YSQL Materialized Views

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Overview

- Materialized views are relations that contain the result of a query.

- Unlike regular views, they persist the results of the view query.

- Unlike regular tables, they cannot be directly updated. Instead, we must use the REFRESH command to update the MV.

- Used to speed up access to the result of a query (at the expense of some storage).

- Currently YSQL only (no MVs in YCQL).

Materialized View Commands

- CREATE MATERIALIZED VIEW

- REFRESH MATERIALIZED VIEW

- DROP MATERIALIZED VIEW

CREATE MATERIALIZED VIEW

- Create the matview as a YB relation

- Can specify the query, column names

- Can specify WITH DATA (default) / WITH NO DATA

Example:

```
CREATE MATERIALIZED VIEW mv AS SELECT COUNT(*) FROM
base_relation GROUP BY col_name;
```

REFRESH MATERIALIZED VIEW

- Used to update the contents of the matview

- Can specify WITH DATA (default) / WITH NO DATA

  - WITH DATA: re-execute the query and re-populate the matview

  - WITH NO DATA: mark the matview as unpopulated (or "outdated"), leaving it in an unscannable state.

- Two modes of REFRESH WITH DATA:

  - Default option

  - "CONCURRENTLY" option

REFRESH MATERIALIZED VIEW (default option)

- Rebuilds and reindexes the relation

- Better if there are a large number of new/modified rows

Example:

```
REFRESH MATERIALIZED VIEW mv;
```

Note: Does not block concurrent SELECTs

REFRESH MATERIALIZED VIEW (CONCURRENTLY)

- Construct a "diff" relation

- Perform updates accordingly

- Better if there are a fewer number of new/modified rows

- Requires a unique index on the materialized view

Example:

```
REFRESH MATERIALIZED VIEW CONCURRENTLY mv;
```

DROP MATERIALIZED VIEW

- Used to DROP the materialized view

- Can specify CASCADE / RESTRICT

Example:

```
DROP MATERIALIZED VIEW mv;
```

Regular Views vs. Materialized Views

Regular Views

- Do not persist the results of a query. The query is run every time we reference the view.
- Don't require any maintenance.
- Generally used when the data is accessed infrequently.

Materialized Views

- Persist the results of a query. The query is only re-run when the `REFRESH` command is used.
- Require maintenance (a `REFRESH` must be performed to retrieve the updated result).
- Used to speed up the access to results of a query (at the expense of some storage).
- Behave like a cache for the view query.
- Generally used when the data is accessed frequently.

Thank You

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