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**College: PCCOE**

**Domain: SQL**

**WEEK 7 TASK**

**Table Design**

**1. CUSTOMER\_DIM**

CREATE TABLE CUSTOMER\_DIM (

CUST\_ID NUMBER PRIMARY KEY,

CUST\_NAME VARCHAR2(100),

ADDRESS VARCHAR2(100),

PREV\_ADDRESS VARCHAR2(100),

EFFECTIVE\_DATE DATE,

EXPIRY\_DATE DATE,

IS\_ACTIVE CHAR(1),

CHANGE\_REASON VARCHAR2(255)

);

**2. CUSTOMER\_STG**

CREATE TABLE CUSTOMER\_STG (

CUST\_ID NUMBER,

CUST\_NAME VARCHAR2(100),

ADDRESS VARCHAR2(100)

);

**3. CUSTOMER\_HISTORY (for Type 4)**

CREATE TABLE CUSTOMER\_HISTORY AS

SELECT \* FROM CUSTOMER\_DIM WHERE 1=0;

**Sample Staging Data**

INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (1, 'Alice', 'Pune');

INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (2, 'Bob', 'Mumbai');

INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (3, 'Charlie', 'Delhi');

COMMIT;

**Stored Procedure Definitions**

**SCD Type 0**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_0\_PROC IS

BEGIN

MERGE INTO CUSTOMER\_DIM d

USING CUSTOMER\_STG s

ON (d.CUST\_ID = s.CUST\_ID)

WHEN NOT MATCHED THEN

INSERT (CUST\_ID, CUST\_NAME, ADDRESS)

VALUES (s.CUST\_ID, s.CUST\_NAME, s.ADDRESS);

END;

/

**SCD Type 1**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_1\_PROC IS

BEGIN

MERGE INTO CUSTOMER\_DIM d

USING CUSTOMER\_STG s

ON (d.CUST\_ID = s.CUST\_ID)

WHEN MATCHED THEN

UPDATE SET d.CUST\_NAME = s.CUST\_NAME,

d.ADDRESS = s.ADDRESS

WHEN NOT MATCHED THEN

INSERT (CUST\_ID, CUST\_NAME, ADDRESS)

VALUES (s.CUST\_ID, s.CUST\_NAME, s.ADDRESS);

END;

/

**SCD Type 2**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_2\_PROC IS

BEGIN

FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

FOR dim IN (

SELECT \* FROM CUSTOMER\_DIM

WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y'

) LOOP

IF dim.CUST\_NAME != rec.CUST\_NAME OR dim.ADDRESS != rec.ADDRESS THEN

UPDATE CUSTOMER\_DIM

SET EXPIRY\_DATE = SYSDATE,

IS\_ACTIVE = 'N'

WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

INSERT INTO CUSTOMER\_DIM (

CUST\_ID, CUST\_NAME, ADDRESS,

EFFECTIVE\_DATE, EXPIRY\_DATE, IS\_ACTIVE

)

VALUES (

rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS,

SYSDATE, NULL, 'Y'

);

END IF;

END LOOP;

INSERT INTO CUSTOMER\_DIM (

CUST\_ID, CUST\_NAME, ADDRESS,

EFFECTIVE\_DATE, IS\_ACTIVE

)

SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, SYSDATE, 'Y'

FROM DUAL

WHERE NOT EXISTS (

SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

);

END LOOP;

END;

/

**SCD Type 3**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_3\_PROC IS

BEGIN

FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

UPDATE CUSTOMER\_DIM

SET PREV\_ADDRESS = ADDRESS,

ADDRESS = rec.ADDRESS

WHERE CUST\_ID = rec.CUST\_ID

AND ADDRESS != rec.ADDRESS;

INSERT INTO CUSTOMER\_DIM (CUST\_ID, CUST\_NAME, ADDRESS)

SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS

FROM DUAL

WHERE NOT EXISTS (

SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

);

END LOOP;

END;

/

**SCD Type 4**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_4\_PROC IS

BEGIN

FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

FOR dim IN (

SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

) LOOP

IF dim.ADDRESS != rec.ADDRESS THEN

INSERT INTO CUSTOMER\_HISTORY

SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID;

UPDATE CUSTOMER\_DIM

SET ADDRESS = rec.ADDRESS

WHERE CUST\_ID = rec.CUST\_ID;

END IF;

END LOOP;

INSERT INTO CUSTOMER\_DIM (CUST\_ID, CUST\_NAME, ADDRESS)

SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS

FROM DUAL

WHERE NOT EXISTS (

SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

);

END LOOP;

END;

/

**SCD Type 6**

CREATE OR REPLACE PROCEDURE SCD\_TYPE\_6\_PROC IS

BEGIN

FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

FOR dim IN (

SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y'

) LOOP

IF dim.ADDRESS != rec.ADDRESS THEN

UPDATE CUSTOMER\_DIM

SET EXPIRY\_DATE = SYSDATE,

IS\_ACTIVE = 'N'

WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

INSERT INTO CUSTOMER\_DIM (

CUST\_ID, CUST\_NAME, ADDRESS, PREV\_ADDRESS,

EFFECTIVE\_DATE, EXPIRY\_DATE, IS\_ACTIVE

) VALUES (

rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, dim.ADDRESS,

SYSDATE, NULL, 'Y'

);

ELSIF dim.CUST\_NAME != rec.CUST\_NAME THEN

UPDATE CUSTOMER\_DIM

SET CUST\_NAME = rec.CUST\_NAME

WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

END IF;

END LOOP;

INSERT INTO CUSTOMER\_DIM (

CUST\_ID, CUST\_NAME, ADDRESS, EFFECTIVE\_DATE, IS\_ACTIVE

)

SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, SYSDATE, 'Y'

FROM DUAL

WHERE NOT EXISTS (

SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

);

END LOOP;

END;

/

**Execution & Testing**

-- Execute any one of the procedures:

EXEC SCD\_TYPE\_1\_PROC;

-- View results:

SELECT \* FROM CUSTOMER\_DIM;

SELECT \* FROM CUSTOMER\_HISTORY; -- For SCD Type 4

**Execution and Results:**

SQL> CREATE TABLE CUSTOMER\_DIM (

2 CUST\_ID NUMBER PRIMARY KEY,

3 CUST\_NAME VARCHAR2(100),

4 ADDRESS VARCHAR2(100),

5 PREV\_ADDRESS VARCHAR2(100),

6 EFFECTIVE\_DATE DATE,

7 EXPIRY\_DATE DATE,

8 IS\_ACTIVE CHAR(1),

9 CHANGE\_REASON VARCHAR2(255)

10 );

Table created.

SQL> CREATE TABLE CUSTOMER\_STG (

2 CUST\_ID NUMBER,

3 CUST\_NAME VARCHAR2(100),

4 ADDRESS VARCHAR2(100)

5 );

Table created.

SQL> DELETE FROM CUSTOMER\_STG;

0 rows deleted.

SQL> INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (1, 'Gaurav', 'Pune');

1 row created.

SQL> INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (2, 'Sanju', 'Mumbai');

1 row created.

SQL> INSERT INTO CUSTOMER\_STG (CUST\_ID, CUST\_NAME, ADDRESS) VALUES (3, 'Ritik', 'Delhi');

1 row created.

SQL> COMMIT;

Commit complete.

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_0\_PROC IS

2 BEGIN

3 MERGE INTO CUSTOMER\_DIM d

4 USING CUSTOMER\_STG s

5 ON (d.CUST\_ID = s.CUST\_ID)

6 WHEN NOT MATCHED THEN

7 INSERT (CUST\_ID, CUST\_NAME, ADDRESS)

8 VALUES (s.CUST\_ID, s.CUST\_NAME, s.ADDRESS);

9 END;

10 /

Procedure created.

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_1\_PROC IS

2 BEGIN

3 MERGE INTO CUSTOMER\_DIM d

4 USING CUSTOMER\_STG s

5 ON (d.CUST\_ID = s.CUST\_ID)

6 WHEN MATCHED THEN

7 UPDATE SET d.CUST\_NAME = s.CUST\_NAME,

8 d.ADDRESS = s.ADDRESS

9 WHEN NOT MATCHED THEN

10 INSERT (CUST\_ID, CUST\_NAME, ADDRESS)

11 VALUES (s.CUST\_ID, s.CUST\_NAME, s.ADDRESS);

12 END;

13 /

Procedure created.

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_2\_PROC IS

2 BEGIN

3 FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

4 -- Check if changed

5 FOR dim IN (

6 SELECT \* FROM CUSTOMER\_DIM

7 WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y'

8 ) LOOP

9 IF dim.CUST\_NAME != rec.CUST\_NAME OR dim.ADDRESS != rec.ADDRESS THEN

10 -- Expire old record

11 UPDATE CUSTOMER\_DIM

12 SET EXPIRY\_DATE = SYSDATE,

13 IS\_ACTIVE = 'N'

14 WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

15

16 -- Insert new

17 INSERT INTO CUSTOMER\_DIM (

18 CUST\_ID, CUST\_NAME, ADDRESS,

19 EFFECTIVE\_DATE, EXPIRY\_DATE, IS\_ACTIVE

20 )

21 VALUES (

22 rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS,

23 SYSDATE, NULL, 'Y'

24 );

25 END IF;

26 END LOOP;

27

28 -- Insert if new

29 INSERT INTO CUSTOMER\_DIM (

30 CUST\_ID, CUST\_NAME, ADDRESS,

31 EFFECTIVE\_DATE, IS\_ACTIVE

32 )

33 SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, SYSDATE, 'Y'

34 FROM DUAL

35 WHERE NOT EXISTS (

36 SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

37 );

38 END LOOP;

39 END;

40 /

Procedure created.

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_3\_PROC IS

2 BEGIN

3 FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

4 -- Update with prev address

5 UPDATE CUSTOMER\_DIM

6 SET PREV\_ADDRESS = ADDRESS,

7 ADDRESS = rec.ADDRESS

8 WHERE CUST\_ID = rec.CUST\_ID

9 AND ADDRESS != rec.ADDRESS;

10

11 -- Insert if new

12 INSERT INTO CUSTOMER\_DIM (CUST\_ID, CUST\_NAME, ADDRESS)

13 SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS

14 FROM DUAL

15 WHERE NOT EXISTS (

16 SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

17 );

18 END LOOP;

19 END;

20 /

Procedure created.

SQL> BEGIN

2 EXECUTE IMMEDIATE 'DROP TABLE CUSTOMER\_HISTORY';

3 EXCEPTION WHEN OTHERS THEN NULL;

4 END;

5 /

PL/SQL procedure successfully completed.

SQL>

SQL> CREATE TABLE CUSTOMER\_HISTORY AS

2 SELECT \* FROM CUSTOMER\_DIM WHERE 1=0;

Table created.

SQL>

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_4\_PROC IS

2 BEGIN

3 FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

4 FOR dim IN (

5 SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

6 ) LOOP

7 IF dim.ADDRESS != rec.ADDRESS THEN

8 -- Move old to history

9 INSERT INTO CUSTOMER\_HISTORY

10 SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID;

11

12 -- Update new

13 UPDATE CUSTOMER\_DIM

14 SET ADDRESS = rec.ADDRESS

15 WHERE CUST\_ID = rec.CUST\_ID;

16 END IF;

17 END LOOP;

18

19 -- Insert new

20 INSERT INTO CUSTOMER\_DIM (CUST\_ID, CUST\_NAME, ADDRESS)

21 SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS

22 FROM DUAL

23 WHERE NOT EXISTS (

24 SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

25 );

26 END LOOP;

27 END;

28 /

Procedure created.

SQL> CREATE OR REPLACE PROCEDURE SCD\_TYPE\_6\_PROC IS

2 BEGIN

3 FOR rec IN (SELECT \* FROM CUSTOMER\_STG) LOOP

4 FOR dim IN (

5 SELECT \* FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y'

6 ) LOOP

7 IF dim.ADDRESS != rec.ADDRESS THEN

8 -- Type 2 - expire old

9 UPDATE CUSTOMER\_DIM

10 SET EXPIRY\_DATE = SYSDATE,

11 IS\_ACTIVE = 'N'

12 WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

13

14 -- Insert new with prev\_address (type 3)

15 INSERT INTO CUSTOMER\_DIM (

16 CUST\_ID, CUST\_NAME, ADDRESS, PREV\_ADDRESS,

17 EFFECTIVE\_DATE, EXPIRY\_DATE, IS\_ACTIVE

18 ) VALUES (

19 rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, dim.ADDRESS,

20 SYSDATE, NULL, 'Y'

21 );

22 ELSIF dim.CUST\_NAME != rec.CUST\_NAME THEN

23 -- Type 1: overwrite

24 UPDATE CUSTOMER\_DIM

25 SET CUST\_NAME = rec.CUST\_NAME

26 WHERE CUST\_ID = rec.CUST\_ID AND IS\_ACTIVE = 'Y';

27 END IF;

28 END LOOP;

29

30 -- Insert if new

31 INSERT INTO CUSTOMER\_DIM (

32 CUST\_ID, CUST\_NAME, ADDRESS, EFFECTIVE\_DATE, IS\_ACTIVE

33 )

34 SELECT rec.CUST\_ID, rec.CUST\_NAME, rec.ADDRESS, SYSDATE, 'Y'

35 FROM DUAL

36 WHERE NOT EXISTS (

37 SELECT 1 FROM CUSTOMER\_DIM WHERE CUST\_ID = rec.CUST\_ID

38 );

39 END LOOP;

40 END;

41 /

Procedure created.

SQL> EXEC SCD\_TYPE\_1\_PROC;

PL/SQL procedure successfully completed.

SQL> EXEC SCD\_TYPE\_2\_PROC;

PL/SQL procedure successfully completed.

SQL> SELECT \* FROM CUSTOMER\_DIM ORDER BY CUST\_ID;

CUST\_ID

----------

CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

--------------------------------------------------------------------------------

EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

--------------------------------------------------------------------------------

1

CUST\_ID

----------

CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

--------------------------------------------------------------------------------

EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

--------------------------------------------------------------------------------

Gaurav

CUST\_ID

----------

CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

--------------------------------------------------------------------------------

EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

--------------------------------------------------------------------------------

Pune

CUST\_ID

----------

CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

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CUST\_ID

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CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

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CHANGE\_REASON

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CUST\_ID

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ADDRESS

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PREV\_ADDRESS

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CHANGE\_REASON

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CUST\_ID

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PREV\_ADDRESS

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CHANGE\_REASON

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CUST\_ID

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CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

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CHANGE\_REASON

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2

CUST\_ID

----------

CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

--------------------------------------------------------------------------------

EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

--------------------------------------------------------------------------------

Sanju

CUST\_ID

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CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

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Mumbai

CUST\_ID

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CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

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CHANGE\_REASON

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CUST\_ID

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CUST\_NAME

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

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CHANGE\_REASON

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3

CUST\_ID

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CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

--------------------------------------------------------------------------------

Ritik

CUST\_ID

----------

CUST\_NAME

--------------------------------------------------------------------------------

ADDRESS

--------------------------------------------------------------------------------

PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

--------- --------- -

CHANGE\_REASON

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Delhi

CUST\_ID

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CUST\_NAME

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ADDRESS

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PREV\_ADDRESS

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EFFECTIVE EXPIRY\_DA I

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CHANGE\_REASON

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CHANGE\_REASON

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