time-travel database

#TimeDatabases #MariaDB #SQL #Groovy

This is a feature found in the database Mariadb that makes the datawarehouse modeling and SQL development much easier and readable.

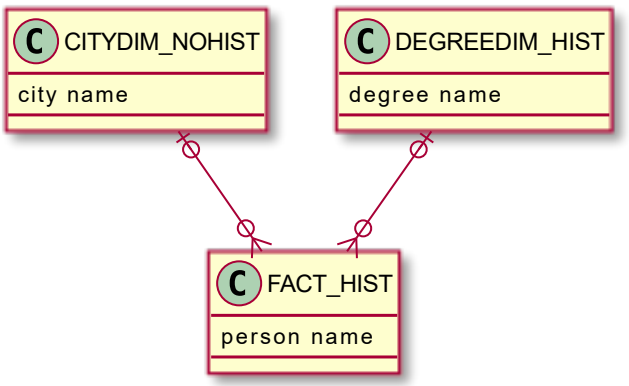
1. a database table can be defined so as to retain any pre-update row behind the scene, timestamped.
2. the db user may run a time-machine SQL query on that table and expect to get the content as-of a past date.
3. this feature is table-level and not database-level. A database-level feature has been offered by postgres and later discontinued because of its generally unacceptable storage requirements.
4. this feature is also aggressive on storage as the smallest unit of historization is the whole line.

implementation

docker image:

```
services:
  mariadb
    image: mariadb:10.9.2
```

data model:



CITYDIM_NOHIST will be our slowly-changing-dimension type 1
DEGREEDIM_HIST will be our slowly-changing-dimension type 2

db tables:

```
CREATE OR REPLACE table CITYDIM_NOHIST (
        id      MEDIUMINT NOT NULL AUTO_INCREMENT PRIMARY KEY,
```

```
        name    varchar(50) UNIQUE KEY
);

CREATE OR REPLACE table DEGREEDIM_HIST (
        id      MEDIUMINT NOT NULL AUTO_INCREMENT PRIMARY KEY,
        name    varchar(50) UNIQUE KEY
) WITH SYSTEM VERSIONING;

CREATE OR REPLACE table FACT (
        id MEDIUMINT NOT NULL AUTO_INCREMENT PRIMARY KEY,
        name varchar(50),
        city_id MEDIUMINT,
        degree_id MEDIUMINT,
        email varchar(50)
)  WITH SYSTEM VERSIONING;

ALTER TABLE FACT
    ADD CONSTRAINT fk_city FOREIGN KEY (city_id) REFERENCES CITYDIM_NOHIST(i
    ADD CONSTRAINT fk_degree FOREIGN KEY (degree_id) REFERENCES DEGREEDIM_HI
```

example of past-date parametric query:

```
-- query1
select
F.id as pid,
F.name as pname,
F.email as email,
C.name as cname,
D.name as dname
from
KIMBALL_CITYDIM_NOHIST as C,
KIMBALL_DEGREEDIM_HIST FOR SYSTEM_TIME AS OF TIMESTAMP ?.ts D,
KIMBALL_FACT FOR SYSTEM_TIME AS OF TIMESTAMP ?.ts as F
where F.degree_id = D.id and F.city_id = C.id
and F.name = ?.nm
```

example of past-date query from an application:

```
String past = new Date().format("yyyy-MM-dd HH:mm:ss",TimeZone.getTimeZone('
// eg '2018-05-03 07:22:33'
Map row1 = sql.firstRow( query1, [ts:past, nm:'Barbara'])
```

source code at: https://github.com/a-moscatelli/DEV/blob/main/mariadb_data_versioning/test_hist_query_on_mariadb.groovy

ref.

- slowly-changing-dimensions-scd
- groovy sql

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postgres time travel (discontinued)
https://www.postgresql.org/docs/6.3/c0503.htm#:~:text=As of Postgres v6.,a short period of time .
the feature was meant to support point-in-time restore.

also:
https://neon.tech/blog/time-travel-with-postgres
... to support db branching.

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back to Portfolio

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backlog 🔒