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Importing and Exporting Optimizer Statistics

You can export and import optimizer statistics from the data dictionary to user-defined statistics tables. You can also copy statistics from one database to another database.

About Transporting Optimizer Statistics

When you transport optimizer statistics between databases, you must use `DBMS_STATS` to copy the statistics to and from a staging table, and tools to make the table contents accessible to the destination database.

Purpose of Transporting Optimizer Statistics

Importing and exporting are especially useful for testing an application using production statistics.

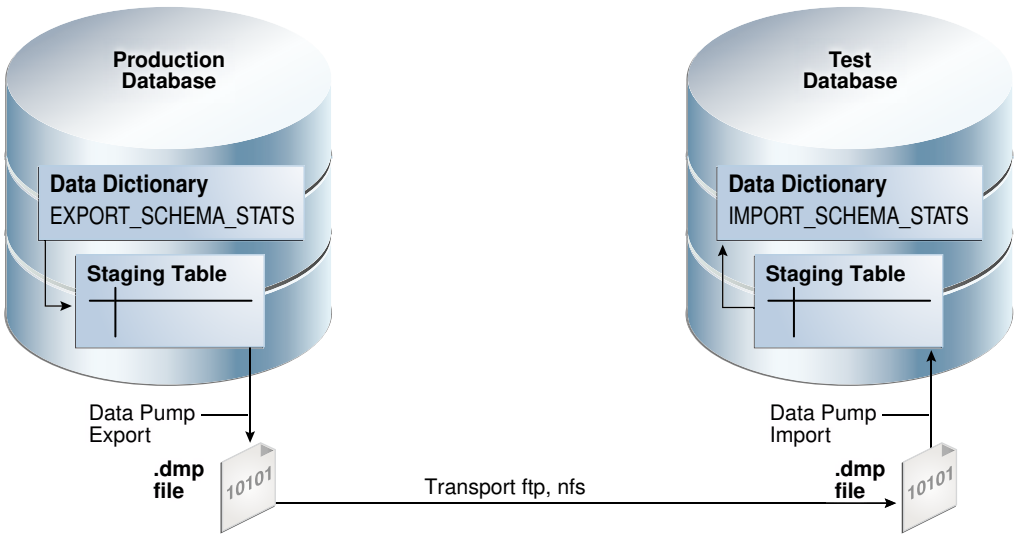
Developers often want to tune query plans in a realistic environment before deploying applications. A typical scenario would be to use `DBMS_STATS.EXPORT_SCHEMA_STATS` to export schema statistics from a production database to a test database.

How Transporting Optimizer Statistics Works

The typical transport operation uses a combination of `DBMS_STATS` and file transfer utilities.

The following figure illustrates the process using Oracle Data Pump and `ftp`.

Figure 17-1 Transporting Optimizer Statistics



The basic steps are as follows:

1. In the production database, copy the statistics from the data dictionary to a staging table using `DBMS_STATS.EXPORT_SCHEMA_STATS`.
2. Export the statistics from the staging table to a `.dmp` file using Oracle Data Pump.
3. Transfer the `.dmp` file from the production host to the test host using a transfer tool such as `ftp`.
4. In the test database, import the statistics from the `.dmp` file to a staging table using Oracle Data Pump.
5. Copy the statistics from the staging table to the data dictionary using `DBMS_STATS.IMPORT_SCHEMA_STATS`.

User Interface for Importing and Exporting Optimizer Statistics

`DBMS_STATS` provides the interface for importing and exporting statistics for schemas and tables.

The following subprograms in `DBMS_STATS` enable you to export schemas and different types of tables.

Table 17-1 Subprograms for Exporting Schema and Table Statistics

Subprogram	Description
`EXPORT_DATABASE_STATS`	This procedure exports statistics for all objects in the database and stores them in the user statistics tables identified by `statown.stattab`.
`EXPORT_DICTIONARY_STATS`	This procedure exports statistics for all data dictionary schemas (`SYS`, `SYSTEM`, and RDBMS component schemas) and stores them in the user statistics table identified by `stattab`.
`EXPORT_FIXED_OBJECT_STATS`	This procedure exports statistics for fixed tables and stores them in the user statistics table identified by `stattab`.
`EXPORT_SCHEMA_STATS`	This procedure exports statistics for all objects in the schema identified by `ownname` and stores them in the user statistics tables identified by `stattab`. By default, the `stat_category` parameter includes statistics collected during real-time statistics. The `REALTIME_STATS` value specifies only online statistics.
`EXPORT_TABLE_STATS`	This procedure exports statistics for a specified table (including associated index statistics) and stores them in the user statistics table identified by `stattab`. By default, the `stat_category` parameter includes statistics collected during real-time statistics. The `REALTIME_STATS` value specifies only online statistics.

The following subprograms in `DBMS_STATS` enable you to import schemas and different types of tables.

Table 17-2 Subprograms for Importing Optimizer Statistics

Subprogram	Description
IMPORT_DATABASE_STATS	This procedure imports statistics for all objects in the database from the user statistics table and stores them in the data dictionary.
IMPORT_DICTIONARY_STATS	This procedure imports statistics for all data dictionary schemas (SYS, SYSTEM, and RDBMS component schemas) from the user statistics table and stores them in the dictionary.
IMPORT_FIXED_OBJECT_STATS	This procedure imports statistics for fixed tables from the user statistics table and stores them in the data dictionary.
IMPORT_SCHEMA_STATS	This procedure imports statistics for all objects in the schema identified by ownname from the user statistics table and stores them in the data dictionary. By default, the stat_category parameter includes statistics collected during real-time statistics. The REALTIME_STATS value specifies only online statistics.
IMPORT_TABLE_STATS	This procedure import statistics for a specified table from the user statistics table identified by stattab and stores them in the data dictionary. By default, the stat_category parameter includes statistics collected during real-time statistics. The REALTIME_STATS value specifies only online statistics.

See Also:

Oracle Database PL/SQL Packages and Types Reference to learn about DBMS_STATS

Transporting Optimizer Statistics to a Test Database: Tutorial

You can transport schema statistics from a production database to a test database using Oracle Data Pump.

Prerequisites and Restrictions

When preparing to export optimizer statistics, note the following:

- Before exporting statistics, you must create a table to hold the statistics. The procedure DBMS_STATS.CREATE_STAT_TABLE creates the statistics table.
- The optimizer does not use statistics stored in a user-owned table. The only statistics used by the optimizer are the statistics stored in the data dictionary. To make the optimizer use statistics in user-defined tables, import these statistics into the data dictionary using the DBMS_STATS import procedure.

> **Note:**
>
> Exporting and importing statistics using `DBMS_STATS` is a distinct operation from using Data Pump Export and Import.

Assumptions

This tutorial assumes the following:

- You want to generate representative `sh` schema statistics on a production database and use `DBMS_STATS` to import them into a test database.
- Administrative user `dba1` exists on both production and test databases.
- You intend to create table `opt_stats` to store the schema statistics.
- You intend to use Oracle Data Pump to export and import table `opt_stats`.

To generate schema statistics and import them into a separate database:

1. On the production host, start SQL*Plus and connect to the production database as administrator `dba1`.
2. Create a table to hold the production statistics.

   For example, execute the following PL/SQL program to create user statistics table `opt_stats`:

   ```
   BEGIN
     DBMS_STATS.CREATE_STAT_TABLE (
       ownname => 'dba1'
   ,   stattab => 'opt_stats'
   );
   END;
   /
   ```

3. Gather schema statistics.

   For example, manually gather schema statistics as follows:

   ```
   -- generate representative workload
   EXEC DBMS_STATS.GATHER_SCHEMA_STATS('SH');
   ```

4. Use `DBMS_STATS` to export the statistics.

   For example, retrieve schema statistics and store them in the `opt_stats` table created previously:

   ```
   BEGIN
     DBMS_STATS.EXPORT_SCHEMA_STATS (
       ownname => 'dba1'
   ,   stattab => 'opt_stats'
   );
   END;
   /
   ```

5. Use Oracle Data Pump to export the contents of the statistics table.

For example, run the `expdp` command at the operating schema prompt:

```
expdp dba1 DIRECTORY=dpump_dir1 DUMPFILE=stat.dmp TABLES=opt_stats
```

6. Transfer the dump file to the test database host.
7. Log in to the test host, and then use Oracle Data Pump to import the contents of the statistics table.

   For example, run the `impdp` command at the operating schema prompt:

   ```
   impdp dba1 DIRECTORY=dpump_dir1 DUMPFILE=stat.dmp TABLES=opt_stats
   ```

8. On the test host, start SQL*Plus and connect to the test database as administrator `dba1`.
9. Use `DBMS_STATS` to import statistics from the user statistics table and store them in the data dictionary.

   The following PL/SQL program imports schema statistics from table `opt_stats` into the data dictionary:

   ```
   BEGIN
     DBMS_STATS.IMPORT_SCHEMA_STATS(
       ownname => 'dba1'
   ,   stattab => 'opt_stats'
   );
   END;
   /
   ```

See Also:

- *Oracle Database PL/SQL Packages and Types Reference* to learn about the `DBMS_STATS.CREATE_STAT_TABLE` function
- *Oracle Database PL/SQL Packages and Types Reference* for an overview of the statistics transfer functions
- *Oracle Database Utilities* to learn about Oracle Data Pump