145
DBMS_PCLXUTIL

The DBMS_PCLXUTIL package provides intra-partition parallelism for creating partition-wise local indexes. DBMS_PCLXUTIL circumvents the limitation that, for local index creation, the degree of parallelism is restricted to the number of partitions as only one parallel execution server process for each partition is used.

> **See Also:**
>
> There are several rules concerning partitions and indexes. For more information, see *Oracle Database Concepts* and*Oracle Database Administrator's Guide*.

This chapter contains the following topics:

DBMS_PCLXUTIL Overview

DBMS_PCLXUTIL uses the DBMS_JOB package to provide a greater degree of parallelism for creating a local index for a partitioned table. This is achieved by asynchronous inter-partition parallelism using the background processes (with DBMS_SCHEDULER), in combination with intra-partition parallelism using the parallel execution server.

DBMS_PCLXUTIL works with both range and range-hash composite partitioning.

The DBMS_PCLXUTIL package can be used during the following DBA tasks:

1. Local index creation

   The procedure BUILD_PART_INDEX assumes that the dictionary information for the local index already exists. This can be done by issuing the create index SQL command with the UNUSABLE option.

   ```
   CREATE INDEX <idx_name> on <tab_name>(...) local(...) unusable;
   ```

   This causes the dictionary entries to be created without "building" the index itself, the time consuming part of creating an index. Now, invoking the procedure BUILD_PART_INDEX causes a concurrent build of local indexes with the specified degree of parallelism.

   ```
   EXECUTE dbms_pclxutil.build_part_index(4,4,<tab_name>,<idx_name>,FALSE);
   ```

   For composite partitions, the procedure automatically builds local indexes for all subpartitions of the composite table.

2. Local index maintenance

   By marking desired partitions usable or unusable, the `BUILD_PART_INDEX` procedure also enables selective rebuilding of local indexes. The `force_opt` parameter provides a way to override this and build local indexes for all partitions.

   ```
   ALTER INDEX <idx_name> local(...) unusable;
   ```

   Rebuild only the desired (sub)partitions (that are marked unusable):

   ```
   EXECUTE dbms_pclxutil.build_part_index(4,4,<tab_name>,<idx_name>,FALSE);
   ```

   Rebuild all (sub)partitions using `force_opt` = `TRUE`:

   ```
   EXECUTE dbms_pclxutil.build_part_index(4,4,<tab_name>,<idx_name>,TRUE);
   ```

   A progress report is produced, and the output appears on screen when the program is ended (because the `DBMS_OUTPUT` package writes messages to a buffer first, and flushes the buffer to the screen only upon termination of the program).

DBMS_PCLXUTIL Security Model

This utility can be run only as table owner, and not as any other user.

DBMS_PCLXUTIL Operational Notes

`DBMS_PCLXUTIL` submits a job for each partition. It is the responsibility of the user/dba to control the number of concurrent jobs by setting the `INIT.ORA` parameter `JOB_QUEUE_PROCESSES` correctly. There is minimal error checking for correct syntax. Any errors are reported in the job queue process trace files.

DBMS_PCLXUTIL Rules and Limits

Because `DBMS_PCLXUTIL` uses the `DBMS_JOB` package, you must be aware of the following limitations pertaining to `DBMS_JOB`:

- You must decide appropriate values for the `job_queue_processes` initialization parameter. Clearly, if the job processes are not started before calling `BUILD_PART_INDEX`(), then the package will not function properly. The background processes are specified by the following `init.ora` parameters:

  ```
  job_queue_processes=n   #the number of background processes = n
  ```

- Failure conditions are reported only in the trace files (a `DBMS_JOB` limitation), making it impossible to give interactive feedback to the user. This package prints a failure message, removes unfinished jobs from the queue, and requests the user to take a look at the `j*.trc` trace files.

> **Note:**
>
> For range partitioning, the minimum compatibility mode is 8.0; for range-hash composite partitioning, the minimum compatibility mode is 8*i*.

Summary of DBMS_PCLXUTIL Subprograms

The DBMS_PCLXUTIL package has one subprogram, the BUILD_PART_INDEX procedure.

Table 145-1 DBMS_PCLXUTIL Package Subprograms

Subprogram	Description
BUILD_PART_INDEX Procedure	Provides intra-partition parallelism for creating partition-wise local indexes

BUILD_PART_INDEX Procedure

This procedure provides intra-partition parallelism for creating partition-wise local indexes.

Syntax

```
DBMS_PCLXUTIL.BUILD_PART_INDEX (
   jobs_per_batch  IN NUMBER   DEFAULT 1,
   procs_per_job   IN NUMBER   DEFAULT 1,
   tab_name        IN VARCHAR2 DEFAULT NULL,
   idx_name        IN VARCHAR2 DEFAULT NULL,
   force_opt       IN BOOLEAN  DEFAULT FALSE);
```

Parameters

Table 145-2 BUILD_PART_INDEX Procedure Parameters

Parameter	Description
jobs_per_batch	The number of concurrent partition-wise "local index builds".
procs_per_job	The number of parallel execution servers to be utilized for each local index build (1 <= procs_per_job <= max_slaves).
tab_name	The name of the partitioned table (an exception is raised if the table does not exist or not partitioned).
idx_name	The name given to the local index (an exception is raised if a local index is not created on the table tab_name).
force_opt	If TRUE, then force rebuild of all partitioned indexes; otherwise, rebuild only the partitions marked 'UNUSABLE'.

Usage Notes

This utility can be run only as table owner, and not as any other user.

Examples

Suppose a table PROJECT is created with two partitions PROJ001 and PROJ002, along with a local index IDX.

A call to the procedure BUILD_PART_INDEX(2,4,'PROJECT','IDX',TRUE) produces the following output:

```
SQLPLUS> EXECUTE dbms_pclxutil.build_part_index(2,4,'PROJECT','IDX',TRUE);
Statement processed.
```

```
INFO: Job #21 created for partition PROJ002 with 4 slaves
INFO: Job #22 created for partition PROJ001 with 4 slaves
```