ PM

Processing: SQL Tuning Advisor Task SQL_TUNING_JLS

The SQL Tuning Advisor task is executing. Click on the Cancel button to return to the previous page. The SQL Tuning Advisor task will continue to execute. You can check its status and view recommendations from the Advisor Central page. Click on the Interrupt button to abort the current execution.

SQL ID: 5mxdwvuf9j3vp Time Limit (seconds): 1800

Status: EXECUTING

Started: Jul 21, 2010 2:33:40 PM

Elapsed Time (seconds): 0

Implementing Recommendations

Database Instance: orcl.example.com > Advisor Central > SQL Tuning Task: SQL_TUNING_JLS > Logged in As SYS

Recommendations for SQL ID: 5mxdwvuf9j3vp

Only one recommendation should be implemented.

SQL Text

```
SELECT /*+ ORDERED USE_NL(c) FULL(c) FULL(s)*/ COUNT(*) FROM SALES S, CUSTOMERS C WHERE C.CUST_ID = S.CUST_ID AND CUST_FIRST_NAME='Dina' ORDER BY TIME_ID
```

Select Recommendation

Original Explain Plan (Annotated)

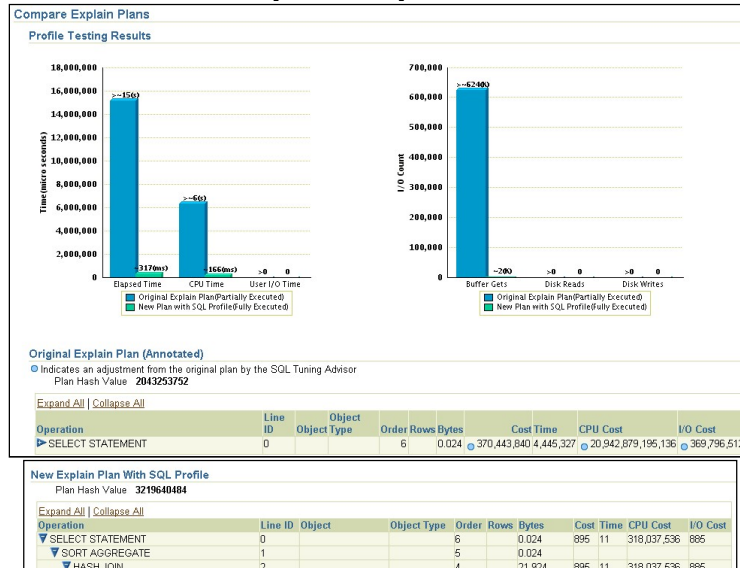
Implement

Select Type	Findings	Recommendations	Rationale	Benefit Other (%)	Statistics	New Explain Plan	Compare Explain Plans
SQL Profile	A potentially better execution plan was found for this statement.	Consider accepting the recommended SQL profile. No SQL profile currently exists for this recommendation.		99.74		aa	aa

Compare Explain Plans

Profile Testing Results

Compare Explain Plan



Quiz

SQL Tuning Advisor recommends:

- SQL Profiles
- Additional Indexes
- Deleting Indexes
- Rewriting SQL Statements
- All of the above

Quiz

The SQL Profile forces the best execution plan even when the data in the table changes.

- a. True
- b. False

Summary

In this lesson, you should have learned how to:

- Describe statement profiling
- Use SQL Tuning Advisor