
Chapter 5. Loading a table space in RO access mode (SHRLEVEL REFERENCE option)

When you specify the SHRLEVEL REFERENCE option, during the load, the table space is available in read-only mode.

When the LOAD utility job includes the SHRLEVEL REFERENCE option, processing is as follows:

1. DB2 UET creates a new set of shadow objects against which to perform the load.

Shadow objects are duplicates that mirror the original database, table spaces, tables, and indexes. Shadow tables are created with same OBID as the original. DB2 UET creates a unique name for the shadow objects by using the prefix that is specified in the option **Shadow database prefix** and adding a numeric suffix. In the shadow database, DB2 UET creates shadow copies of the table space, table, and all indexes on the table that is being loaded, and uses the value of the **Shadow schema** option as the schema name for the objects.

2. DB2 UET copies check constraints from production to shadow objects and determines the data set list of the objects that are being loaded.
3. DB2 UET places the production (original) objects in read-only access mode during processing.
4. If you specify RESUME YES, the contents of the existing production data sets are copied to shadow data sets (FlashCopy is used, if available). After copying the data DB2 UET runs a repair utility on the shadow objects to make the OBID, version, and level information of the copied data sets match the production objects.

During this process, DB2 UET places the production object in read-only (RO) mode and briefly stops the shadow objects (allowing no access).

5. If an inline image copy was requested, the image copy is removed from the LOAD utility syntax.
6. DB2 UET loads the data into the shadow table instead of the production table. During the load, the *production* table is available for select processing.
7. After a successful LOAD utility job, processing is as follows:

- a. DB2 UET examines the shadow objects and repairs identifiers as necessary to match production objects.
- b. If an inline copy was requested and removed from the syntax, DB2 UET invokes the COPY utility to take a full image copy after the LOAD utility completes.
- c. A brief outage begins when DB2 UET stops the production spaces.
- d. To make the loaded data accessible in the new production object, DB2 UET swaps the underlying VSAM data sets for the production and shadow objects.
- e. DB2 UET updates real-time statistics (RTS) for the production table.
- f. If referential constraints on the old production table were detected, DB2 UET sets CHECK-pending (CHKP) status on the new production object, if appropriate.
- g. DB2 UET starts the new production object in the state that it was in before the load, and the outage ends.

- h. DB2 UET deletes renamed temporary data sets and drops the old production objects.

Syntax diagram

The following syntax diagram illustrates the correct syntax to use for adding the SHRLEVEL REFERENCE option to a DB2 LOAD utility statement that contains the REPLACE or RESUME NO option. (This syntax diagram is a fragment of the LOAD syntax diagram and does not show other native LOAD options that can be specified at this level.)



Usage considerations and restrictions

Consider the following usage issues for the SHRLEVEL REFERENCE option:

- This option requires DB2 version 10 or later.
- This option requires the DB2 COPY utility APAR PI43298.
- When an image copy is requested during the LOAD process, this option requires the following DB2 PTFs:
 - DB2 10: UI28994
 - DB2 11: UI28995
- Because DB2 UET requires random access to the image copy during the load process, the image copy cannot be on tape. (After the load, you can move the image copy back to tape.)
- When using the LOG NO option, specify the NOCOPYPEND option so that the LOAD utility does not set the table space in COPY-pending status. For more information, see the "Syntax and options of the LOAD control statement" topic in the *DB2 Utility Guide and Reference* documentation.
- When an inline image copy is requested, the image copy is taken against the shadow objects using its table space DBID and OBID. DB2 UET ensures that the image copy is updated so that it is valid for the production object.
- For versioned objects, if you specify the REPLACE option, the current version number is reset to zero.
- Do not use this option if a DB2 utility is running against the same object. DB2 UET must stop the object briefly, and the utility might end with a "RESOURCE NOT AVAILABLE" error.
- This option does not support the following parallel processing:
 - Parallel processing with a native DB2 LOAD job against the same partitions of a table space, including partitions implied by global options.
 - Multiple jobs accessing the same partitions of a partitioned table space.
- If you specify this option and the job abends during the load, complete the following manual steps:
 1. Reset the status of the source objects to read-write (RW).
 2. Drop the shadow objects.
 3. Use the ABPMANT utility to terminate the utility. For more information, see *Terminating a DB2 utility for which interception has occurred*.

- DB2 UET does not perform referential integrity checks during load prevalidation processing. If it detects referential integrity constraints, after a successful load, DB2 UET places the affected production objects in check-pending status.

The SHRLEVEL REFERENCE option cannot be used in conjunction with the following options and objects:

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- PART RESUME NO
- LOG YES
- BY PARTITION for spaces with nonpartitioned secondary indexes (NPSI)
If BY PARTITION is specified, then the job ends and an error message is issued. You can load the entire table instead of partitions.
- LOB and XML objects
- VCAT-defined table spaces
- simple table spaces
- table spaces with rotated partitions
- RESUME NO (Use RESUME YES or REPLACE.)
- RESUME YES for table spaces with versioned rows

Using DFSMSdss COPY options

The following extended syntax options are available for use with the DFSMSdss COPY command when you specify LOAD RESUME or you specify LOAD REPLACE with the KEEPDICTIONARY option for a compressed table space:

FCTOPPRCP

DB2 UET gathers the value for this option from the ZPARM parameter FLASHCOPY PPRC. The FLASHCOPY PPRC parameter specifies the behavior for DFSMSdss FlashCopy® requests when the target disk storage volume is the primary device in a peer-to-peer remote copy relationship. FLASHCOPY_PPRC determines

- whether DFSMSdss preserves mirroring while processing a DB2 utilities request
- whether the target device pair is allowed to go to duplex pending state

For more information, see the IBM reference information for DB2 10 for z/OS online utilities.

Syntax diagram

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>>+-----+-----><
    '-FCTOPPRCP-----'
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COPY_FASTREP

Specifies whether the use of DFSMSdss fast replication (FlashCopy®) is preferred, required, or not to be used. The value specified for this option does not affect concurrent copy or virtual concurrent copy processing. Valid values are as follows:

- PREFERRED specifies that you want to use a fast replication method, if possible. If fast replication cannot be used, DFSMSdss completes the operation using traditional data movement methods.
- REQUIRED specifies that fast replication must be used. DFSMSdss stops processing the current data set if fast replication cannot be used. However, DFSMSdss continues processing the rest of the data sets using fast replication. When the DEBUG(FRMSG(MIN|SUM|DTL)) keyword

Chapter 6. Validating records before committing changes (IFDISCARDS option)

The IFDISCARDS option for the DB2 LOAD utility provides Load Prevalidate feature.

When you specify the IFDISCARDS extended syntax option, before committing changes to the database, DB2 UET validates records in the SYSREC file against the check constraints and data types of the table that is specified in the LOAD utility syntax. If it detects issues, you can review them before performing the load, correct the errors, and rerun the job without performing a recovery of the objects.

The IFDISCARDS option indicates to the DB2 UET DSNUTILB intercept program that you want to use the Load Prevalidate feature and the action that you want taken when rows are flagged for discard. Rows found to be in violation are written to the data set that is specified by the DISCARD DDN option.

When the LOAD utility job includes the IFDISCARDS option, processing is as follows:

1. DB2 UET creates a new set of shadow objects against which to perform the load.

Shadow objects are duplicates that mirror the original database, table spaces, tables, and indexes. Shadow tables are created with same OBID as the original. DB2 UET creates a unique name for the shadow objects by using the prefix that is specified in the option **Shadow database prefix** and adding a numeric suffix. In the shadow database, DB2 UET creates shadow copies of the table space, table, and all indexes on the table that is being loaded, and uses the value of the **Shadow schema** option as the schema name for the objects.

2. DB2 UET copies check constraints from production to shadow objects and determines the data set list of the objects that are being loaded.
3. DB2 UET places the production (original) objects in read-only access mode during processing.
4. If you specify RESUME YES, the contents of the existing production data sets are copied to shadow data sets (FlashCopy[®] is used, if available). After copying the data DB2 UET runs a repair utility on the shadow objects to make the OBID, version, and level information of the copied data sets match the production objects.

During this process, DB2 UET places the production object in read-only (RO) mode and briefly stops the shadow objects (allowing no access).

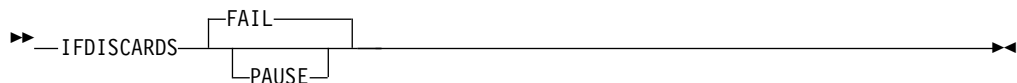
5. If an inline image copy was requested, the image copy is removed from the LOAD utility syntax.
6. DB2 UET loads the data into the shadow table instead of the production table. During the load, the *production* table is available for select processing.
7. After a successful LOAD utility job, processing is as follows:
 - a. DB2 UET examines the shadow objects and repairs identifiers as necessary to match production objects.
 - b. If an inline copy was requested and removed from the syntax, DB2 UET invokes the COPY utility to take a full image copy after the LOAD utility completes.

- c. A brief outage begins when DB2 UET stops the production spaces.
- d. To make the loaded data accessible in the new production object, DB2 UET swaps the underlying VSAM data sets for the production and shadow objects.
- e. DB2 UET updates real-time statistics (RTS) for the production table.
- f. If referential constraints on the old production table were detected, DB2 UET sets CHECK-pending (CHKP) status on the new production object, if appropriate.
- g. DB2 UET starts the new production object in the state that it was in before the load, and the outage ends.
- h. DB2 UET deletes renamed temporary data sets and drops the old production objects.

Note: If DB2 UET encounters errors, it responds as determined by the IFDISCARDS option value.

Syntax for the IFDISCARDS option

The IFDISCARDS option is specified for the entire LOAD statement as shown in the following syntax diagram. (This syntax diagram is a fragment of the LOAD syntax diagram and does not show other native LOAD options that can be specified at this level.)



If the IFDISCARDS option is specified and no operand is present, FAIL is the default value. If the option IFDISCARDS is not present in the LOAD utility syntax, prevalidation does not occur, and the LOAD utility processes the table as usual.

FAIL IFDISCARDS FAIL (the default) tells DB2 UET to discontinue the LOAD utility if data records are discarded, then delete the shadow objects, and leave the production table unaltered in the same state as before the load started. The utility and its corresponding utility ID are terminated automatically and cannot be restarted. The return code is set to 8. The table data is untouched by the load prevalidation process.

PAUSE

IFDISCARDS PAUSE tells DB2 UET to pause the LOAD utility after performing load prevalidation processing if data records are discarded. You can review the data rows that were flagged for discard and decide whether to restart the LOAD utility and discard the data rows, or terminate the LOAD utility, which leaves the production table data untouched.

The LOAD utility ID is not terminated, allowing the LOAD utility job to be restarted. The return code is set to 4. The job will not appear in the report generated by the **-DIS UTIL** command. That is, the job is not in a stopped state because DB2 has no record of it in the SYSUTIL directory table.

The job is recorded in the DB2 UET worklist table as paused, and you can restart it by rerunning the job with the same utility ID. The LOAD utility processes the table by discarding rows in the standard manner and loading data into the production table.

If you choose to terminate the LOAD utility job and revert to the original table as it was before the LOAD utility began, you must terminate the utility ID by using the DB2 UET ABPMAINT utility program with the TERM_UTILITY option.

Usage considerations and restrictions

Consider the following usage issues for the IFDISCARDS option:

- This option requires DB2 version 10 or later.
- When an image copy is requested during the LOAD process, this option requires the following DB2 PTFs:
 - DB2 10: UI28994
 - DB2 11: UI28995
- When using the LOG NO option, specify the NOCOPYPEND option so that the LOAD utility does not set the table space in COPY-pending status. For more information, see the "Syntax and options of the LOAD control statement" topic in the *DB2 Utility Guide and Reference* documentation.
- For versioned objects, if you specify the REPLACE option, the current version number is reset to zero.
- Do not use this option if a DB2 utility is running against the same object. DB2 UET must stop the object briefly, and the utility might end with a "RESOURCE NOT AVAILABLE" error.
- This option does not support the following parallel processing:
 - Parallel processing with a native DB2 LOAD job against the same partitions of a table space, including partitions implied by global options.
 - Multiple jobs accessing the same partitions of a partitioned table space.
- If you specify this option and the job abends during the load, complete the following manual steps:
 1. Reset the status of the source objects to read-write (RW).
 2. Drop the shadow objects.
 3. Use the ABPMAINT utility to terminate the utility. For more information, see *Terminating a DB2 utility for which interception has occurred*.
- DB2 UET does not perform referential integrity checks during load prevalidation processing. If it detects referential integrity constraints, after a successful load, DB2 UET places the affected production objects in check-pending status.

The IFDISCARDS option cannot be used in conjunction with the following options and objects:

- DISCARDS *integer* with an *integer* value greater than 0
If specified, then the job ends with return code 8. The utility job and its corresponding ID are terminated and cannot be restarted.
- SHRLEVEL CHANGE
If specified, then the job ends, the LOAD utility ID is terminated, and an error message is issued.
- LOG YES
- BY PARTITION for spaces with nonpartitioned secondary indexes (NPSI)
If BY PARTITION is specified, then the job ends and an error message is issued. You can load the entire table instead of partitions.
- LOB and XML objects
- VCAT-defined table spaces

- simple table spaces
- table spaces with rotated partitions
- RESUME NO (Use RESUME YES or REPLACE.)
- RESUME YES for table spaces with versioned rows