37
DBMS_AUTO_MV

DBMS_AUTO_MV contains subprograms for configuring automatic materialized views.

This chapter contains the following topics:

- Using DBMS_AUTO_MV
- Summary of DBMS_AUTO_MV Subprograms

Using DBMS_AUTO_MV

The DBMS_AUTO_MV package contains functions and procedures to manage automatic materialized views.

This package is owned by SYS, so EXECUTE package privilege is required by non-SYS users. Grant EXECUTE privilege on the package to the users.

Summary of DBMS_AUTO_MV Subprograms

This table lists the DBMS_AUTO_MV package subprograms and briefly describes them.

Table 37-1 DBMS_AUTO_MV Package Subprograms

Subprogram	Description
CONFIGURE Procedure	Enables, disables, and configures the various parameters of the automatic materialized view feature.
DROP_AUTO_MVS Procedure	Drops automatic materialized views that were created. This routine can only be executed by DBA.
RECOMMEND Function	This function allows a user to manually generate automatic materialized view recommendations for SQL statements in a given SQL tuning set
REFRESH Procedure	This procedure allows a user to manually refresh all stale automatic materialized views in the system unconditionally.
REPORT_ACTIVITY Function	This function generates a report on the automatic materialized view activities and usage for a specified time duration. The report can be generated in text, HTML, or XML formats as specified by the argument type.
REPORT_LAST_ACTIVITY Function	This function generates a report on the most recent automatic materialized view activities and usage. The report can be generated in text, HTML, or XML formats as specified by the argument type.

CONFIGURE Procedure

This procedure enables, disables, and configures the various parameters of the automatic materialized view feature.

Syntax

```
DBMS_AUTO_MV.CONFIGURE (
   parameter   IN VARCHAR2,
   value       IN VARCHAR2,
   allow       IN BOOLEAN DEFAULT TRUE);
```

Parameters

Table 37-2 CONFIGURE Procedure Parameters

Parameter	Description
`parameter`	The name of the parameter to be modified. Parameter names are not case sensitive.
`value`	The value of the specified parameter.
`allow`	This parameter allows or disallows various schemas or app modules. It is applicable only for the `AUTO_MV_SCHEMA` and `AUTO_MV_APP_MODULE` parameters.

Parameters

Table 37-3 CONFIGURE Parameters Names

Parameter	Description
`AUTO_MV_MODE`	Enables, disables, or engages report-only mode. Possible values are: • `OFF`: No recommendations are made. This is the default value. • `REPORT ONLY`: This mode generates recommendations and stores them in the internal repository so they are available to the DBA through `DBA_AUTO_MV_ANALYSIS_RECOMMENDATIONS`. • `IMPLEMENT`: This mode generates, verifies, and publishes recommendations, or drops them.
`AUTO_MV_MAINT_TASK`	Activates and deactivated automatic maintenance of materialized views. • `ENABLE`: Activates automatic maintenance of materialized views. • `DISABLE`: Deactivates the automatic maintenance of materialized views. If automatic maintenance of materialized views is in progress, it finishes the maintenance. This is the default value. • `CLEANUP_AND_DISABLE`: Drops all automatic materialized views, and deactivates automatic maintenance of materialized views. If automatic materialized views maintenance is in progress, it finishes the maintenance before the task is deactivated.

Table 37-3 (Cont.) CONFIGURE Parameters Names

Parameter	Description
AUTO_MV_SPACE_BUDGET	Specifies the amount of space budget available for implementing automatic materialized views. The total space value is the sum of currently space used by all user tables (i.e. not system tables). The calculation does not include user access structures (like indexes or materialized views). Possible values are: • Budget in percent: A positive number ending with % symbol designating the percentage of currently utilized space for all user tables. • Budget in GB: A positive integer ending with GB that indicates the absolute space limit for automatic materialized views. For example, 10GB indicates 10 Gigabytes. The minimum value is 1GB but no maximum value. The default budget is 10% of the total size of user tables.
AUTO_MV_DEFAULT_TABLESPACE	Specifies the tablespace to place automatic materialized views. Possible values are: • Tablespace name: A valid Oracle tablespace name to be used when creating new automatic materialized views. Quoted identifiers are supported. • NULL: A new automatic materialized view is created in the default tablespace of the owner of parent object. If automatic materialized view has more than one parent object, such as materialized views defined on multiple base tables, the default tablespace of the owner of largest base table is selected. This is the default value. If the value is changed dynamically, it takes effect the next time automatic materialized views recommendations are implemented.
AUTO_MV_TEMP_TABLESPACE	Specifies the temporary tablespace while creating or refreshing automatic materialized views. Possible values are: • Tablespace name: A valid Oracle temp tablespace name to be used when creating new automatic materialized views and the data needs to be spilled to temp. • NULL: The temp table space assigned to the owner of the largest parent object of the automatic materialized views. This is the default value. If the value is changed dynamically, it takes effect the next time recommendations are implemented.
AUTO_MV_RETENTION	Specifies the number of days automatic materialized views exists without being utilized by a query. When the expiry period is reached, the materialized view is dropped. Positive integer: An integer between 1 and 373. The default value is 33 days.
AUTO_MV_ANALYZE_REPORT_RETENTION	Specifies the maximum number of days to retain analysis and recommendation history. Positive integer: An integer value between 0 and 90. Value 0 implies that history is not maintained. The default value is 31. The history of analysis and verification is retained in the DBA_AUTO_MV_* dictionary tables.
AUTO_MV_ANALYZE_WORKLOAD_WINDOW	Specifies the maximum number of hours to make recommendations. Positive integer: An integer value between 1 and 8760. The default value is 24.
AUTO_MV_ANALYZE_WORKLOAD_MIN_TIME	Specifies the minimum time in seconds for a query to be considered for automatic materialized views recommendation. Queries below this threshold are not considered for recommendations. Positive value: An integer value between 0 and 3600 (1 hour). The default value is 120 (2 minutes).

Table 37-3 (Cont.) CONFIGURE Parameters Names

Parameter	Description
AUTO_MV_SCHEMA	Specifies the schemas to include or exclude from creation of automatic materialized views. Possible values are: • TRUE: Adds the specified schema to the inclusion list. • FALSE: Adds the specified schema to the exclusion list. • NULL: Removes the specified schema from the list to which it is currently added. If both the lists (the inclusion list and the exclusion list) contain at least one schema, then all the schemas can use automatic materialized views, except the schemas listed in the exclusion list.
AUTO_MV_APP_MODULE	Specifies application modules to include or exclude from creation of automatic materialized views. Possible values are: • TRUE: Adds the specified application module to the inclusion list. • FALSE: Adds the specified application module to the exclusion list. • NULL: Removes the specified application module from the list to which it is currently added. Initially, the inclusion list and the exclusion list are empty and we can create automatic materialized views under all application modules when automatic automatic materialized views are enabled for a database.
AUTO_MV_VERIFY_REPORT_RETENTION	Specifies the maximum number of days to retain the verification history. Positive value: An integer value between 0 and 90 for the number of days the history of analysis and verification is retained in the DBA_AUTO_MV_* dictionary tables . Value 0 implies that history is not maintained. The default value is 31.
AUTO_MV_MAINT_REPORT_RETENTION	Specifies the maximum number of days to retain history of automatic materialized view maintenance. Positive integer: An integer value between 0 and 90 for the number of days the history of automatic materialized view refreshes is retained in the DBA_AUTO_MV_REFRESH_* dictionary tables. Value 0 means no history is maintained. The default value is 31.

Example

```
begin
   dbms_auto_mv.configure ('AUTO_MV_SPACE_BUDGET',  '50%');
end;
begin
   dbms_auto_mv.configure ('AUTO_MV_SCHEMA',  'SH', FALSE);
   dbms_auto_mv.configure ('AUTO_MV_SCHEMA',  'SCOTT');
end;
/
```

DROP_AUTO_MVS Procedure

This procedure drops automatic materialized views that were created. This routine can only be executed by DBA.

Syntax

```
DBMS_AUTO_MV.DROP_AUTO_MVS (
   owner            IN VARCHAR2,
   mv_name          IN VARCHAR2,
   allow_recreate   IN BOOLEAN DEFAULT FALSE);
```

Parameters

Table 37-4 DROP_AUTO_MVS Procedure Parameters

Parameter	Description
OWNER	Specifies the name of the owner of the automatic materialized views. If OWNER is explicity specified and MV_NAME is set to null, all automatic materialized views which the user has privileges are dropped. If OWNER is explicity specified and MV_NAME is set to null, all automatic materialized views with the given OWNER are dropped. Dropped automatic materialized views are not recreated automatically by the system as default.
MV_NAME	The name of the automatic materialized views.
ALLOW_RECREATE	Enables or disables the automatic creation of dropped automatic materialized views. FALSE disables the automatic creation of dropped automatic materialized views. This is default. TRUE enables the automatic creation of dropped automatic materialized views.

Examples

```
begin
   dbms_auto_mv.DROP_AUTO_MVS ('SH');
end;
/

begin
   dbms_auto_mv.DROP_AUTO_MVS ('SH', 'AUTO_MV$$_G2MKPB9SA1FB7');
end;
/
```

RECOMMEND Function

This function allows a user to manually generate automatic materialized view recommendations for SQL statements in a given SQL tuning set

Syntax

```
DBMS_AUTO_MV.RECOMMEND (
   sts_owner              IN  VARCHAR2  DEFAULT 'SYS',
   sts_name               IN  VARCHAR2  DEFAULT 'SYS_AUTO_STS',
   workload_start_time    IN  TIMESTAMP DEFAULT NULL,
   workload_end_time      IN  TIMESTAMP DEFAULT NULL,
   automv_mode            IN  VARCHAR2  DEFAULT 'REPORT ONLY')
RETURN VARCHAR2;
```

Parameters

Table 37-5 RECOMMEND Function Parameters

Parameter	Description
sts_owner	The name of the owner of the SQL tuning set. The default value is SYS.
sts_name	The name of the SQL tuning set. The default value is SYS_AUTO_STS.
workload_start_time	The start time of the workload window. The value NULL means that the default is chosen. The default is SYSDATE minus the number of hours defined by AUTO_MV_ANALYZE_WORKLOAD_WINDOW.
workload_end_time	The end time of the workload window.
automv_mode	When AUTOMV_MODE is set to REPORT ONLY, which is the default mode, the function will only output the recommendations. If this parameter is set to IMPLEMENT, then the recommended automatic materialized views will be verified and implemented.

Return Value

The execution name (execution_name) to be used in DBA_AUTO_MV% catalog views.

Examples

In the following examples, the default SQL tuning set, SYS_AUTO_STS is used. Make sure that SYS_AUTO_STS contains the required workload to generate the automatic materialized views.

Example 1: Generate and report recommendations using SYS_AUTO_STS for the past 24 hours. Note that the default behavior of this function is REPORT ONLY, so no automatic materialized view will be implemented.

```
var exec_name varchar2(200);
begin
    :exec_name := dbms_auto_mv.recommend();
end;
/

SELECT * FROM DBA_AUTO_MV_ANALYSIS_RECOMMENDATIONS
        WHERE exec_name = :exec_name;
```

Example 2: Generate and publish recommendations using SYS_AUTO_STS for the past 24 hours.

```
var exec_name varchar2(200);
begin
    :exec_name := dbms_auto_mv.recommend(automv_mode=>'IMPLEMENT');
end;
/
```

REFRESH Procedure

This procedure allows a user to manually refresh all stale automatic materialized views in the system unconditionally.

Syntax

```
DBMS_AUTO_MV.REFRESH ();
```

Example

```
begin
    dbms_auto_mv.refresh();
end;
/
```

REPORT_ACTIVITY Function

This function generates a report on the automatic materialized view activities and usage for a specified time duration. The report can be generated in text, HTML, or XML formats as specified by the argument type.

Syntax

```
DBMS_AUTO_MV.REPORT_ACTIVITY (
   activity_start        IN  TIMESTAMP WITH TIME ZONE DEFAULT SYSTIMESTAMP -1,
   activity_end          IN  TIMESTAMP WITH TIME ZONE DEFAULT SYSTIMESTAMP,
   type                  IN  VARCHAR2  DEFAULT 'TEXT',
   section               IN  VARCHAR2  DEFAULT 'ALL',
   level                 IN  VARCHAR2  DEFAULT 'TYPICAL')
RETURN CLOB;
```

Parameters

Table 37-6 REPORT_ACTIVITY Function Parameters

Parameter	Description
activity_start	The start time for report generation.
activity_end	The end time for report generation.
type	The format type in which the report needs to be generated. The possible values are: • TEXT • HTML • XML The default value is TEXT.

Table 37-6 (Cont.) REPORT_ACTIVITY Function Parameters

Parameter	Description
section	The section can be a combination of the following: • SUMMARY • MV_DETAILS • QUERY_DETAILS • VERIFICATION_DETAILS • ALL The default value is ALL. You can generate a specific combination of report by using + or – operators. For example, when section is specified as SUMMARY+MV_DETAILS, the generated report will contain only the summary and the details about the automatic materialized view.
level	The level can be either BASIC, TYPICAL, or ALL. When the level is set to BASIC, a minimum set of information regarding the most recent automatic materialized view activity is reported. On the other hand, when the level is set to ALL, a detailed report is generated. The default value is TYPICAL.

Return Value

This functions returns the report as a CLOB.

Examples

Example 1: The following call to REPORT_ACTIVITY() generates an HTML output for all the automatic materialized view activities:

```
select dbms_auto_mv.report_activity(type => 'HTML') from dual;
```

REPORT_LAST_ACTIVITY Function

This function generates a report on the most recent automatic materialized view activities and usage. The report can be generated in text, HTML, or XML formats as specified by the argument type.

Syntax

```
DBMS_AUTO_MV.REPORT_LAST_ACTIVITY (
   type                 IN  VARCHAR2  DEFAULT 'TEXT',
   section              IN  VARCHAR2  DEFAULT 'ALL',
   level                IN  VARCHAR2  DEFAULT 'TYPICAL')
RETURN CLOB;
```

Parameters

Table 37-7 REPORT_LAST_ACTIVITY Function Parameters

Parameter	Description
type	The format type in which the report needs to be generated. The possible values are: • TEXT • HTML • XML The default value is TEXT.
section	The section can be a combination of the following: • SUMMARY • MV_DETAILS • QUERY_DETAILS • VERIFICATION_DETAILS • ALL The default value is ALL. You can generate a specific combination of report by using + or – operators. For example, when section is specified as SUMMARY+MV_DETAILS, the generated report will contain only the summary and the details about the automatic materialized view.
level	The level can be either BASIC, TYPICAL, or ALL. When the level is set to BASIC, a minimum set of information regarding the most recent automatic materialized view activity is reported. On the other hand, when the level is set to ALL, a detailed report is generated. The default value is TYPICAL.

Return Value

This functions returns the report as a CLOB.

Examples

Example 1: The following call to REPORT_LAST_ACTIVITY() generates a TEXT output:

```
select dbms_auto_mv.report_last_activity('TEXT', 'ALL', 'TYPICAL') from dual;
```

Example 2: The following call to REPORT_LAST_ACTIVITY() generates an XML output:

```
select dbms_auto_mv.report_last_activity('XML', 'ALL', 'TYPICAL') from dual;
```

Example 3: The following call to REPORT_LAST_ACTIVITY() generates an HTML output:

```
select dbms_auto_mv.report_last_activity('HTML', 'ALL', 'TYPICAL') from dual;
```