Experiment 3

Ojas Patil

2019130048

TE COMPS

Aim: Design a distributed database by applying the concept of vertical fragmentation.

Scenario:

Consider a CUSTOMER schema with attributes CUST_CODE, CUST_NAME, CUST_CITY, WORKING_AREA, CUST_COUNTRY, PAYMENT_AMT, PHONE_NO.

We will fragment the given schema in 3 fragments,

fragment 1:(CUST_CODE, CUST_NAME, PHONE_NO),

fragment 2:(CUST_CODE, CUST_CITY, WORKING_AREA, CUST_COUNTRY),

fragment 3:(CUST_CODE, PAYMENT_AMT)

Q. 1) Display name and phone number of all the Indian customers

Q. 2) Display name, city and payment_amt of all the customers having payment_amt > 7000 and country='UK'.

Q. 3) Display * of customer with cust_code = 'C00018'

Q. 4) Display name and payment_amt of customer working in 'London'

Procedure:

1) Create a global schema

```
CREATE TABLE IF NOT EXISTS CUSTOMER
  (     "CUST_CODE" VARCHAR(6) NOT NULL PRIMARY KEY,
                "CUST_NAME" VARCHAR(40) NOT NULL,
                "CUST_CITY" CHAR(35),
                "WORKING_AREA" VARCHAR(35) NOT NULL,
                "CUST_COUNTRY" VARCHAR(20) NOT NULL,
                "PAYMENT_AMT" DECIMAL(12,2) NOT NULL,
                "PHONE_NO" VARCHAR(17) NOT NULL
);
```

```
CREATE TABLE

Query returned successfully in 277 msec.
```

2) Populate global schema

```
INSERT INTO CUSTOMER VALUES ('C00013', 'Holmes', 'London', 'London', 'UK', '4000.00', 'BBBBBBB');
INSERT INTO CUSTOMER VALUES ('C00001', 'Micheal', 'New York', 'New York', 'USA', '6000.00', 'CCCCCCC');
INSERT INTO CUSTOMER VALUES ('C00020', 'Albert', 'New York', 'New York', 'USA', '6000.00', 'BBBBSBB');
INSERT INTO CUSTOMER VALUES ('C00025', 'Ravindran', 'Bangalore', 'Bangalore', 'India','8000.00', 'AVAVAVA');
INSERT INTO CUSTOMER VALUES ('C00024', 'Cook', 'London', 'London', 'UK', '6000.00', 'FSDDSDF');
INSERT INTO CUSTOMER VALUES ('C00015', 'Stuart', 'London', 'London', 'UK', '11000.00', 'GFSGERS');
INSERT INTO CUSTOMER VALUES ('C00002', 'Bolt', 'New York', 'New York', 'USA', '3000.00', 'DDNRDRH');
INSERT INTO CUSTOMER VALUES ('C00018', 'Fleming', 'Brisban', 'Brisban', 'Australia', '5000.00', 'NHBGVFC');
INSERT INTO CUSTOMER VALUES ('C00021', 'Jacks', 'Brisban', 'Brisban', 'Australia', '7000.00', 'WERTGDF');
INSERT INTO CUSTOMER VALUES ('C00019', 'Yearannaidu', 'Chennai', 'Chennai', 'India', '8000.00', 'ZZZZBFV');
INSERT INTO CUSTOMER VALUES ('C00005', 'Sasikant', 'Mumbai', 'Mumbai', 'India', '11000.00', '147-25896312');
INSERT INTO CUSTOMER VALUES ('C00007', 'Ramanathan', 'Chennai', 'Chennai', 'India', '9000.00', 'GHRDWSD');
INSERT INTO CUSTOMER VALUES ('C00022', 'Avinash', 'Mumbai', 'Mumbai', 'India', '9000.00', '113-12345678');
INSERT INTO CUSTOMER VALUES ('C00004', 'Winston', 'Brisban', 'Brisban', 'Australia', '6000.00', 'AAAAAAA');
```

```
INSERT 0 1

Query returned successfully in 64 msec.
```

3) Verify completeness

SELECT * FROM CUSTOMER WHERE "CUST_CODE"='C00022';

	CUST_CODE [PK] character varying (6)	CUST_NAME character varying (40)	CUST_CITY character (35)	WORKING_AREA character varying (35)	CUST_COUNTRY character varying (20)	PAYMENT_AMT numeric (12,2)	PHONE_NO character varying (17)
1	C00022	Avinash	Mumbai	Mumbai	India	9000.00	113-12345678

SELECT * FROM CUSTOMERV1 INNER JOIN CUSTOMERV2 USING("CUST_CODE") INNER JOIN CUSTOMERV3 USING("CUST_CODE") WHERE "CUST_CODE"='C00022';

	CUST_CODE character varying (6)	CUST_NAME character varying (40)	PHONE_NO character varying (17)	CUST_CITY character (35)	WORKING_AREA character varying (35)	CUST_COUNTRY character varying (20)	PAYMENT_AMT numeric (12,2)
1	C00022	Avinash	113-12345678	Mumbai	Mumbai	India	9000.00

4) Verify reconstruction

SELECT * FROM CUSTOMER;

	CUST_CODE [PK] character varying (6)	CUST_NAME character varying (40)	CUST_CITY character (35)	WORKING_AREA character varying (35)	CUST_COUNTRY character varying (20)	PAYMENT_AMT numeric (12,2)	PHONE_NO character varying (17)
1	C00013	Holmes	London	London	UK	4000.00	BBBBBBB
2	C00001	Micheal	New York	New York	USA	6000.00	CCCCCCC
3	C00020	Albert	New York	New York	USA	6000.00	BBBBSBB
4	C00025	Ravindran	Bangalore	Bangalore	India	8000.00	AVAVAVA
5	C00024	Cook	London	London	UK	6000.00	FSDDSDF
6	C00015	Stuart	London	London	UK	11000.00	GFSGERS
7	C00002	Bolt	New York	New York	USA	3000.00	DDNRDRH
8	C00018	Fleming	Brisban	Brisban	Australia	5000.00	NHBGVFC
9	C00021	Jacks	Brisban	Brisban	Australia	7000.00	WERTGDF
10	C00019	Yearannaidu	Chennai	Chennai	India	8000.00	ZZZZBFV
11	C00005	Sasikant	Mumbai	Mumbai	India	11000.00	147-25896312
12	C00007	Ramanathan	Chennai	Chennai	India	9000.00	GHRDWSD
13	C00022	Avinash	Mumbai	Mumbai	India	9000.00	113-12345678
14	C00004	Winston	Brisban	Brisban	Australia	6000.00	AAAAAAA

SELECT * FROM CUSTOMERV1 INNER JOIN CUSTOMERV2 USING("CUST_CODE") INNER JOIN CUSTOMERV3 USING("CUST_CODE");

	CUST_CODE character varying (6)	CUST_NAME character varying (40)	PHONE_NO character varying (17)	CUST_CITY character (35)	WORKING_AREA character varying (35)	CUST_COUNTRY character varying (20)	PAYMENT_AMT numeric (12,2)
1	C00013	Holmes	BBBBBBB	London	London	UK	4000.00
2	C00001	Micheal	CCCCCCC	New York	New York	USA	6000.00
3	C00020	Albert	BBBBSBB	New York	New York	USA	6000.00
4	C00025	Ravindran	AVAVAVA	Bangalore	Bangalore	India	8000.00
5	C00024	Cook	FSDDSDF	London	London	UK	6000.00
6	C00015	Stuart	GFSGERS	London	London	UK	11000.00
7	C00002	Bolt	DDNRDRH	New York	New York	USA	3000.00
8	C00018	Fleming	NHBGVFC	Brisban	Brisban	Australia	5000.00
9	C00021	Jacks	WERTGDF	Brisban	Brisban	Australia	7000.00
10	C00019	Yearannaidu	ZZZZBFV	Chennai	Chennai	India	8000.00
11	C00005	Sasikant	147-25896312	Mumbai	Mumbai	India	11000.00
12	C00007	Ramanathan	GHRDWSD	Chennai	Chennai	India	9000.00
13	C00022	Avinash	113-12345678	Mumbai	Mumbai	India	9000.00
14	C00004	Winston	AAAAAAA	Brisban	Brisban	Australia	6000.00

5) Display name and phone number of all the Indian customers

SELECT "CUST_NAME", "PHONE_NO" FROM CUSTOMERV1 INNER JOIN CUSTOMERV2 USING("CUST_CODE") WHERE "CUST_COUNTRY" = 'India';

	CUST_NAME character varying (40)	PHONE_NO character varying (17)
1	Ravindran	AVAVAVA
2	Yearannaidu	ZZZZBFV
3	Sasikant	147-25896312
4	Ramanathan	GHRDWSD
5	Avinash	113-12345678

6) Display name, city and payment_amt of all the customers having payment_amt > 7000 and country='UK'.

SELECT "CUST_NAME", "CUST_CITY", "PAYMENT_AMT" FROM CUSTOMERV1 INNER JOIN CUSTOMERV2 USING("CUST_CODE") INNER JOIN CUSTOMERV3 USING("CUST_CODE") WHERE "PAYMENT_AMT" > 7000 and "CUST_COUNTRY"='UK';

	CUST_NAME character varying (40)	CUST_CITY character (35)	PAYMENT_AMT numeric (12,2)
1	Stuart	London	11000.00

7) Display * of customer with cust_code = 'C00018'

```
SELECT * FROM CUSTOMERV1 INNER JOIN CUSTOMERV2
USING("CUST_CODE")
INNER JOIN CUSTOMERV3 USING("CUST_CODE") WHERE "CUST_CODE"
= 'C00018';
```

	CUST_CODE character varying (6)	CUST_NAME character varying (40)	PHONE_NO character varying (17)	CUST_CITY character (35)	WORKING_AREA character varying (35)	CUST_COUNTRY character varying (20)	PAYMENT_AMT numeric (12,2)
1	C00018	Fleming	NHBGVFC	Brisban ...	Brisban	Australia	5000.00

8) Display name and payment_amt of customer working in 'London'

```
SELECT "CUST_NAME", "PAYMENT_AMT" FROM CUSTOMERV1 INNER
JOIN CUSTOMERV2 USING("CUST_CODE")
INNER JOIN CUSTOMERV3 USING("CUST_CODE") WHERE
"WORKING_AREA" = 'London';
```

	CUST_NAME character varying (40)	PAYMENT_AMT numeric (12,2)
1	Holmes	4000.00
2	Cook	6000.00
3	Stuart	11000.00

Conclusion:

From the above experiment, I understood the process of vertical fragmentation. In the above experiment, I fragmented global schema into three fragments. This method gave me three fragments and followed all the correctness rules of fragmented database except disjunction as primary key column was present in all fragments. This allowed me to get data from remaining fragments even if one fragment gets compromised.