

Automatic Block Media Recovery

If corrupt data blocks are encountered when a database is accessed, they can be automatically replaced with uncorrupted copies of those blocks.

This requires the following conditions:

- The physical standby database must be operating in real-time query mode, which requires an Oracle Active Data Guard license.
- The physical standby database must be running real-time apply.

Automatic block media recovery works in two directions depending on whether the corrupted blocks are encountered on the primary or on the standby.

Corrupted Blocks On the Primary

If corrupt data blocks are encountered at a primary database, then the primary automatically searches for good copies of those blocks on a standby and, if they are found, has them shipped back to the primary.

The primary requires a LOG_ARCHIVE_DEST_*n* to the standby only (a physical standby, a cascading physical standby, or a far sync instance). The primary does not require a LOG_ARCHIVE_DEST_*n* to any terminal destinations; it is able to automatically ascertain their service names.

Corrupted Blocks On a Standby

If corrupt data blocks are encountered at a standby, then the standby automatically initiates communication with the primary and requests uncorrupted copies of those blocks. For the primary to be able to ship the uncorrupted blocks to the standby, the following database initialization parameters must be configured on the standby. This is true even if the primary does not directly service the standby (for example, in cascading configurations).

- The LOG_ARCHIVE_CONFIG parameter is configured with a DG_CONFIG list and a LOG_ARCHIVE_DEST_*n* parameter is configured for the primary database.
or
- The FAL_SERVER parameter is configured and its value contains an Oracle Net service name for the primary database.

Additional Automatic Block Media Repair Considerations

- Automatic repair is supported with any Oracle Data Guard protection mode. However, the effectiveness of repairing a corrupt block at the primary using the non-corrupt version of the block from the standby depends on how closely the standby apply is synchronized with the redo generated by the primary.
- When an automatic block repair has been performed, a message is written to the database alert log.
- If automatic block repair is not possible, an ORA-1578 error is returned.

Manual Block Media Recovery

The RMAN RECOVER BLOCK command is used to manually repair a corrupted data block. This command searches several locations for an uncorrupted copy of the data block. By default, one of the locations is any available physical standby database operating in real-time query mode. The EXCLUDE STANDBY option of the RMAN RECOVER BLOCK command can be used to exclude physical standby databases as a source for replacement blocks.

Tuning Queries on a Physical Standby Database

Queries on a physical standby database can be tuned for optimal performance.

Performing DML Operations on Active Data Guard Standby Databases

You can run DML operations on Active Data Guard standby databases. This enables you to run read-mostly applications, which occasionally execute DMLs, on the standby database.

DML operations on a standby can be transparently redirected to and run on the primary database. This includes DML statements that are part of PL/SQL blocks. The Active Data Guard session waits until the corresponding changes are shipped to and applied to the Active Data Guard standby. Read consistency is maintained during the DML operation and the standby database on which the DML is run can view its uncommitted changes. However, all the other standby database instances can view these changes only after the transaction is committed.

Automatic redirection of DML operations to the primary can be configured at the system level or the session level. The session level setting overrides the system level setting.

To configure automatic redirection of DML operations for all standby sessions in an Active Data Guard environment:

- Set the ADG_REDIRECT_DML initialization parameter to TRUE.

To configure automatic redirection of DML operations for the current session, use the following command:

- ALTER SESSION ENABLE ADG_REDIRECT_DML;

The physical standby database in an Active Data Guard setup contains a table named employees. You can insert rows into this table by running DML on a physical standby database in the Active Data Guard environment.

On the standby database, enable DML redirection for the current session:

```
SQL> ALTER SESSION ENABLE ADG_REDIRECT_DML;
```

Using the Result Cache on Physical Standby Databases

In an Active Data guard environment, using the result cache on physical standby databases enables you to run queries, without performance impact.

By default, query results on physical standbys are not stored in the result cache. To improve the performance for recurring queries that are run on the standby, and that can be mapped to cached results, you can enable the use of result cache. Identify objects that are frequently used in queries and enable the use of result cache for these objects. A query result is stored in the result cache only if all the dependent objects of the query are enabled for the result cache. The `STANDBY ENABLE` clause in the `CREATE TABLE` command and `ALTER TABLE` command is used to specify that a table is enabled for the result cache on physical standbys. Query results from views are not stored in the result cache.

If a query involves multiple tables, the result cache is used while executing this query only if result cache usage has been enabled for all the tables included in the query.

You must enable the use of result cache for each table that will be used in a query.

To enable the use of result cache for queries that are run against the physical standby database:

- If the table already exists, modify the table definition using an `ALTER TABLE` command with the `STANDBY ENABLE` clause.
- If the table is being created, include the `STANDBY ENABLE` clause in the `CREATE TABLE` command.

The following example modifies the definition of the `employee` table and enables the use of the standby result cache for this table.

```
ALTER TABLE employee RESULT_CACHE (STANDBY ENABLE);
```