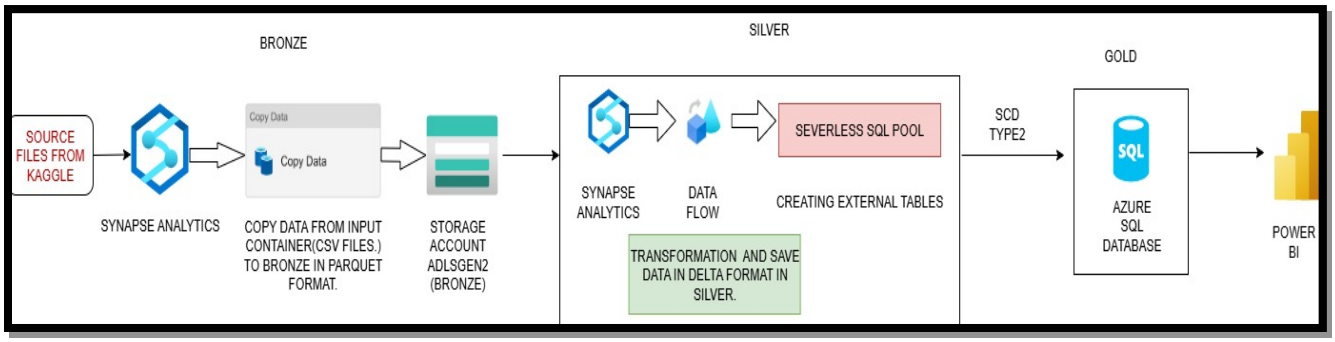
NANDINI RATHORE

BOOTCAMP PROJECT-3

Customer 360 Data Integration

PROJECT ARCHITECTURE:-



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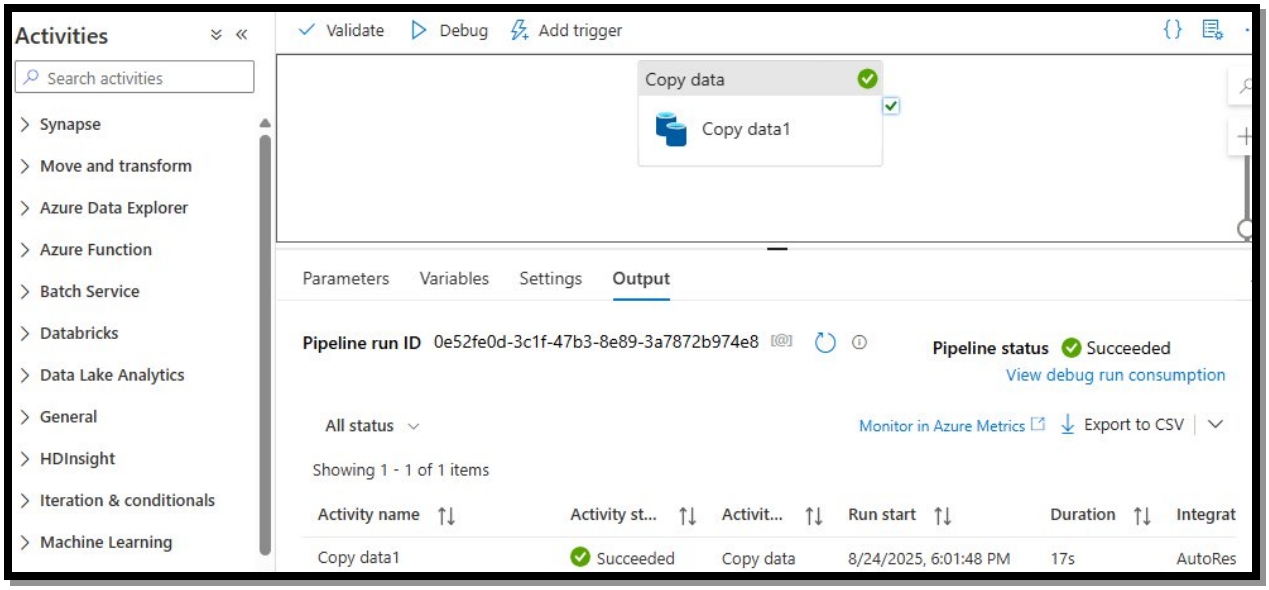
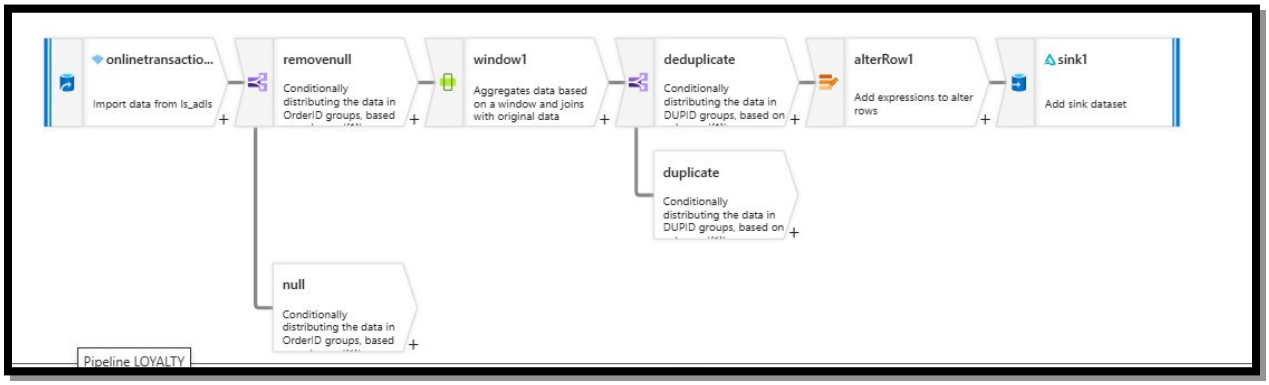


I first use copy activity to load raw csv files from input container to bronze layer in parquet format.

Then , in synapse using data flow for transformation of all the files and save them in silver layer in delta format.

1.ONLINE TRANSACTION



Removing null values

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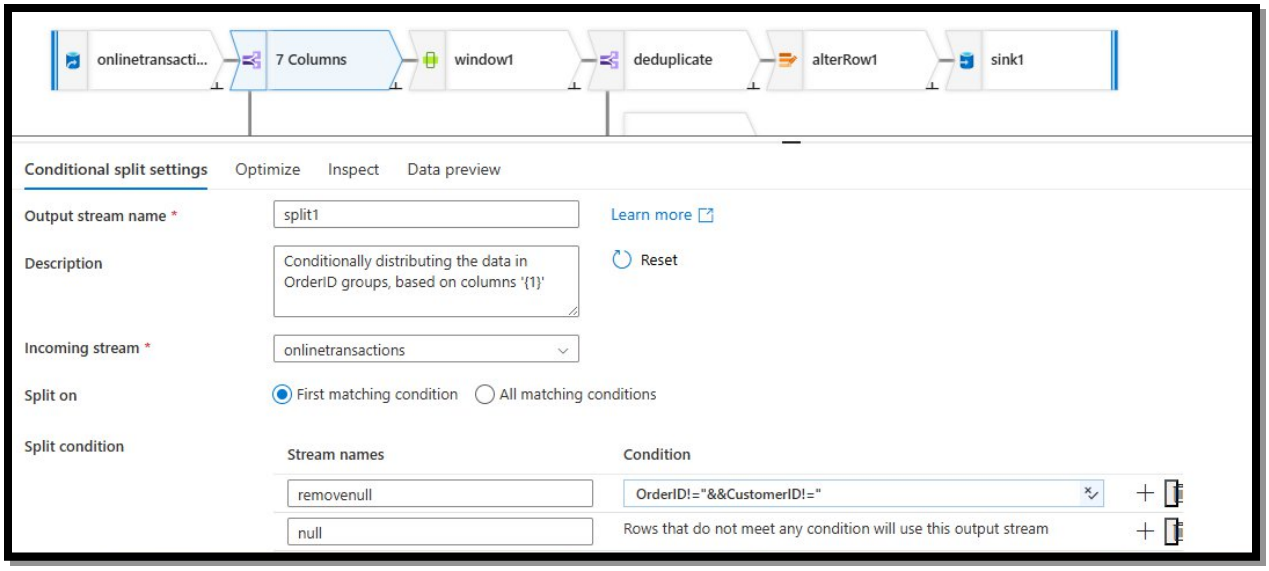
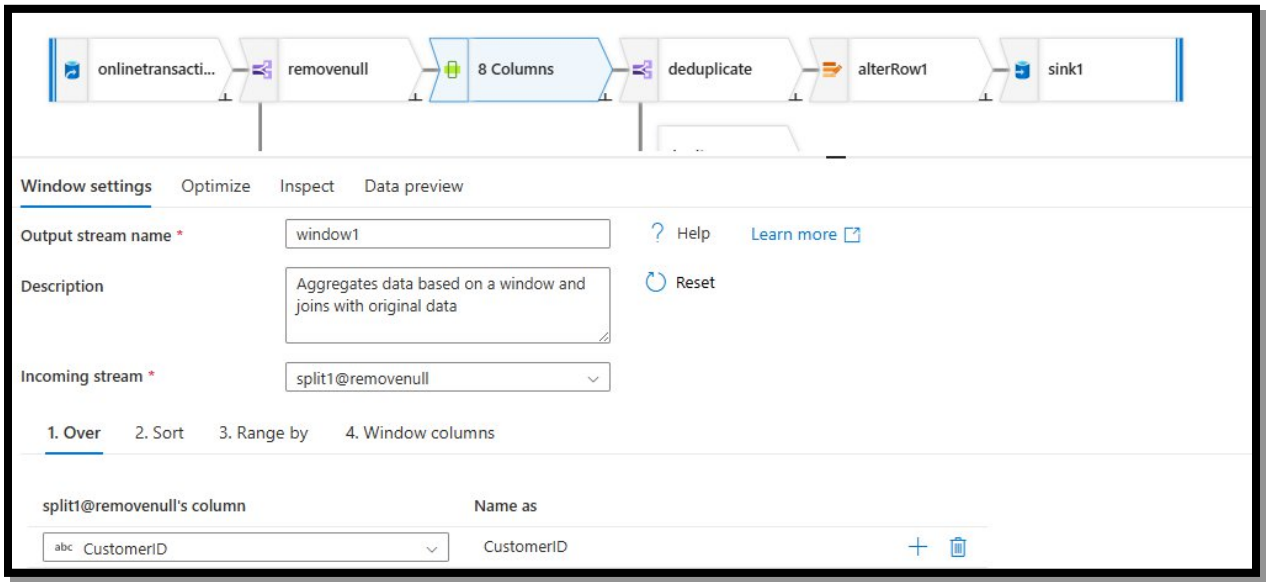


Window



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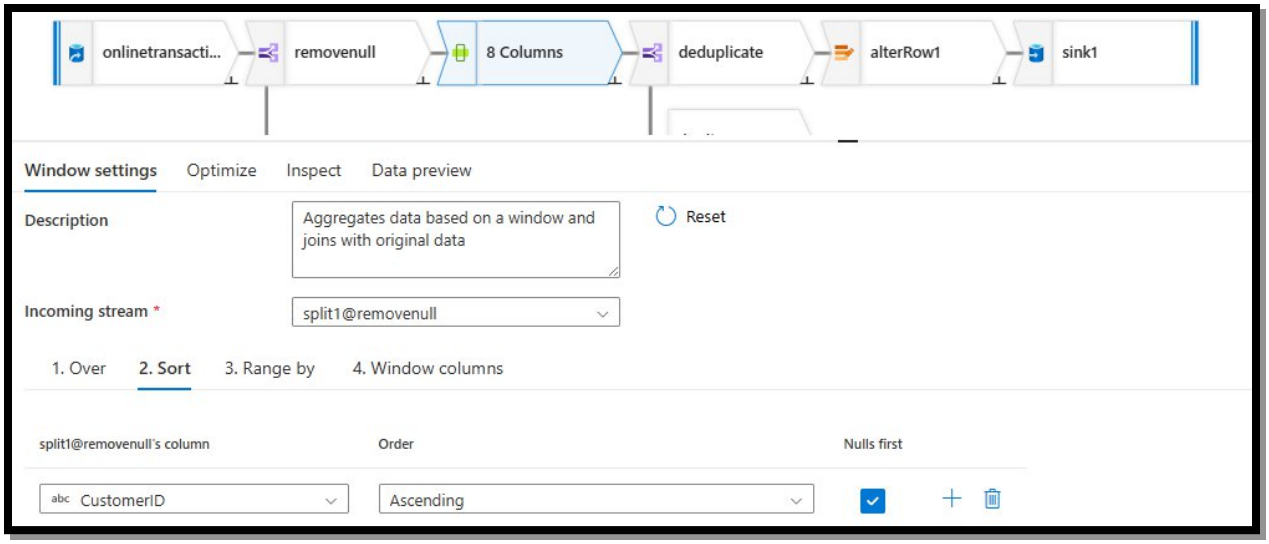
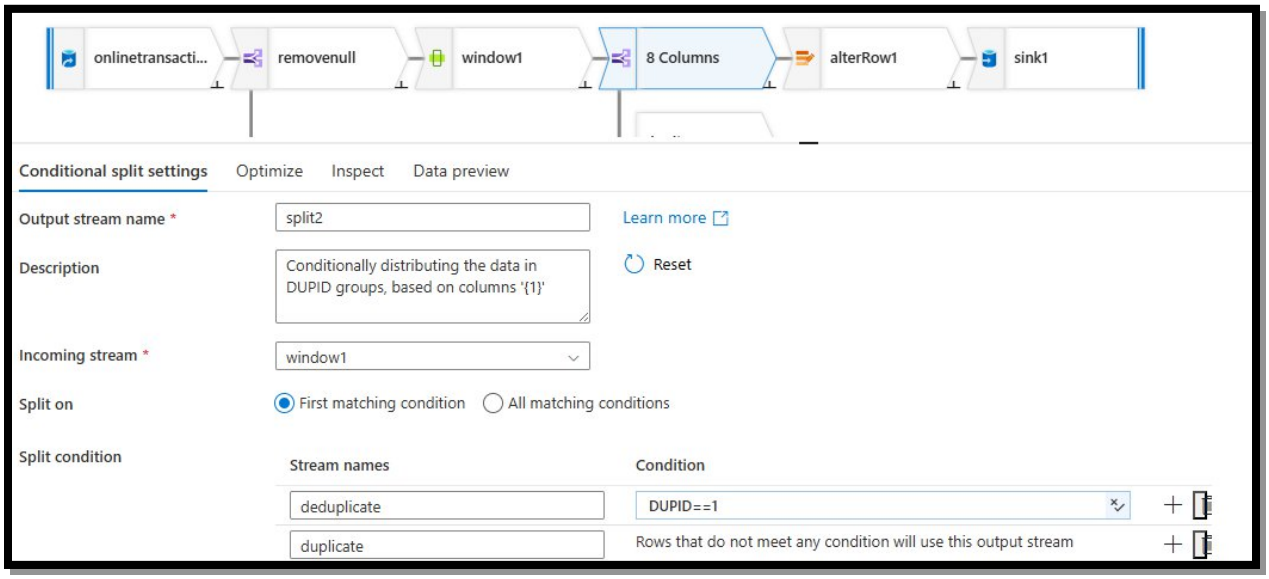


Removing duplicates



Alter row

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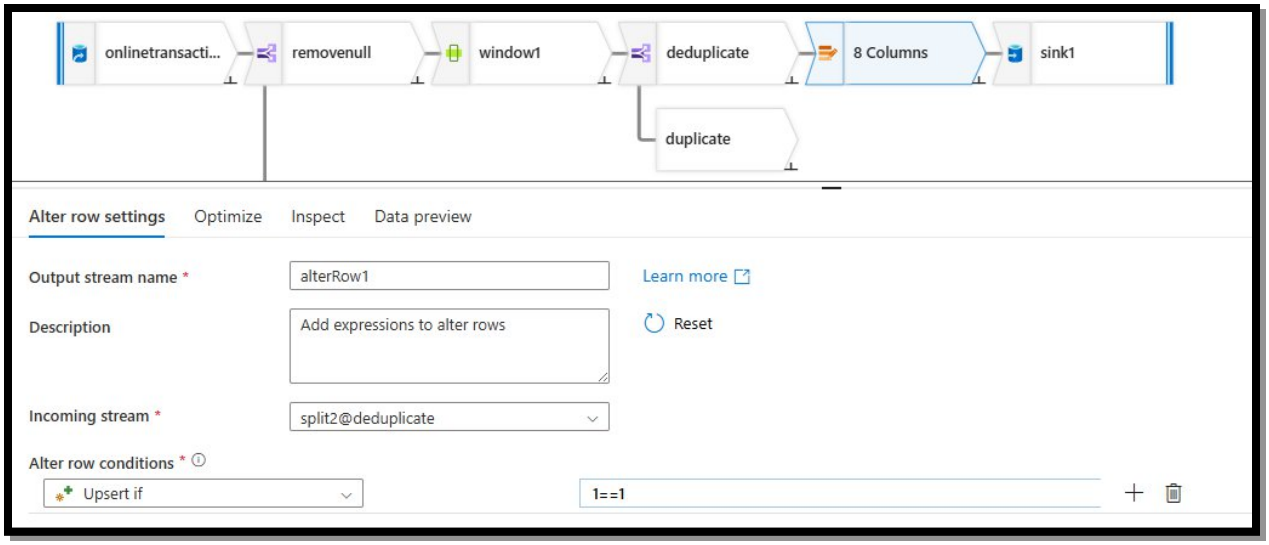
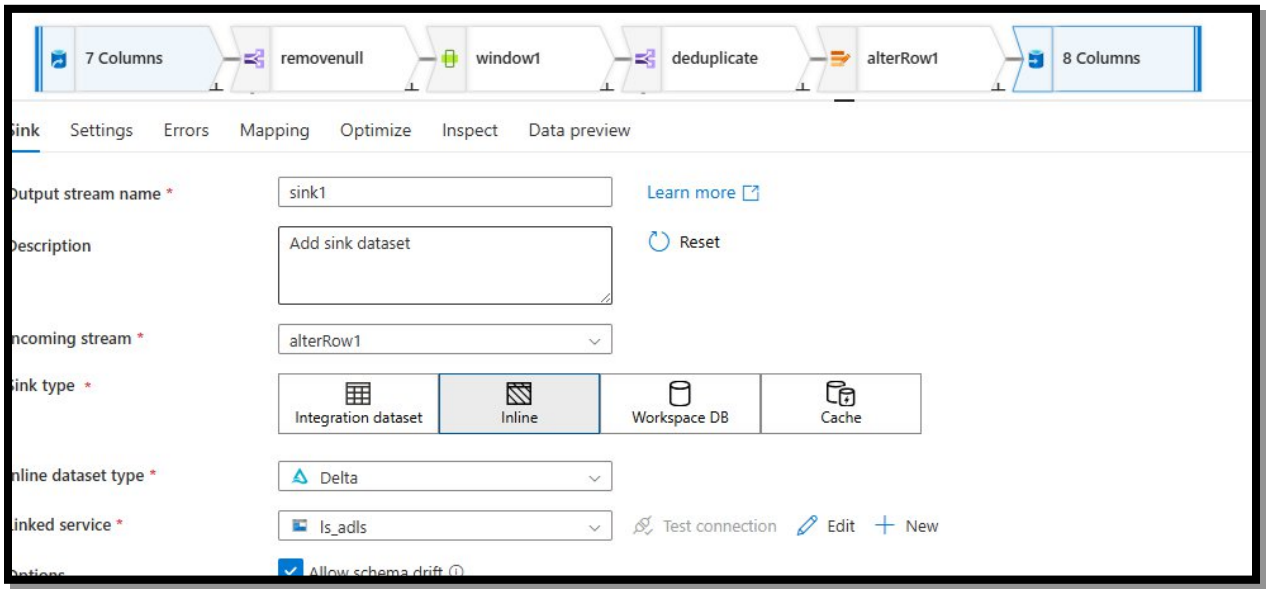
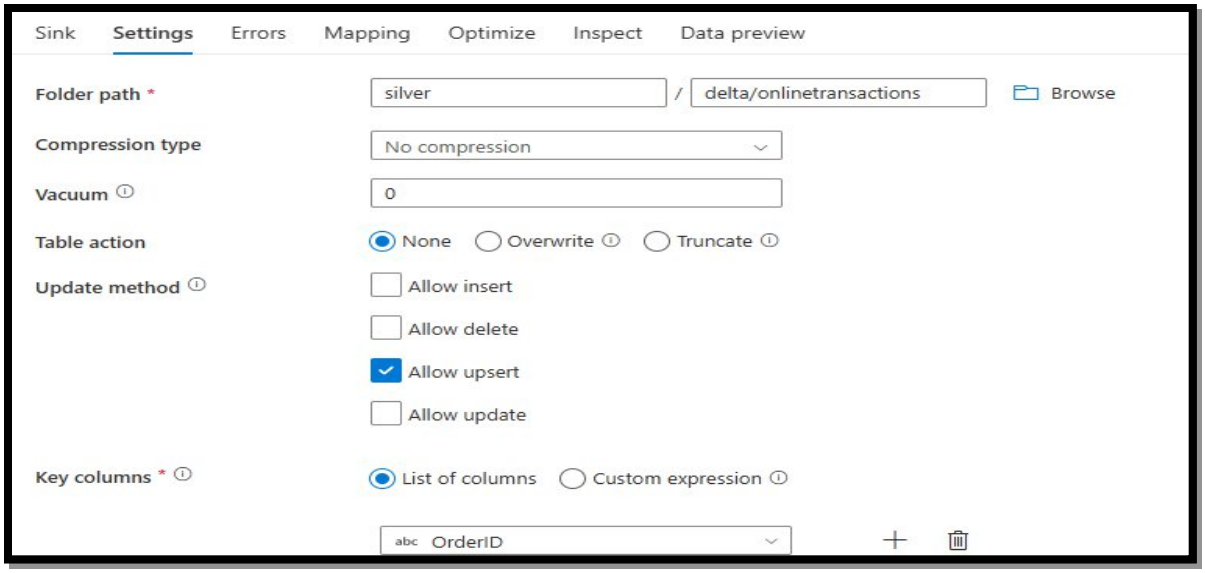


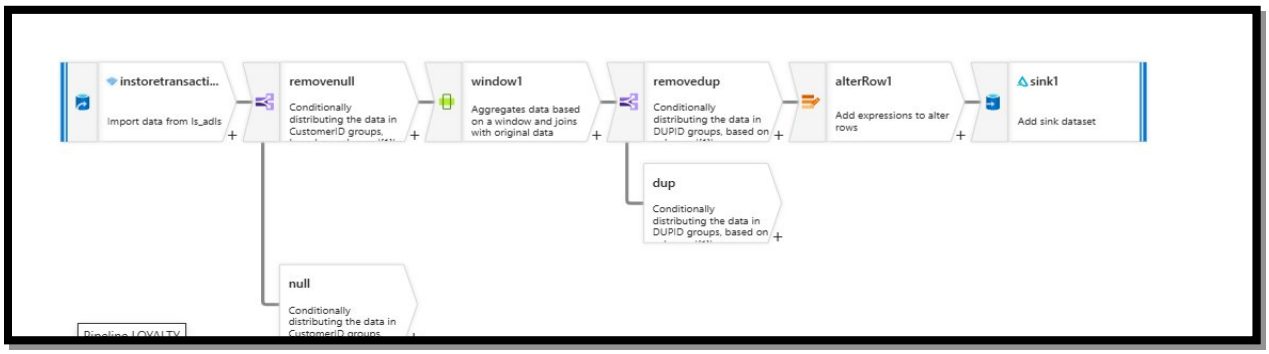
Sink



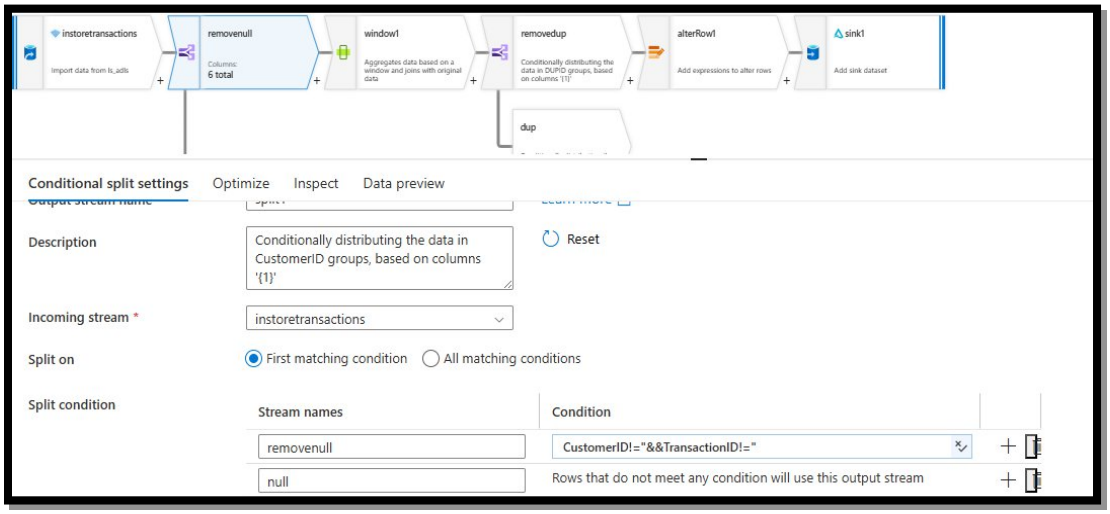
NANDINI RATHORE



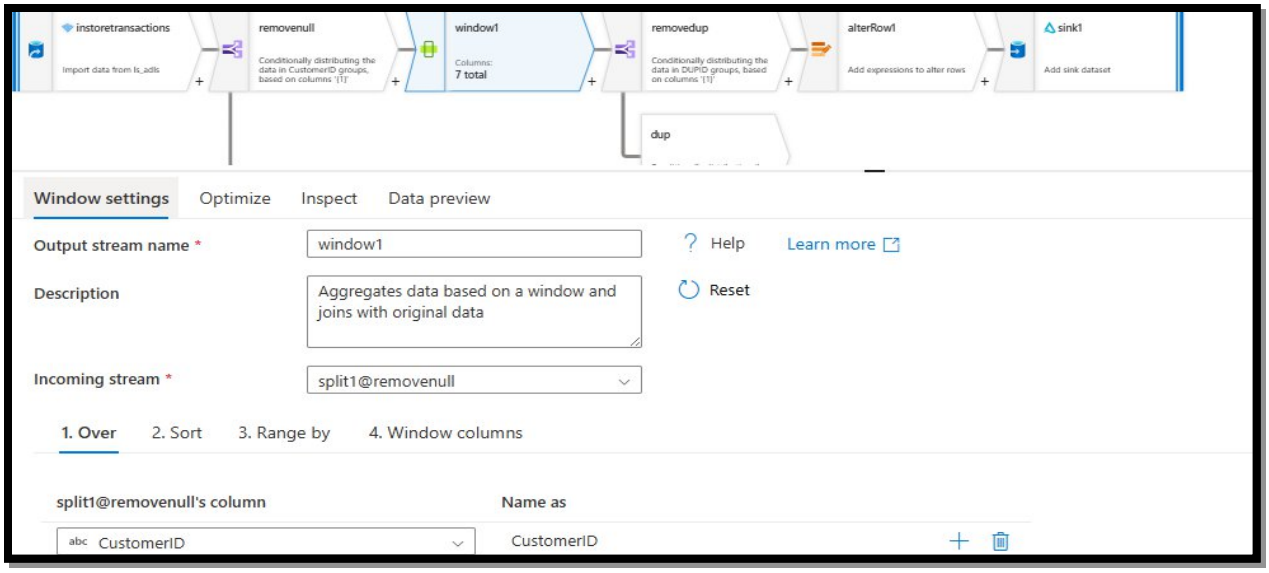
2.STORE PURCHASE

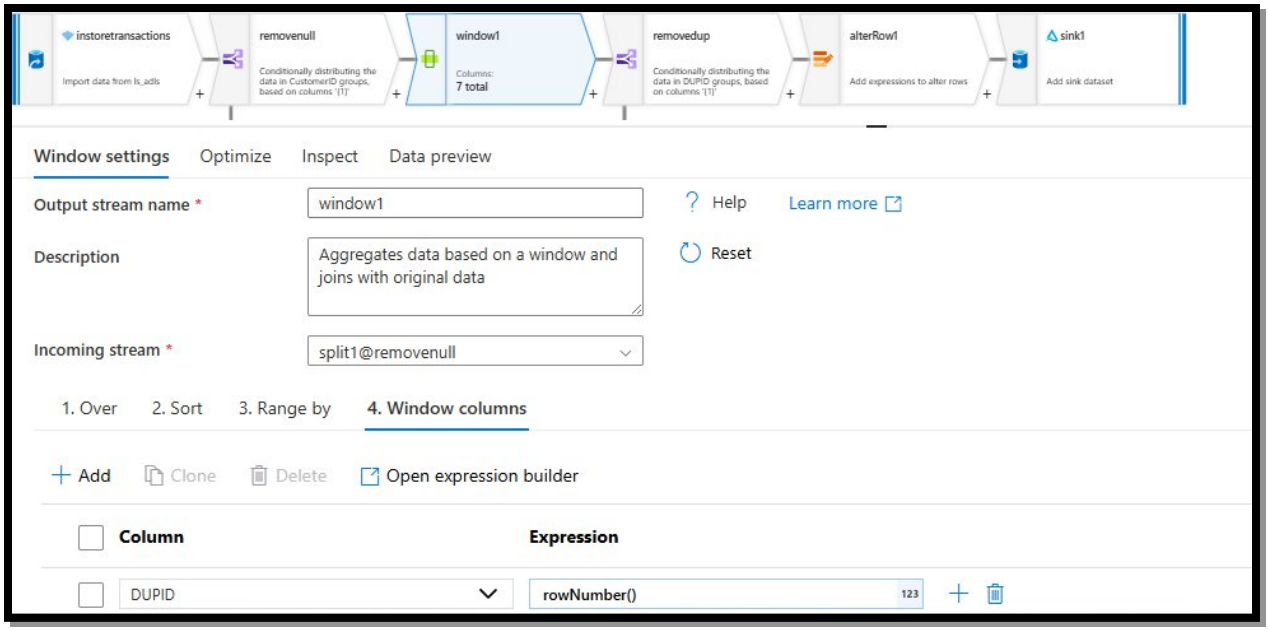


Removing null values



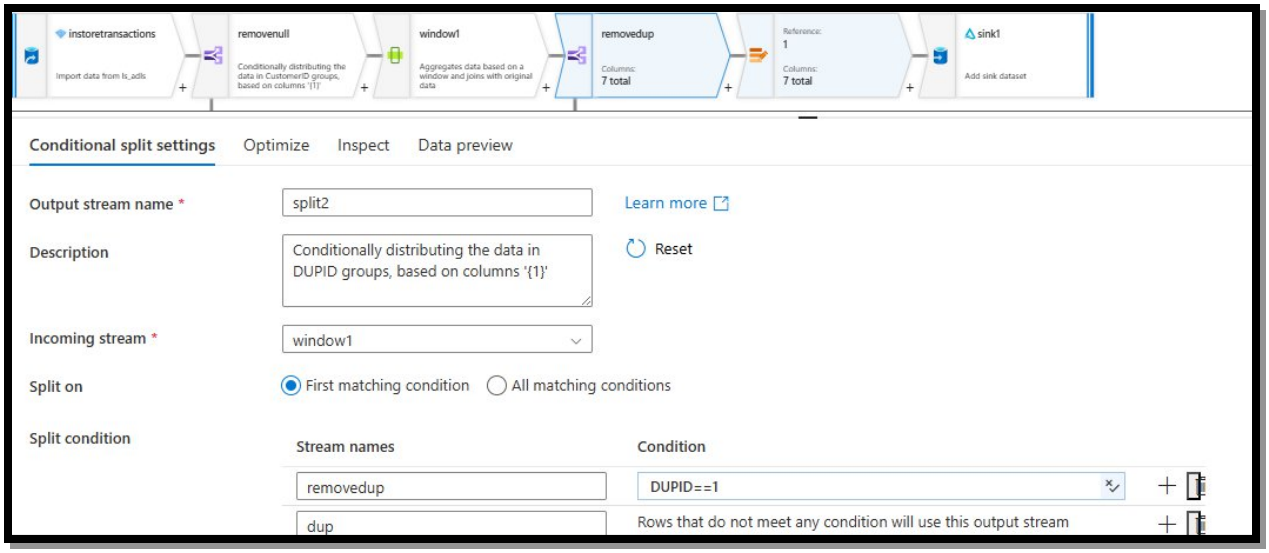
NANDINI RATHORE



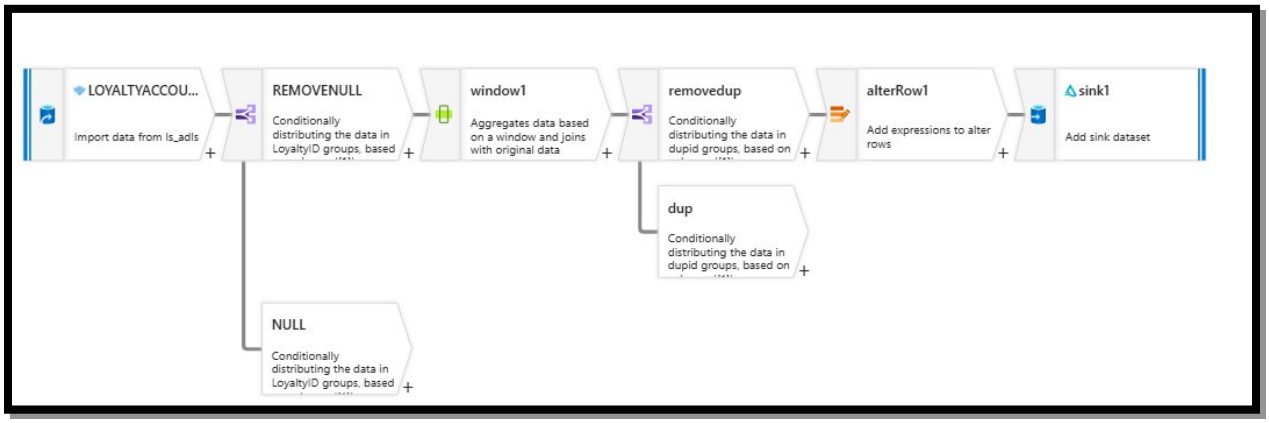


Remove duplicates

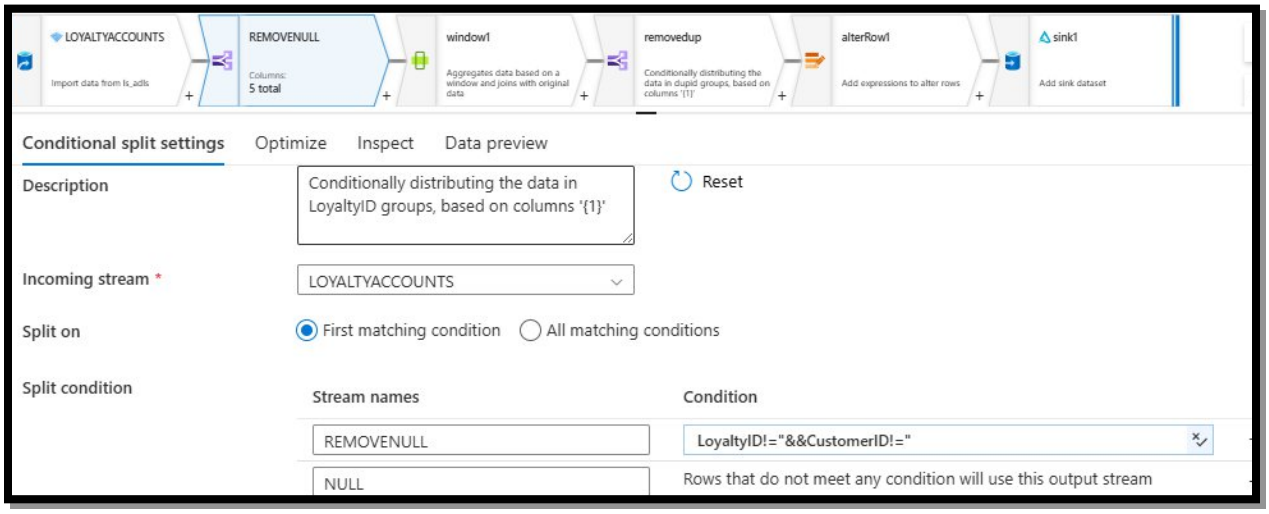
NANDINI RATHORE



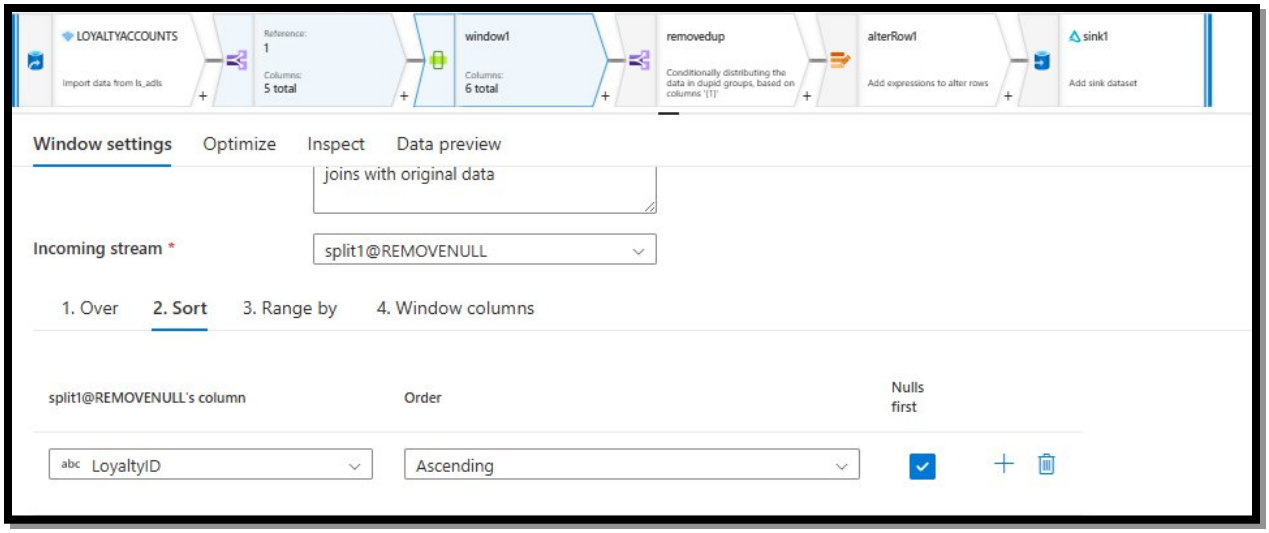
3.LOYALTY ACCOUNTS.

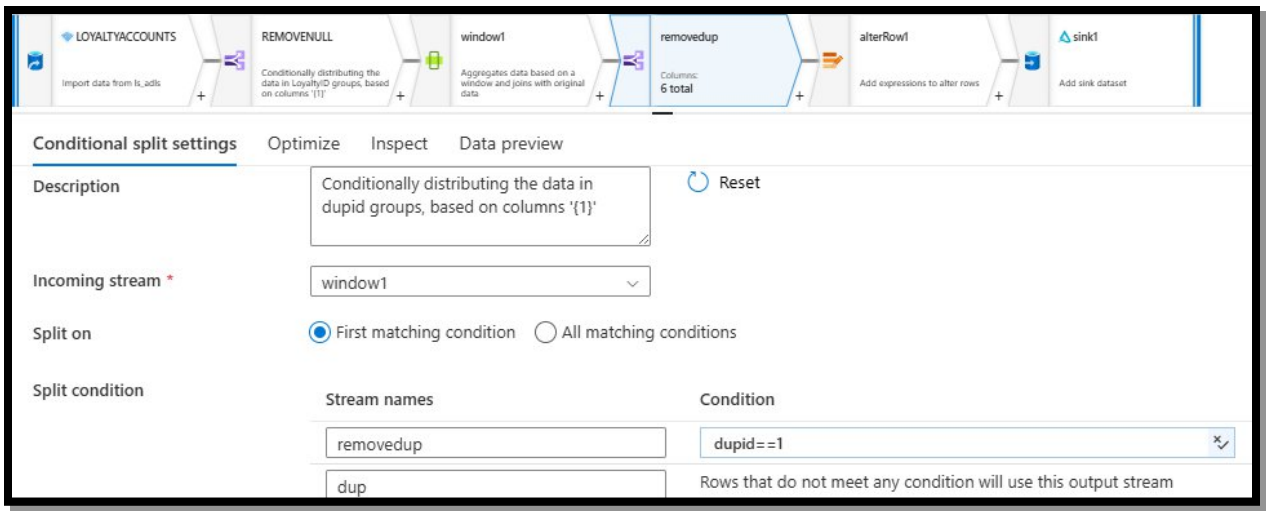


Removing null



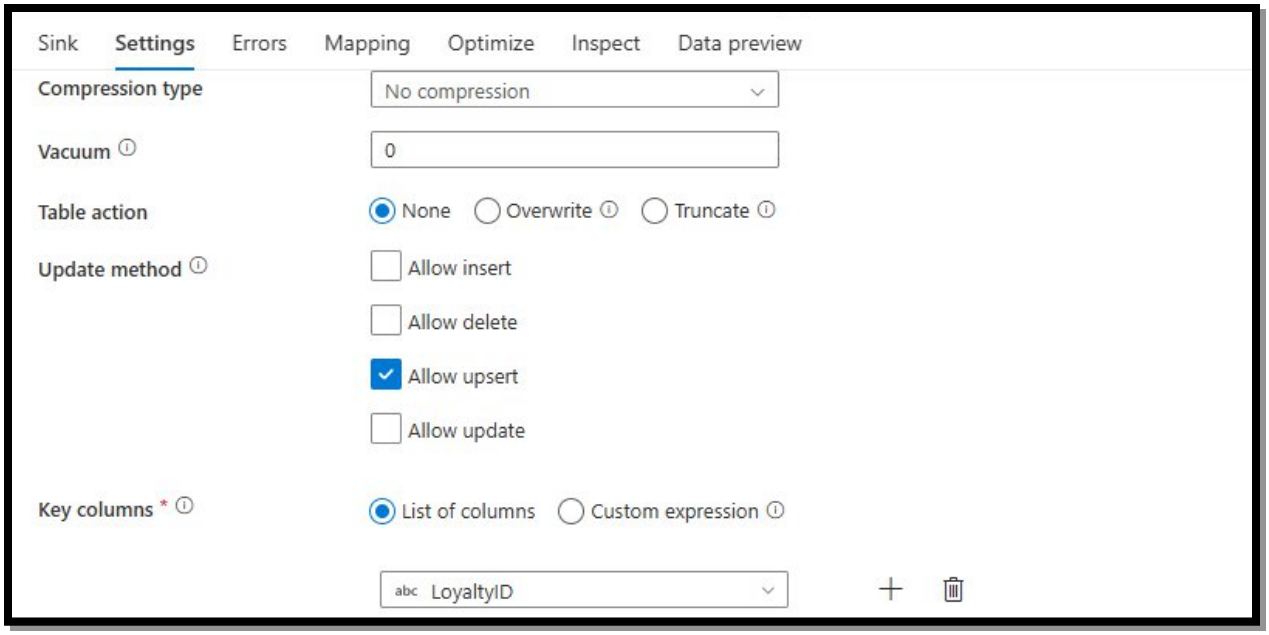
NANDINI RATHORE



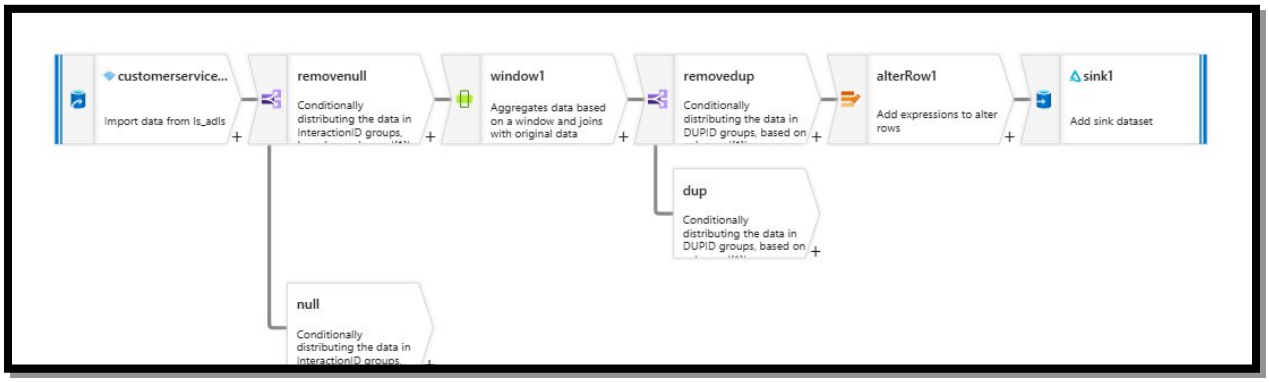


Sink

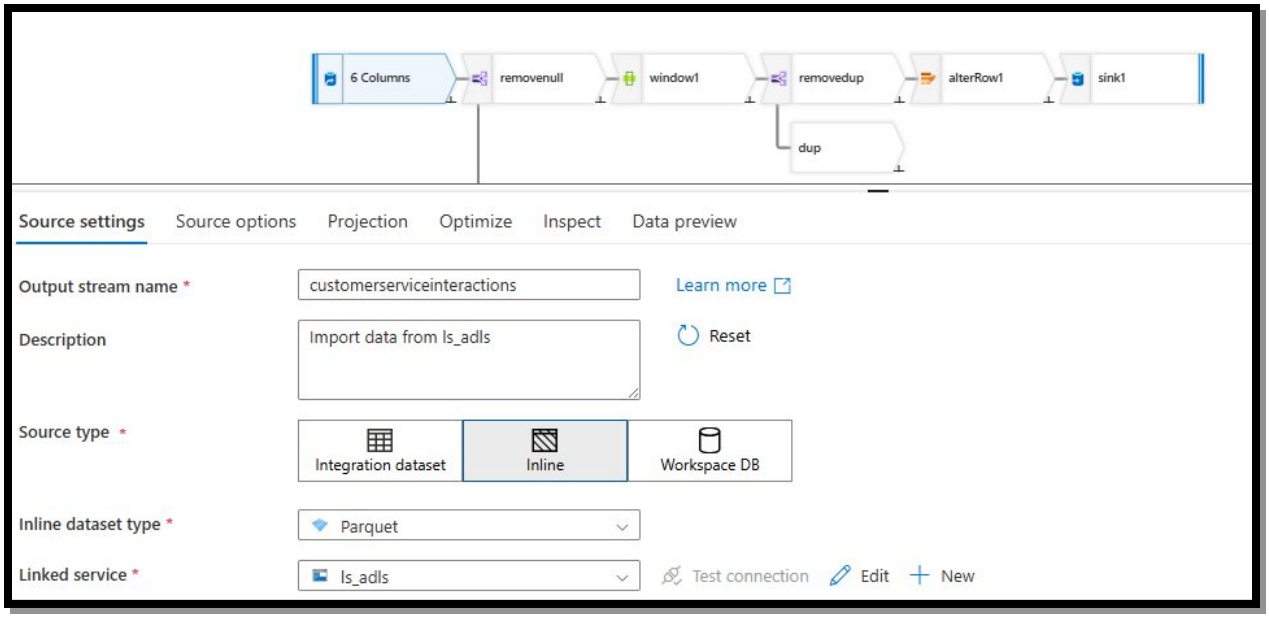
NANDINI RATHORE

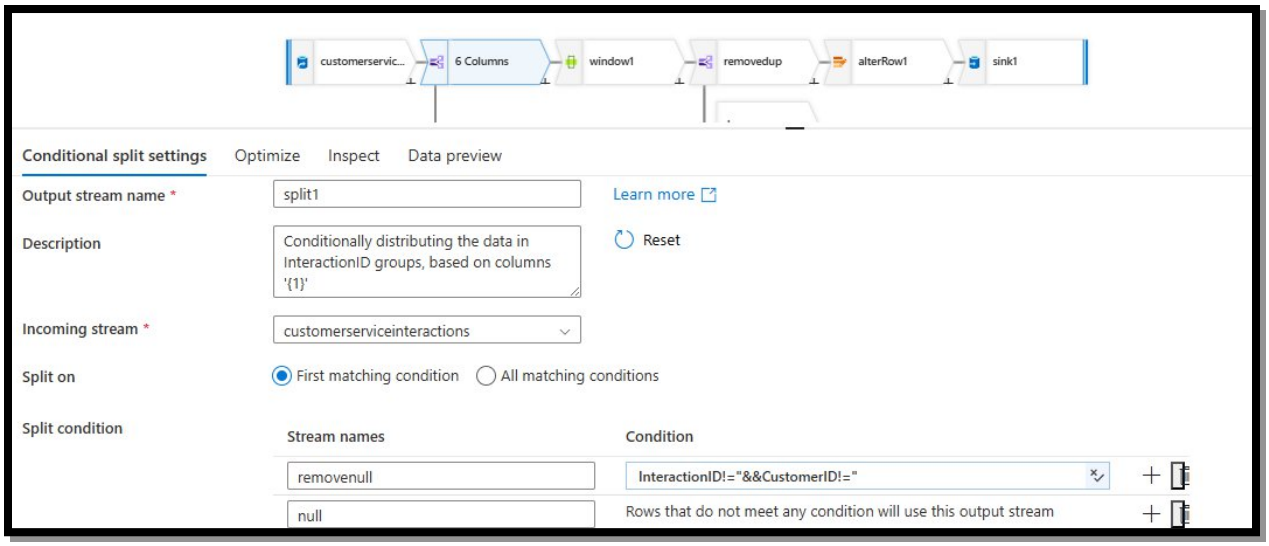


4.CUSTOMER INTERACTION SERVICE.

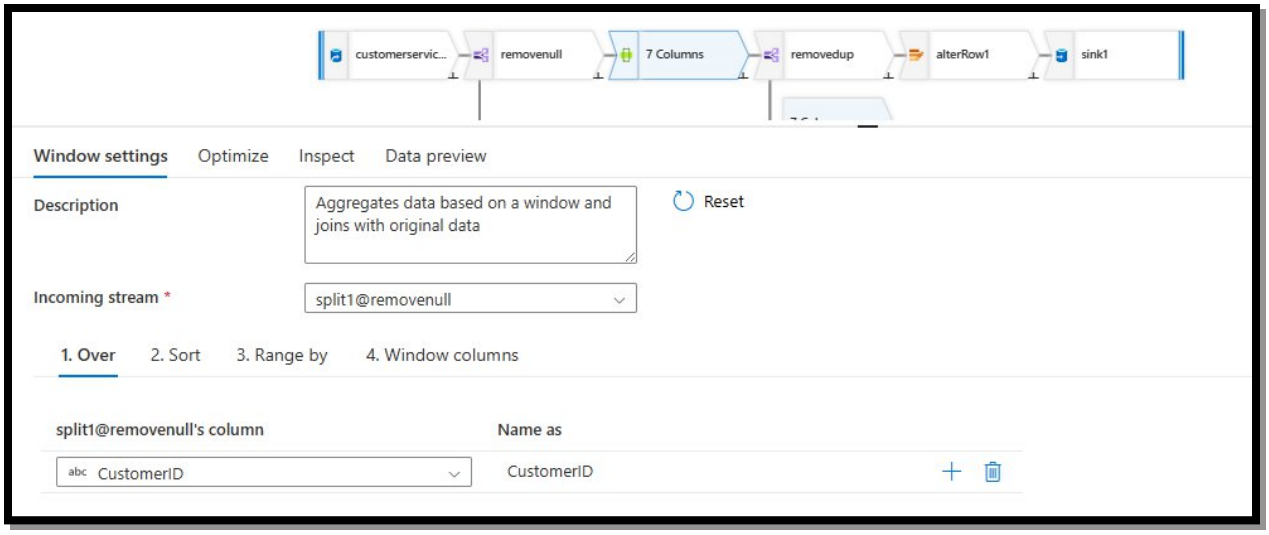


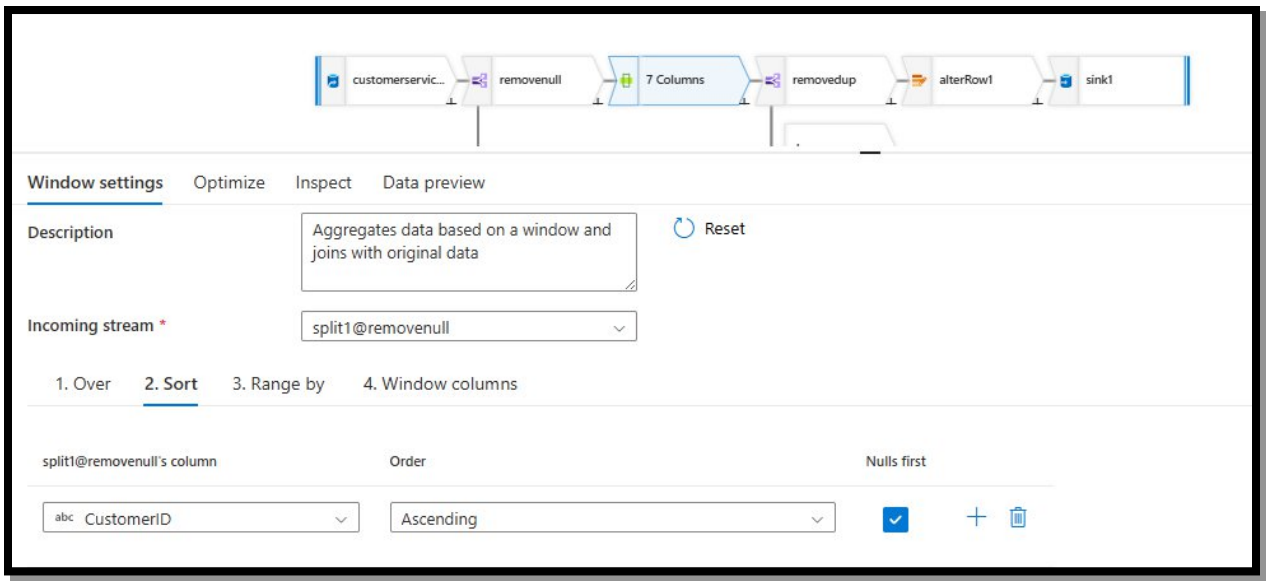
NANDINI RATHORE





NANDINI RATHORE





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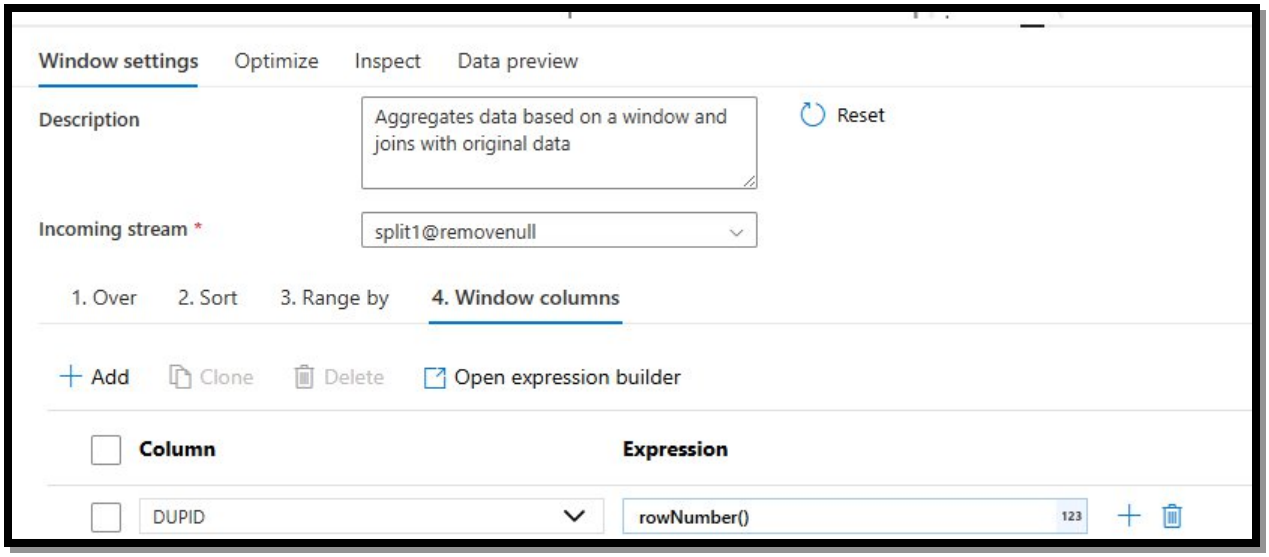
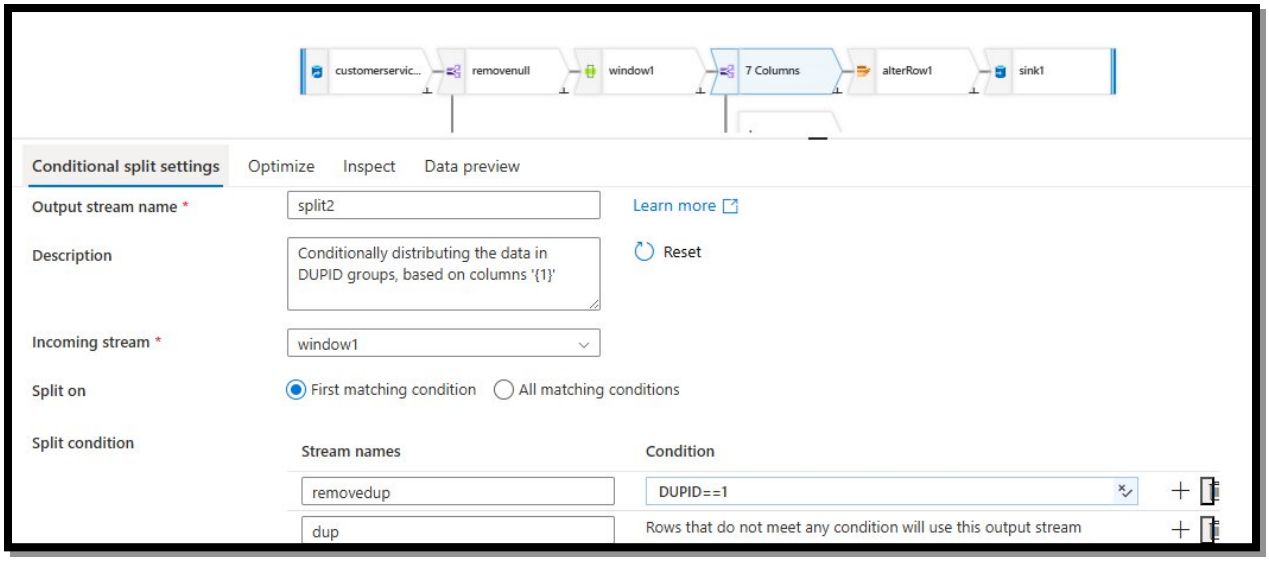
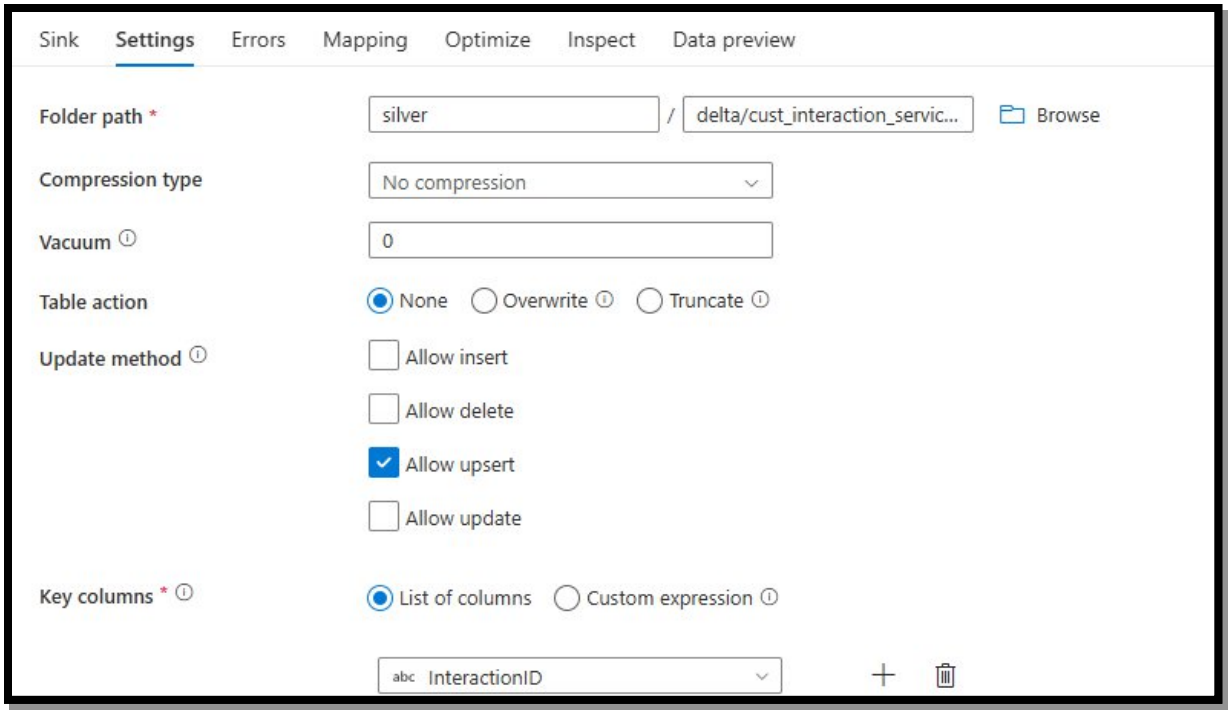
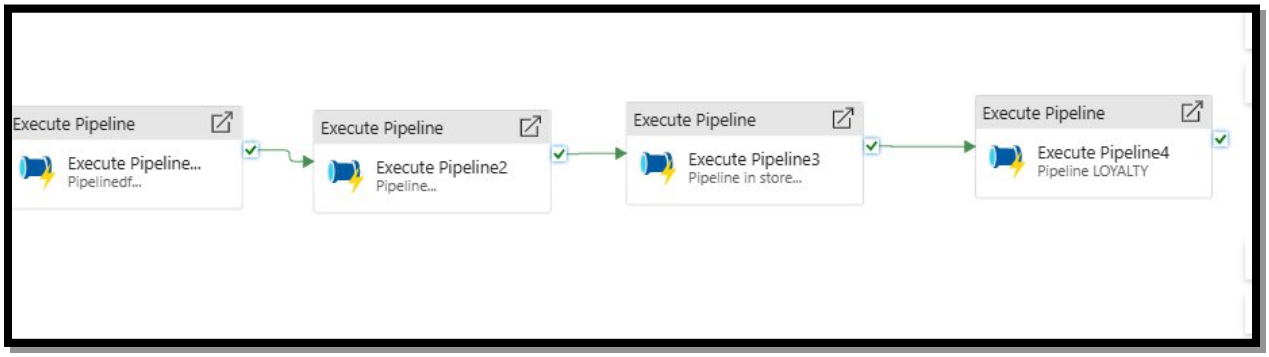




NANDINI RATHORE



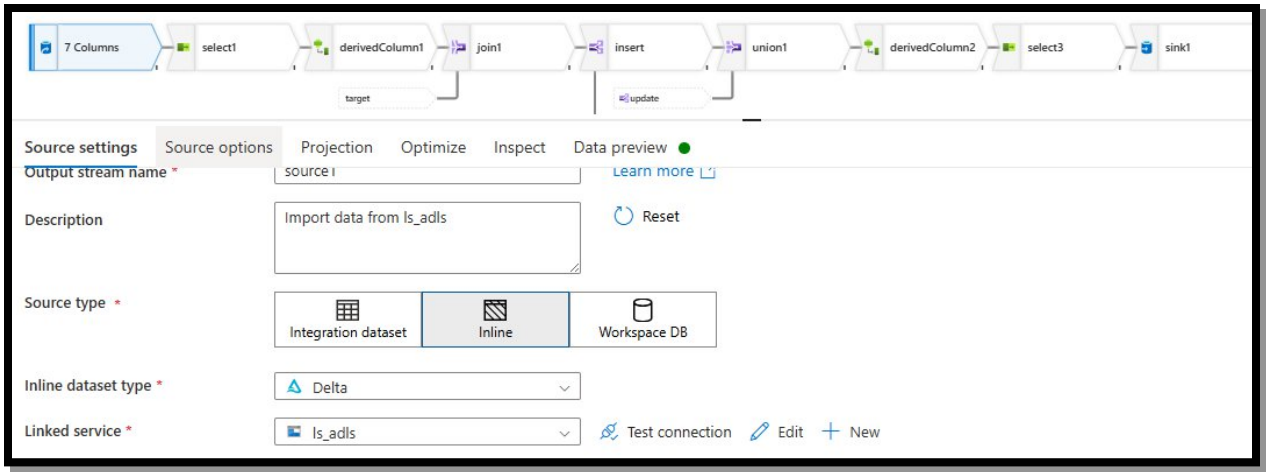


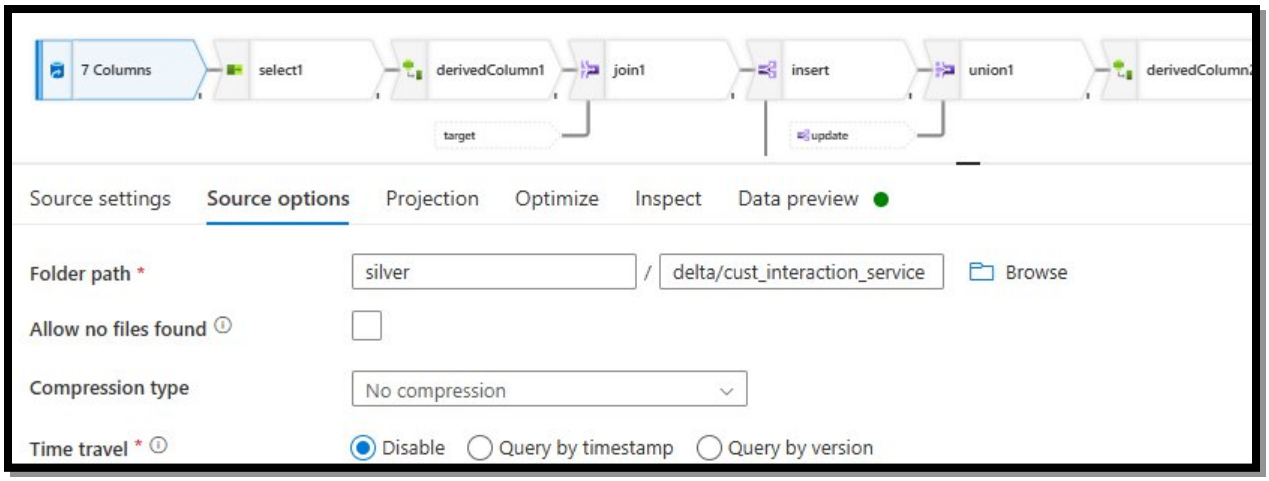
EXEC PIPELINE TO RUN DATAFLOW PARALLELY.

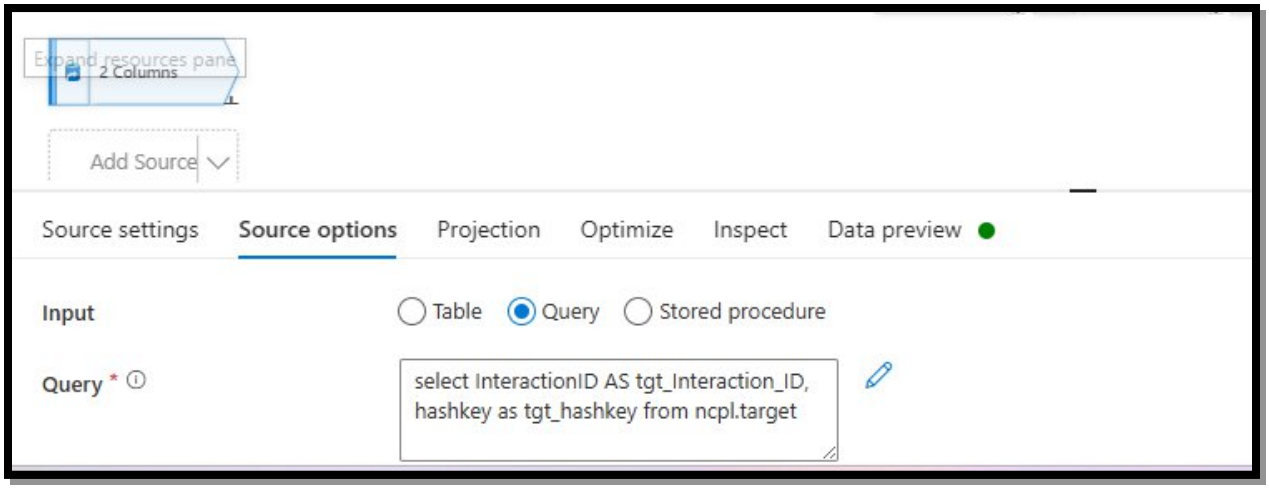
THEN PERFORMING SCD TYPE 2:-

1.CUSTOMER INTERACTION SERVICE.

NANDINI RATHORE







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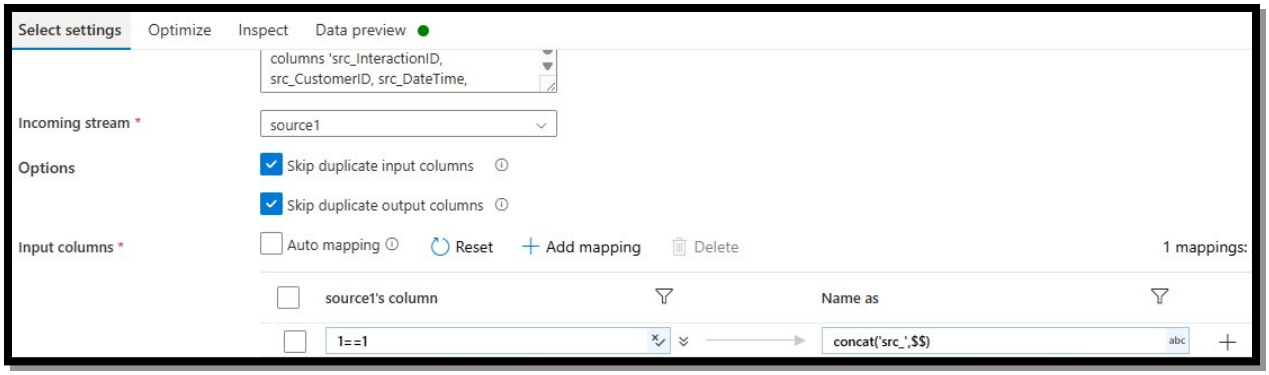
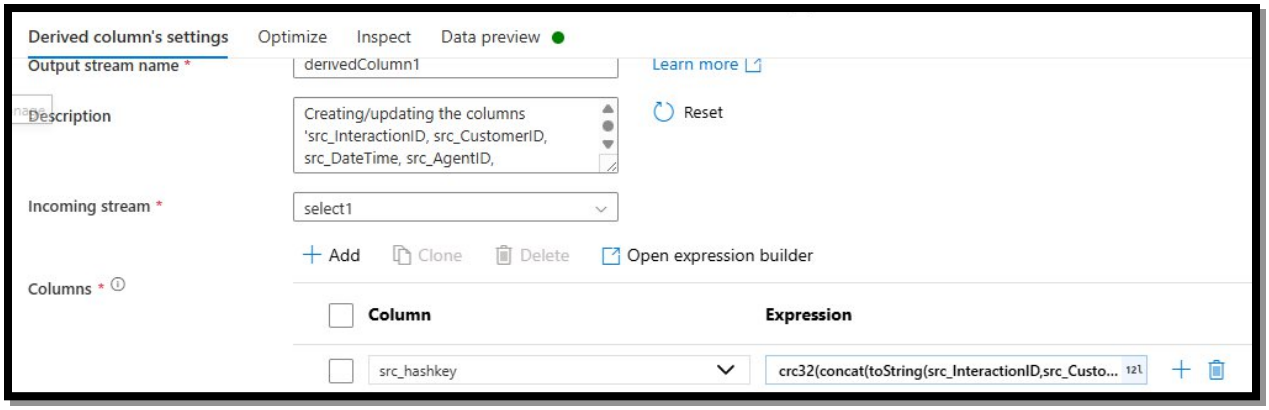
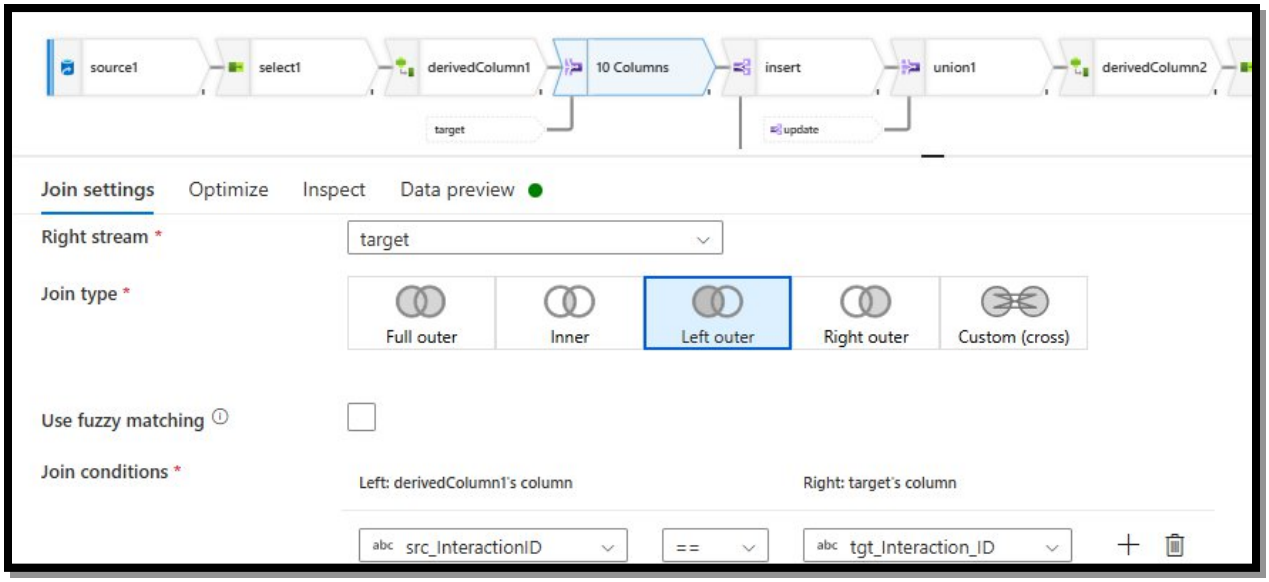
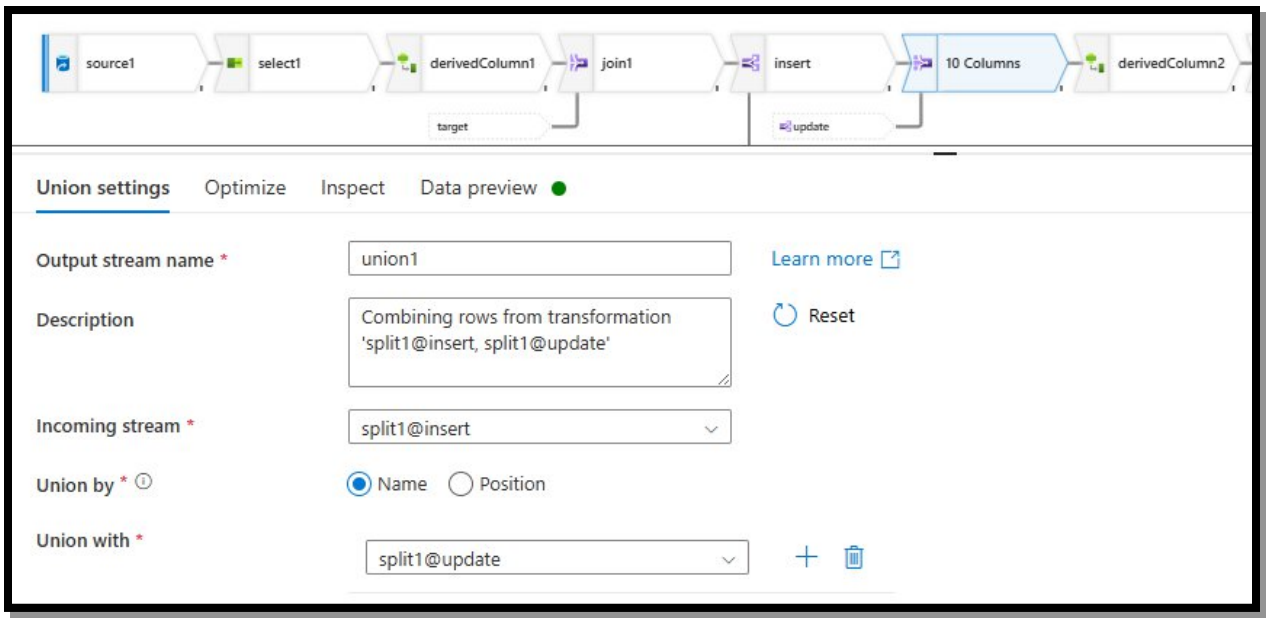
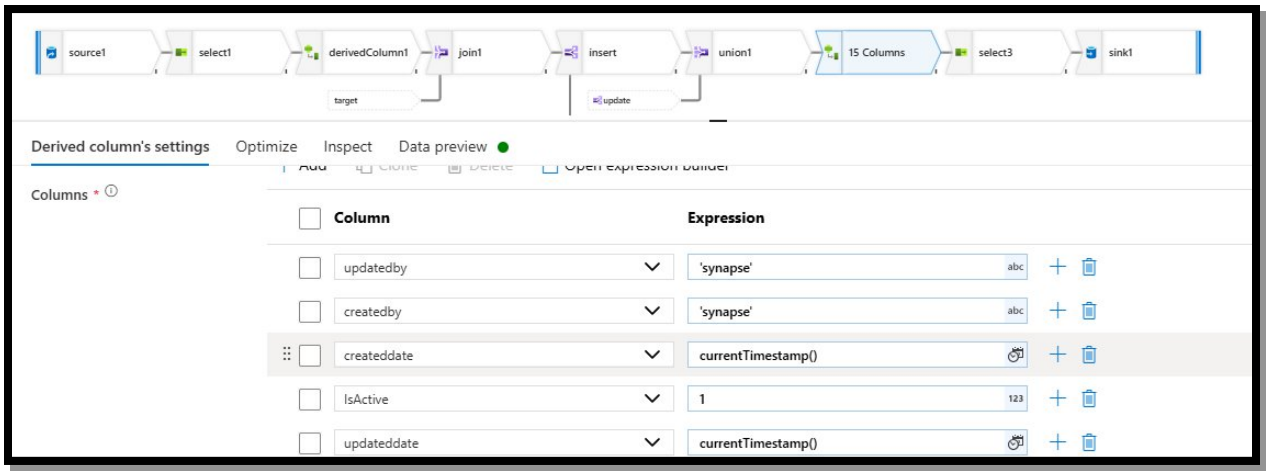






NANDINI RATHORE





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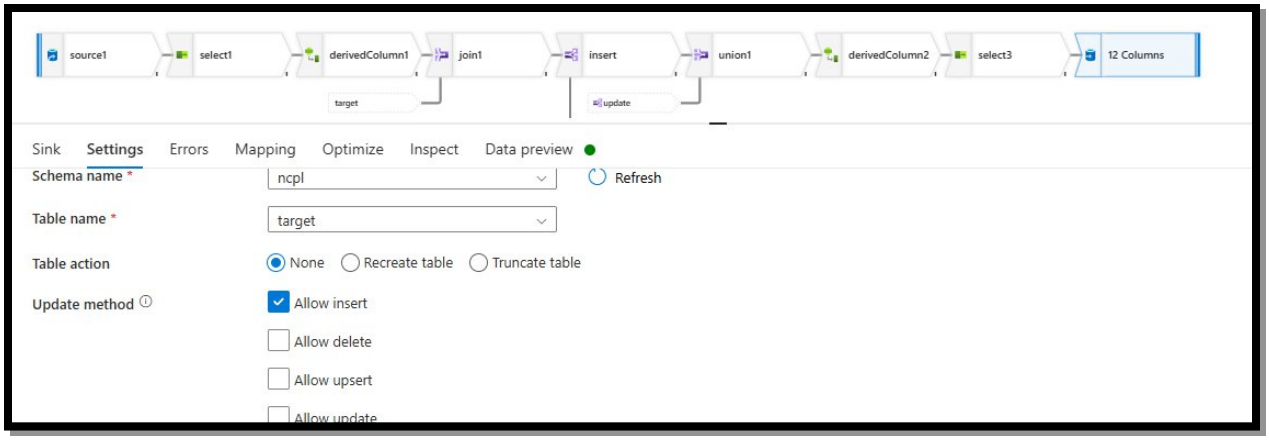

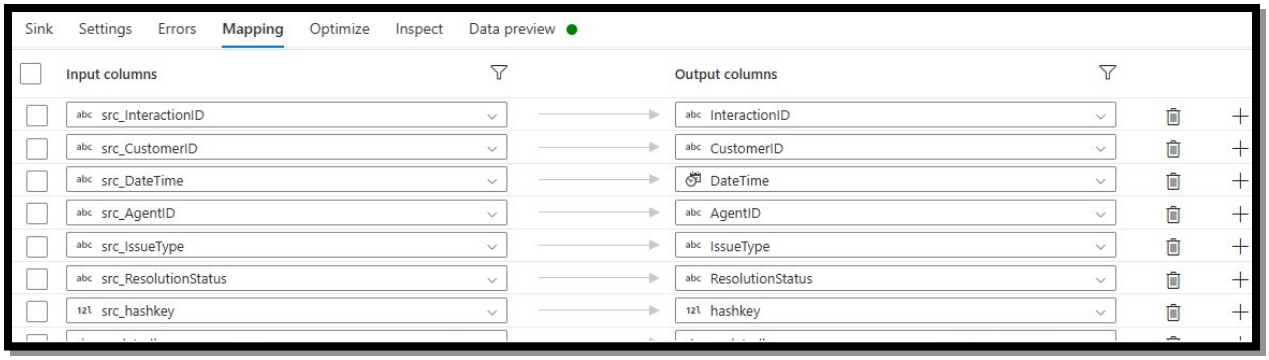

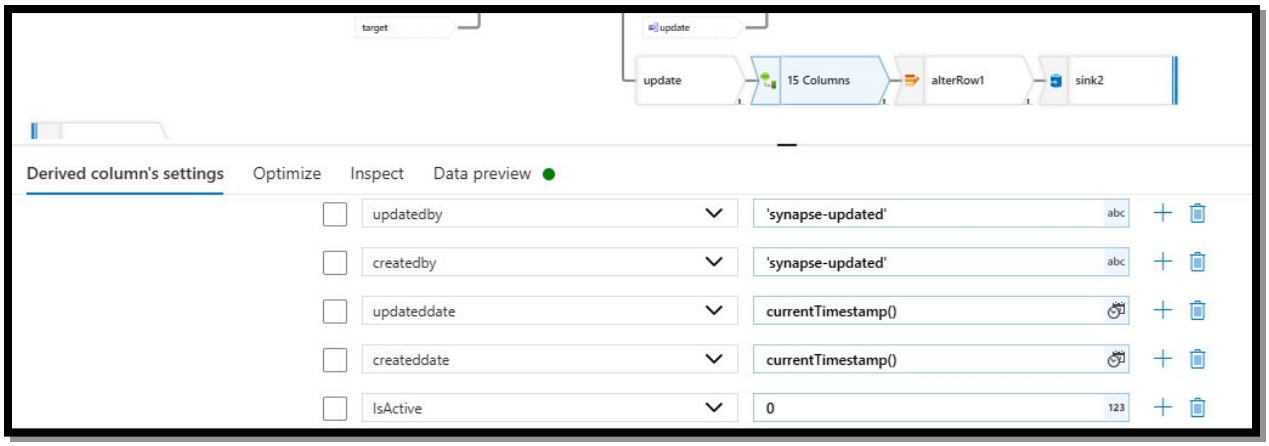

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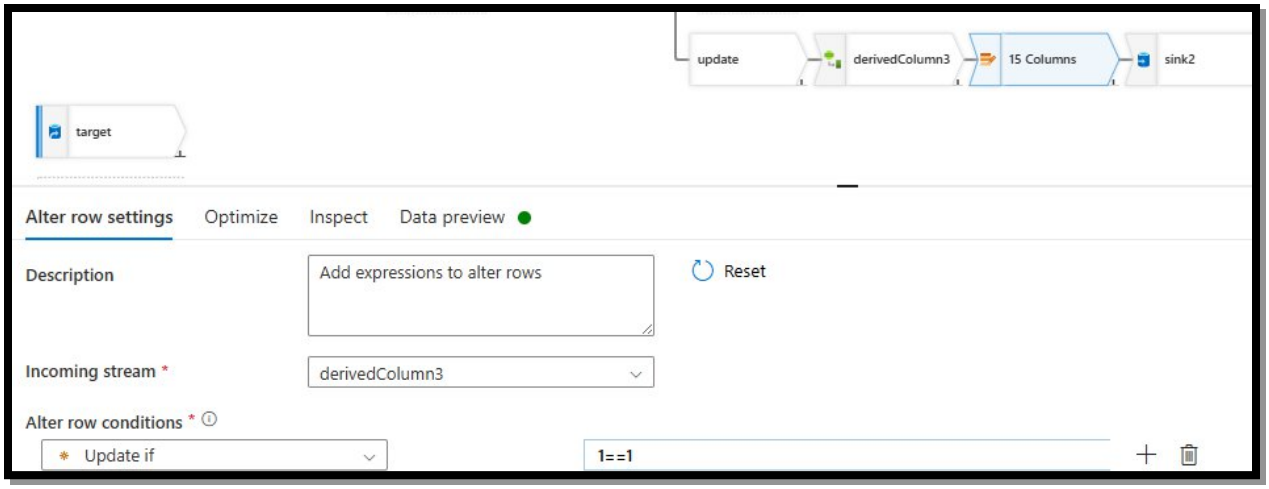
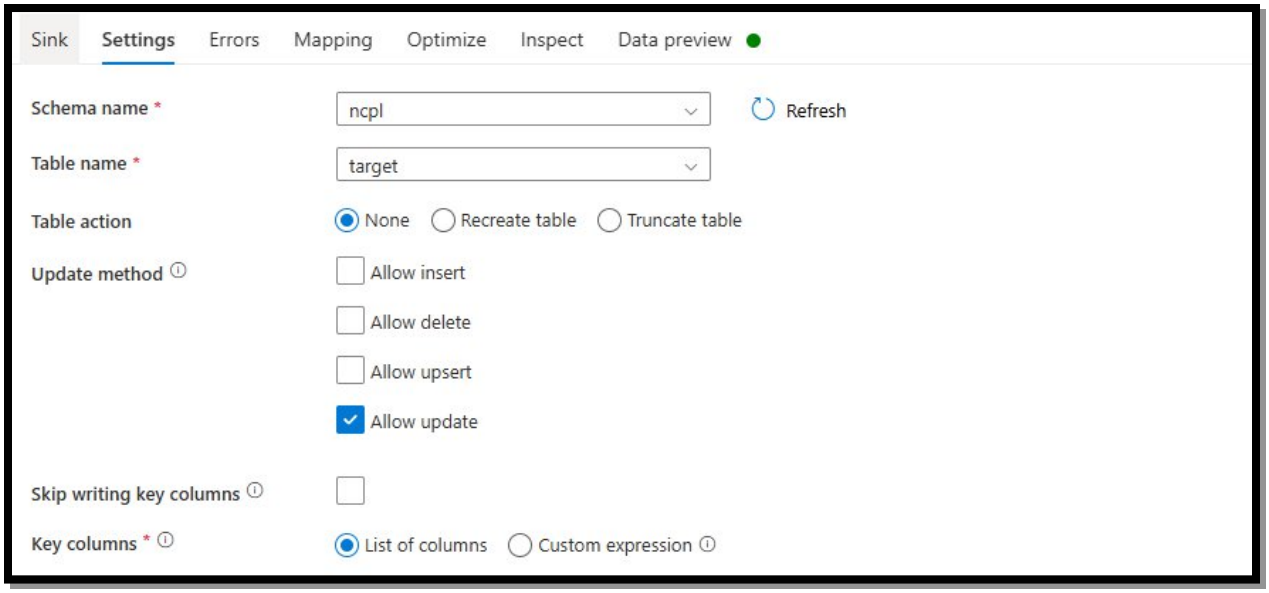




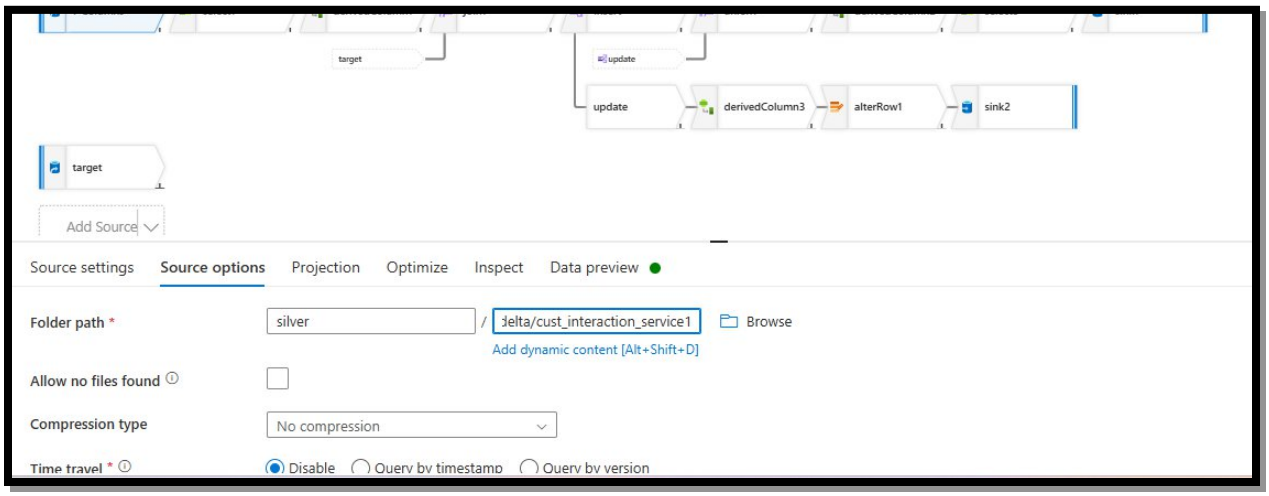
NANDINI RATHORE

```
16  select * from ncpl.target
17
```

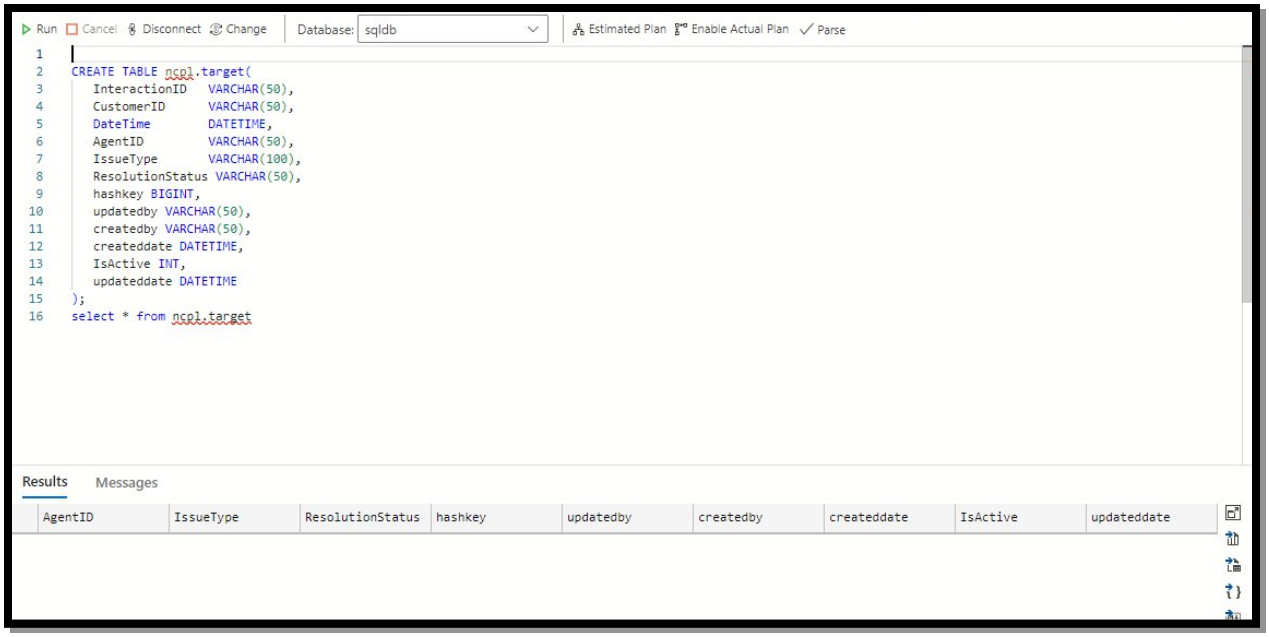
Results | Messages

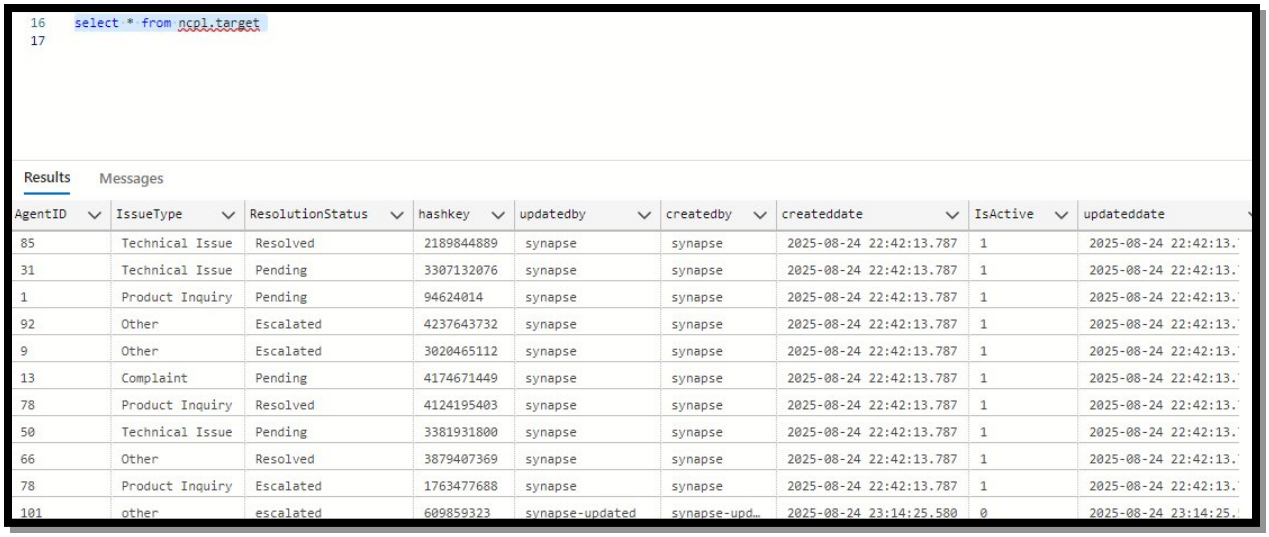
AgentID	IssueType	ResolutionStatus	hashkey	updatedby	createdby	createddate	IsActive	updateddate
34	Billing	Resolved	4128546745	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
4	Complaint	Escalated	2790703594	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
73	Complaint	Resolved	940955941	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
88	Product Inquiry	Escalated	428630457	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
87	Technical Issue	Resolved	213253941	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
7	Other	Resolved	2036608558	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
96	Complaint	Resolved	469473356	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
72	Technical Issue	Resolved	469859290	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
66	Other	Escalated	4117180405	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
95	Technical Issue	Escalated	2629270830	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
70	Other	Pending	3890452916	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
29	Complaint	Resolved	1387019592	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
57	Product Inquiry	Pending	2093561070	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787
48	Technical Issue	Pending	2507396159	synapse	synapse	2025-08-24 22:42:13.787	1	2025-08-24 22:42:13.787

UPDATE



NANDINI RATHORE





CREATING EXTERNAL TABLE.

NANDINI RATHORE

```
Run  Undo  Publish  Query plan  Connect to: Built-in  Use database: DEMO

IF NOT EXISTS (SELECT * FROM sys.external_file_formats WHERE name = 'SynapseDeltaFormat')
    CREATE EXTERNAL FILE FORMAT [SynapseDeltaFormat]
    WITH ( FORMAT_TYPE = DELTA)
GO

IF NOT EXISTS (SELECT * FROM sys.external_data_sources WHERE name = 'silver_datalakestorage22_dfs_core_windows_net
    CREATE EXTERNAL DATA SOURCE [silver_datalakestorage22_dfs_core_windows_net]
    WITH (
        LOCATION = 'abfss://silver@datalakestorage22.dfs.core.windows.net'
    )
GO
create schema ncpl
CREATE EXTERNAL TABLE ncpl.project3 (
    [InteractionID] nvarchar(4000),
    [CustomerID] nvarchar(4000),
    [DateTime] nvarchar(4000),
    [AgentID] nvarchar(4000),
    [IssueType] nvarchar(4000),
```

```
Run  Undo  Publish  Query plan  Connect to: Built-in  Use database: DEMO

CREATE EXTERNAL TABLE ncpl.project3 (
    [InteractionID] nvarchar(4000),
    [CustomerID] nvarchar(4000),
    [DateTime] nvarchar(4000),
    [AgentID] nvarchar(4000),
    [IssueType] nvarchar(4000),
    [ResolutionStatus] nvarchar(4000),
    [DUPID] int
    )
    WITH (
    LOCATION = 'delta/cust_interaction_service/',
    DATA_SOURCE = [silver_datalakestorage22_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDeltaFormat]
    )
GO


SELECT TOP 100 * FROM ncpl.project3
GO
```

CREATED MASTER KEY,CREDENTIALS,EXTERNAL SOURCE,FILE FORMAT IN SQLDB ALSO. TO TAKE PERMISSIONS FROM STORAGE ACCOUNT,OTHERWISE IT WILL SHOW AN ERROR.

I CONNECTED SQLDB WITH SEVERLESS SQL SYNAPSE ENDPOINT.

```
CREATE MASTER KEY ENCRYPTION BY PASSWORD= 'rathore@001';
GO

CREATE DATABASE SCOPED CREDENTIAL projectstorage1
WITH
    IDENTITY = 'SHARED ACCESS SIGNATURE',
    SECRET = 'sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupyx&se=2025-08-25T01:05:38Z&st=2025-08-24T16:50:38Z&spr=https&sig=z2c%2F8Ti5iGAAAEw6GzRRAq6AEyoD%2F9wPk
GO
IF NOT EXISTS (SELECT * FROM sys.external_data_sources WHERE name = 'cred_silver_dfs_core_windows_net')
    CREATE EXTERNAL DATA SOURCE [cred_silver_dfs_core_windows_net]
    WITH (
        LOCATION = 'abfss://silver@datalakestorage22.dfs.core.windows.net',
        CREDENTIAL= projectstorage1
    )
GO
```

NANDINI RATHORE

```
Run  Cancel  Disconnect  Change   Database: DEMO   Estimated Plan  Enable Actual Plan  Parse

19
20    CREATE EXTERNAL TABLE ncpl.project4 (
21        [InteractionID] nvarchar(4000),
22        [CustomerID] nvarchar(4000),
23        [DateTime] nvarchar(4000),
24        [AgentID] nvarchar(4000),
25        [IssueType] nvarchar(4000),
26        [ResolutionStatus] nvarchar(4000),
27        [DUPID] int
28        )
29        WITH (
30        LOCATION = 'delta/cust_interaction_service/',
31        DATA_SOURCE = [cred_silver_dfs_core_windows_net],
32        FILE_FORMAT = [SynapseDeltaFormat]
33        )
34    GO
35
36
37    SELECT TOP 100 * FROM ncpl.project4
38    GO
```

```
20  CREATE EXTERNAL TABLE ncpl.project4 (
21      [InteractionID] nvarchar(4000),
22      [CustomerID] nvarchar(4000),
23      [DateTime] nvarchar(4000),
24      [AgentID] nvarchar(4000),
25      [IssueType] nvarchar(4000),
26      [ResolutionStatus] nvarchar(4000),
```

Results | Messages

	InteractionID	CustomerID	DateTime	AgentID	IssueType	ResolutionStatus	DUPID
1	44	78	2025-01-10 00:03:03	78	Product Inquiry	Resolved	1
2	42	34	2025-01-06 03:57:24	87	Technical Issue	Resolved	1
3	83	10	2025-03-06 15:32:16	31	Technical Issue	Pending	1
4	17	71	2025-01-15 03:13:48	83	Technical Issue	Resolved	1
5	72	58	2025-01-27 09:55:40	98	Other	Pending	1
6	34	17	2025-01-25 01:38:58	72	Technical Issue	Resolved	1
7	11	69	2025-01-03 21:23:28	4	Complaint	Escalated	1
8	58	15	2025-01-31 09:33:57	34	Product Inquiry	Escalated	1
9	89	33	2025-03-04 03:03:57	43	Billing	Escalated	1
1…	40	27	2025-02-17 02:47:01	17	Billing	Escalated	1
1…	91	61	2025-01-16 14:09:09	11	Billing	Resolved	1
1…	8	50	2025-01-15 16:44:36	66	Other	Escalated	1
1…	90	92	2025-01-19 13:54:03	19	Billing	Pending	1
1…	94	11	2025-01-28 00:10:43	69	Complaint	Resolved	1
1…	19	79	2025-02-06 17:01:07	5	Technical Issue	Pending	1

Creating a view

```
CREATE VIEW Succes AS
SELECT
    AgentID,
    COUNT(*) AS TotalInteractions,
    SUM(CASE WHEN ResolutionStatus = 'Resolved' THEN 1 ELSE 0 END) AS ResolutionSuccess,
    SUM(CASE WHEN ResolutionStatus = 'Resolved' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS ResolutionRate
FROM ncpl.project3
GROUP BY AgentID;
SELECT * FROM Succes
```

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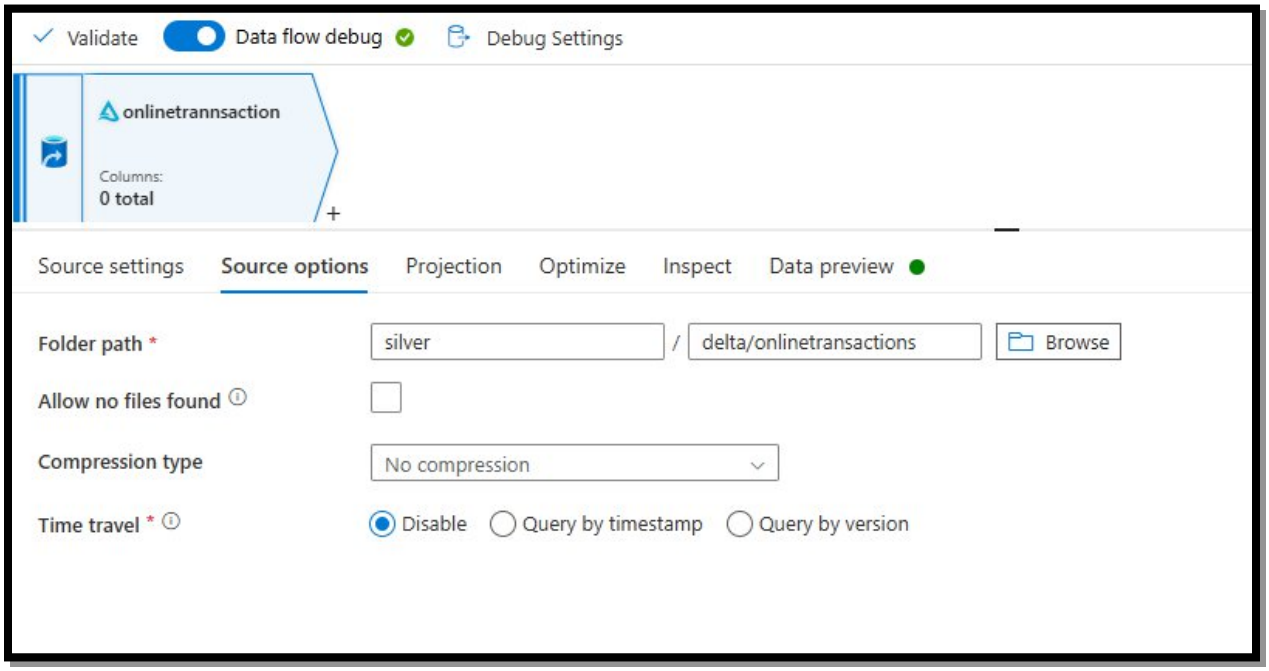
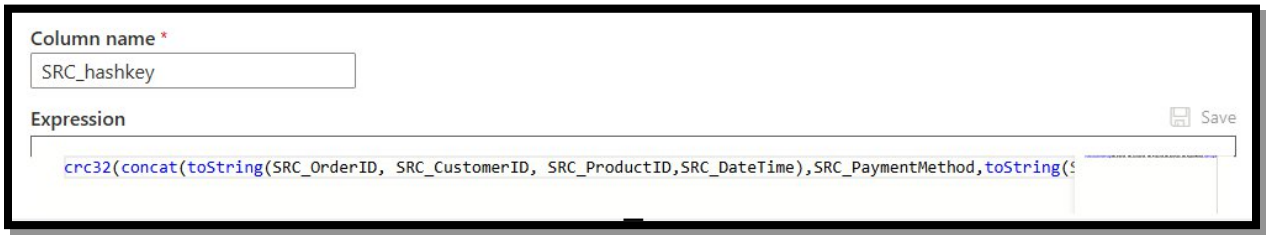
AgentID	TotalInteractions	ResolutionSuccess	ResolutionRate
21	2	2	100.000000000000
5	1	0	0.000000000000
32	1	0	0.000000000000
95	1	0	0.000000000000

2.ONLINE TRANSACTION- SCD TYPE2





Target table

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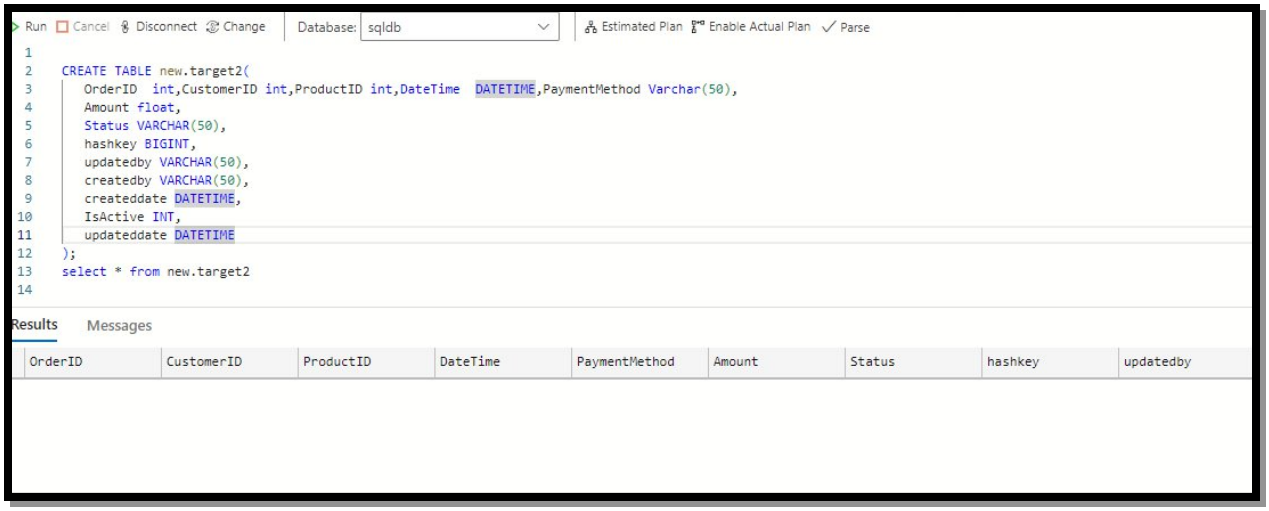

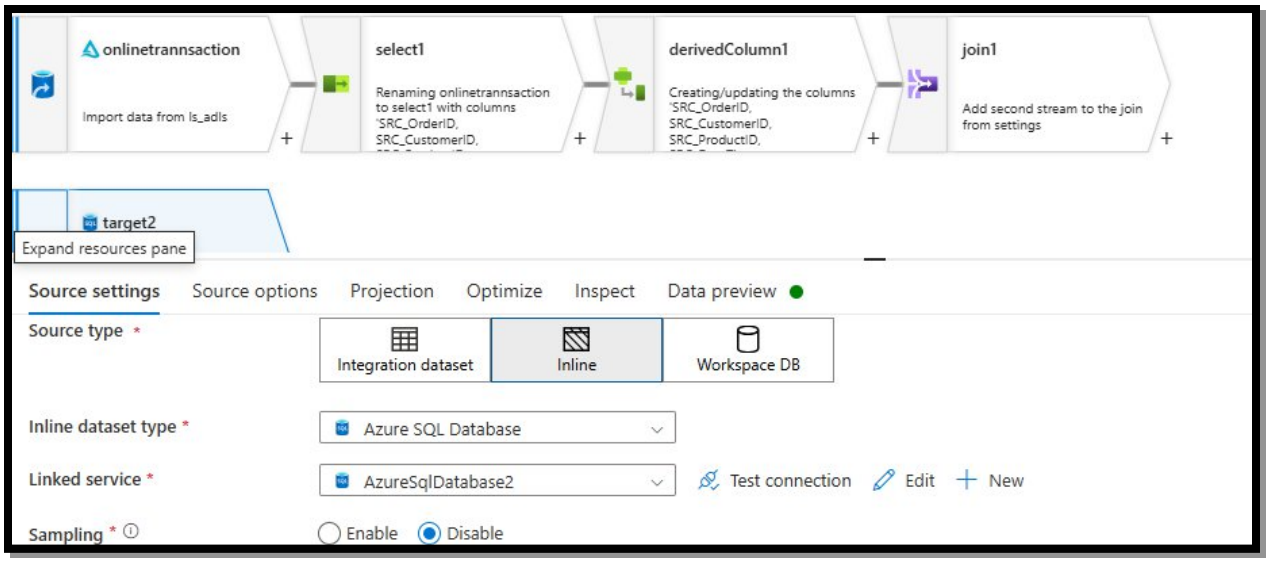

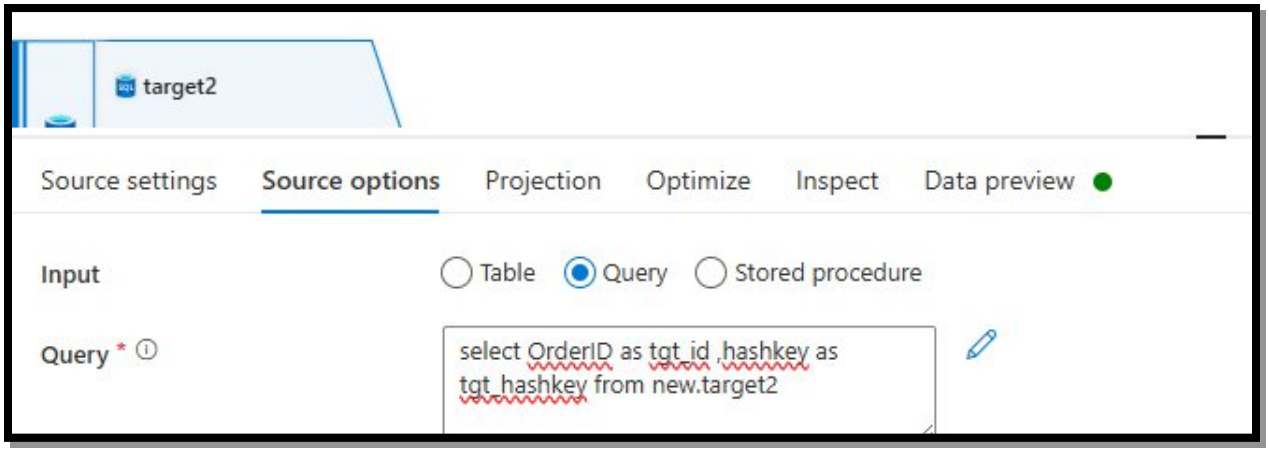

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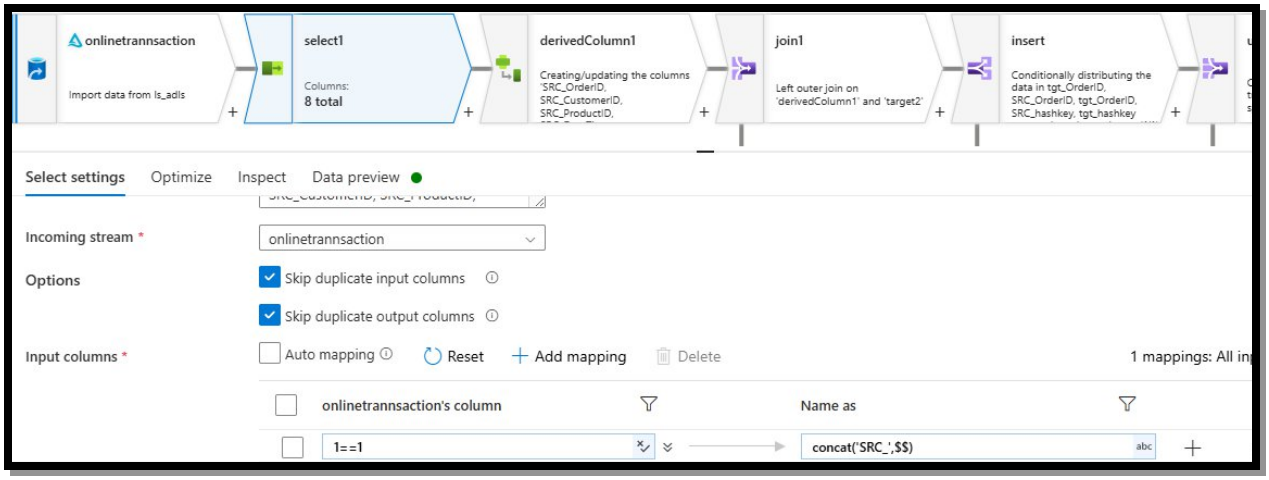

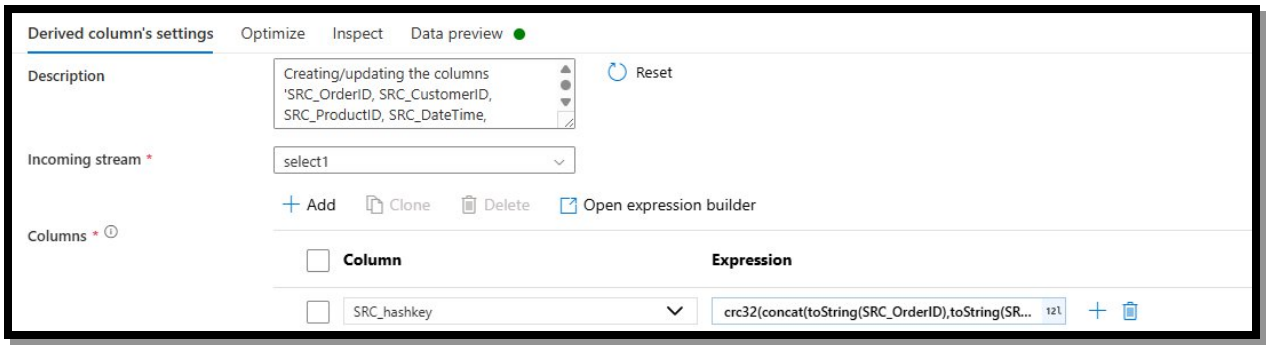

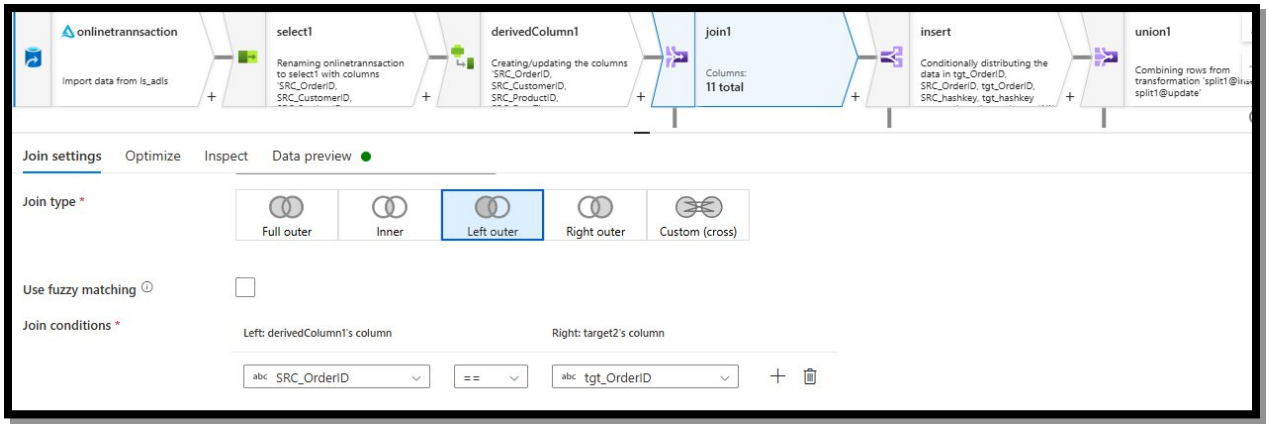

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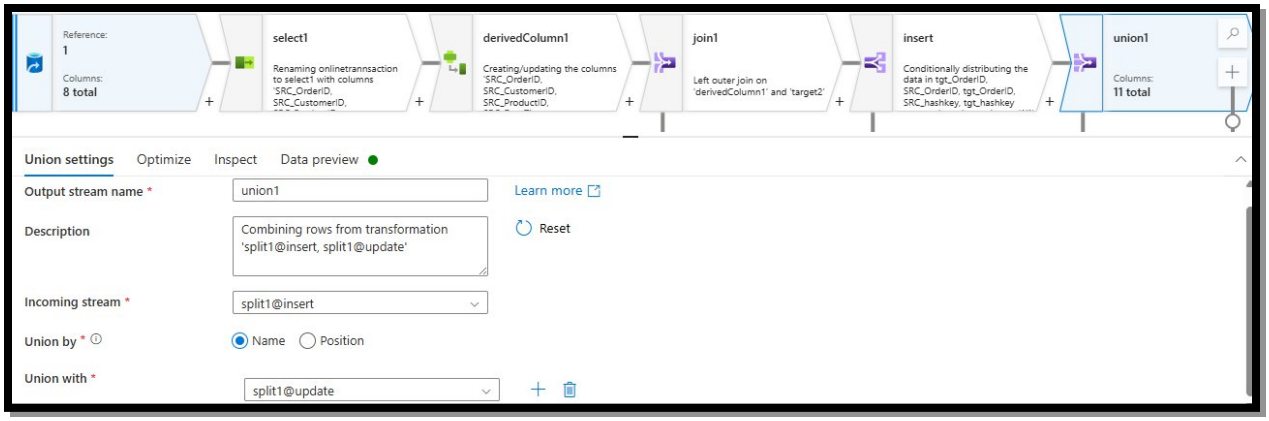

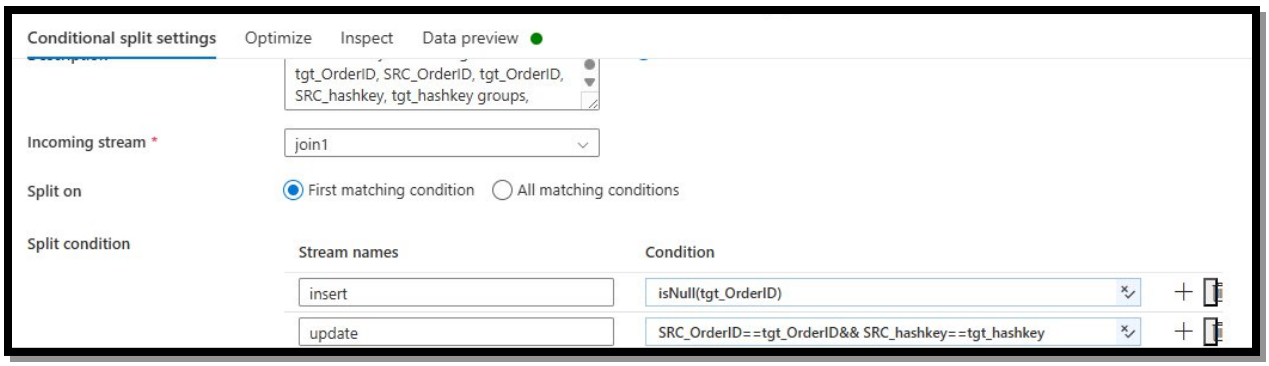

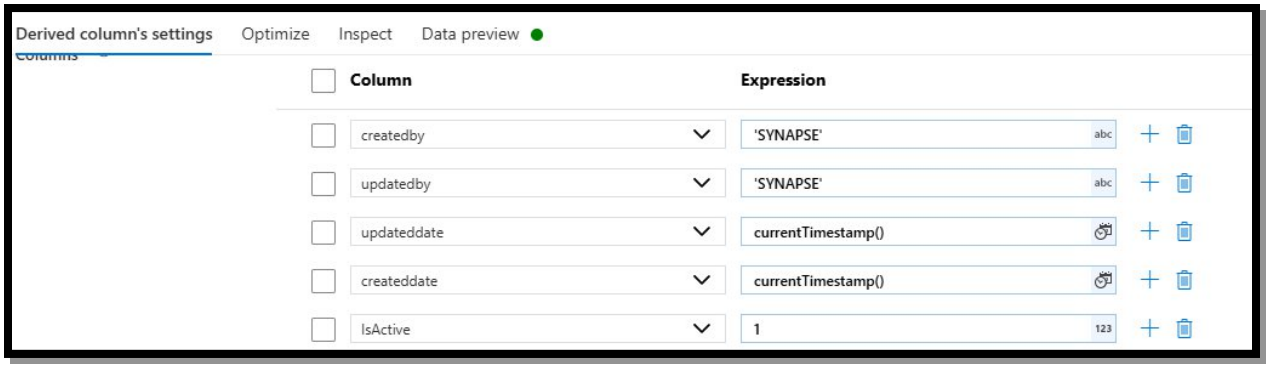

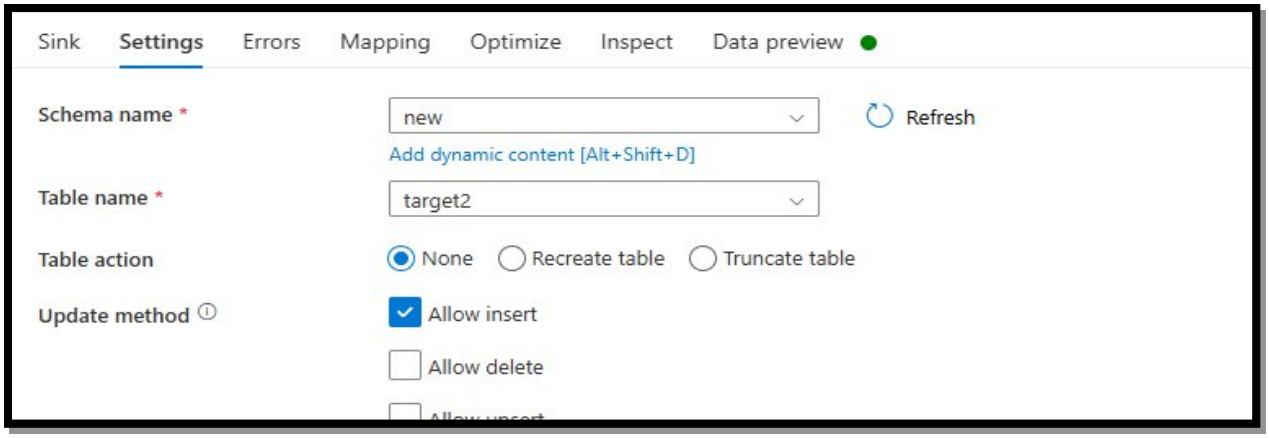

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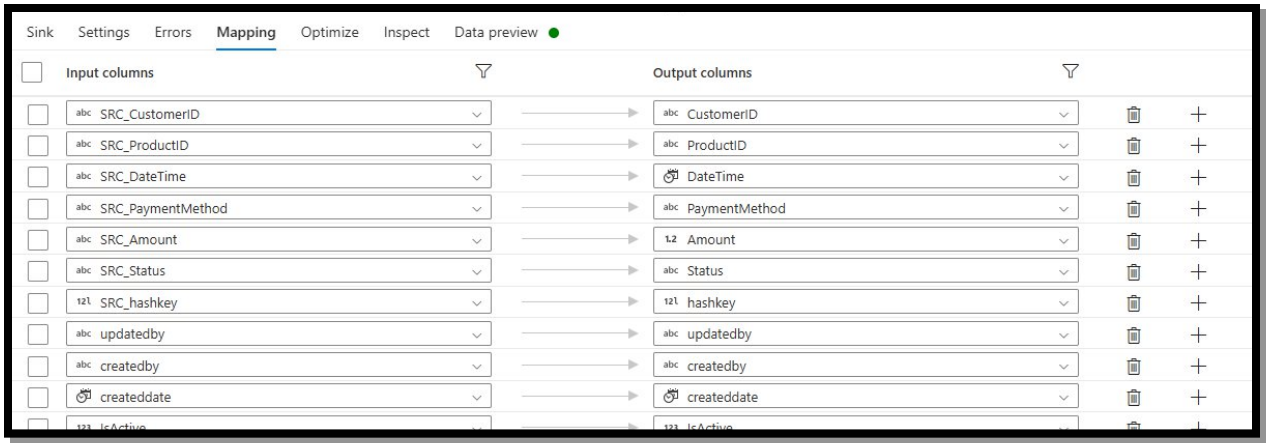

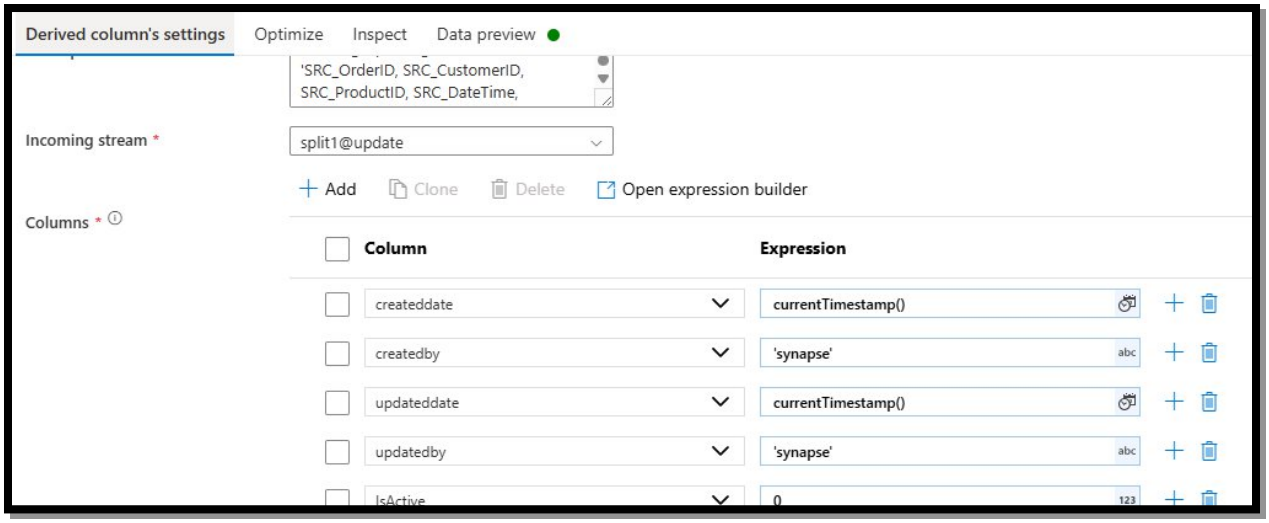

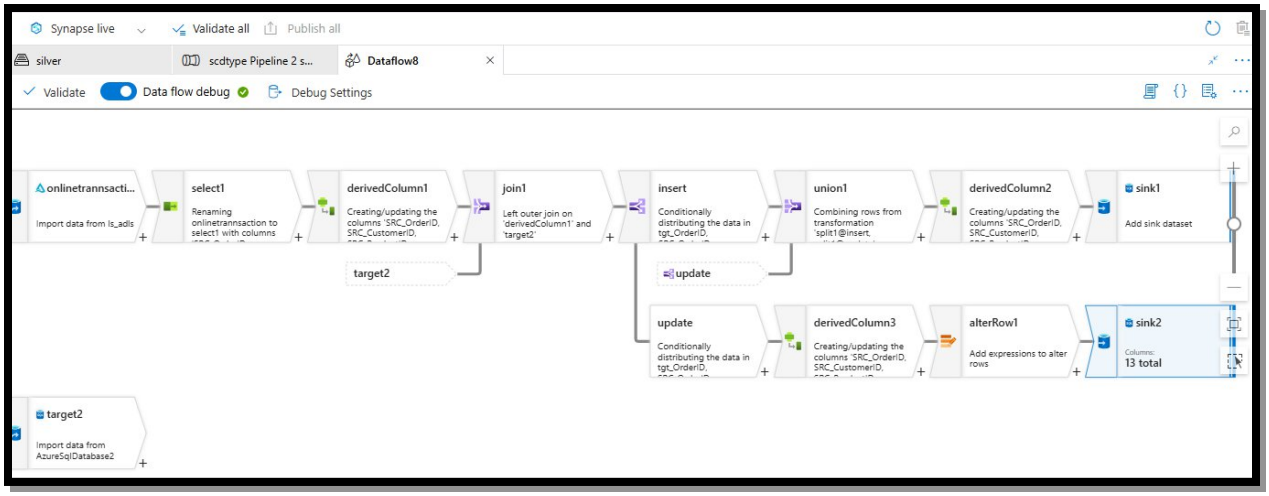

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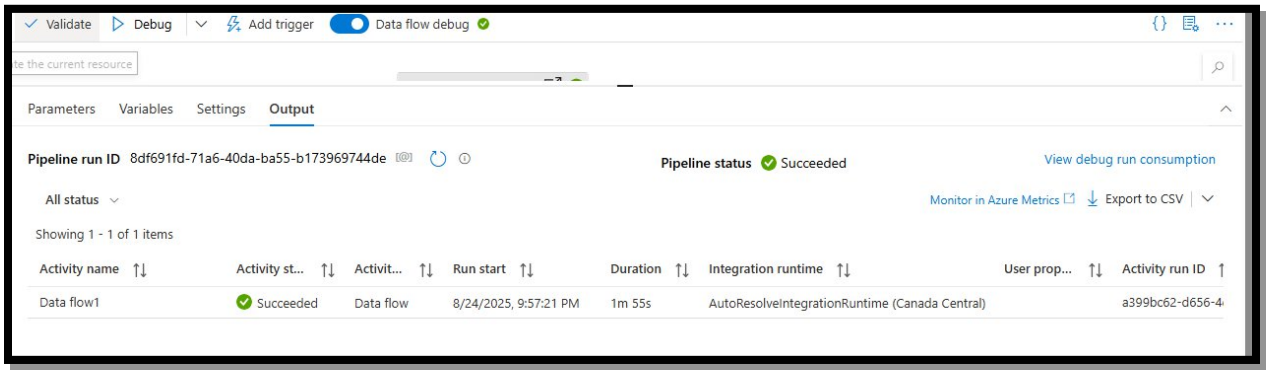
```
    OrderID  VARCHAR(50),CustomerID VARCHAR(50),ProductID varchar(100),DateTime  DATETIME,PaymentMethod Varchar(50),
    Amount float,
    Status VARCHAR(50),
    hashkey BIGINT,
    updatedby VARCHAR(50),
    createdby VARCHAR(50),
    createddate DATETIME,
    IsActive INT,
    updateddate DATETIME
);
select * from new.target2
```

Results | Messages

PaymentMethod	Amount	Status	hashkey	updatedby	createdby	createddate	IsActive	updateddate
PayPal	109.86	Pending	4204031711	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
PayPal	91.74	Failed	2547056265	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	47.99	Pending	2045784130	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	94.31	Failed	774481334	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Gift Card	71.25	Completed	2203407420	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	17.41	Failed	4086692138	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Debit Card	104.86	Failed	1647668209	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Debit Card	70.5	Pending	3535258902	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	57.85	Pending	779325532	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
PayPal	145.31	Pending	4191006348	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	90.37	Failed	2641955715	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
PayPal	78.53	Completed	2774225325	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207
Credit Card	187.64	Completed	1828626749	SYNAPSE	SYNAPSE	2025-08-25 01:39:01.207	1	2025-08-25 01:39:01.207

New.target2 table in sqldb.



Results | Messages

aymentMethod	Amount	Status	hashkey	updatedby	createdby	createddate	IsActive	updateddate
Gift Card	71.25	Completed	1000806666	synapse	synapse	2025-08-25 02:08:55.257	0	2025-08-25 02:08:55
PayPal	109.86	Pending	3548010882	synapse	synapse	2025-08-25 02:08:55.257	0	2025-08-25 02:08:55
PayPal	91.74	Failed	4158057614	synapse	synapse	2025-08-25 02:08:55.257	0	2025-08-25 02:08:55
Credit Card	47.99	Pending	2752377160	synapse	synapse	2025-08-25 02:08:55.257	0	2025-08-25 02:08:55

Updated few columns.

Now creating external tables for silver delta tables.

1.customer_interaction_service—this showed previously.

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2.IN STORE-

```
CREATE EXTERNAL TABLE PROJECT.INSTORE (
    [TransactionID] nvarchar(4000),
    [CustomerID] nvarchar(4000),
    [StoreID] nvarchar(4000),
    [DateTime] nvarchar(4000),
    [Amount] nvarchar(4000),
    [PaymentMethod] nvarchar(4000),
    [DUPID] int
    )
    WITH (
    LOCATION = 'delta/IN STORE/',
    DATA_SOURCE = [silver_datalakestorage22_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDeltaFormat]
    )
GO


SELECT TOP 100 * FROM PROJECT.INSTORE
GO
```

Results Messages

00:00:09 Query executed successfully.

3. LOYALTY ACCOUNT.

```
CREATE EXTERNAL TABLE PROJECT.LOYALTY (
    [LoyaltyID] nvarchar(4000),
    [CustomerID] nvarchar(4000),
    [PointsEarned] nvarchar(4000),
    [TierLevel] nvarchar(4000),
    [JoinDate] nvarchar(4000),
    [dupid] int
    )
    WITH (
    LOCATION = 'delta/loyalty/',
    DATA_SOURCE = [silver_datalakestorage22_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDeltaFormat]
    )
GO
```

4.online transaction

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```
CREATE EXTERNAL TABLE PROJECT.ONLINETRANSACTIONS (
    [OrderID] nvarchar(4000),
    [CustomerID] nvarchar(4000),
    [ProductID] nvarchar(4000),
    [DateTime] nvarchar(4000),
    [PaymentMethod] nvarchar(4000),
    [Amount] nvarchar(4000),
    [Status] nvarchar(4000),
    [DUPID] int
    )
    WITH (
    LOCATION = 'delta/onlinetransactions/',
    DATA_SOURCE = [silver_datalakestorage22_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDeltaFormat]
    )
GO
```

Results Messages

00:00:03 Query executed successfully.

CREATING VIEWS

1. **FOR NUMBER OF INTERACTIONS AND RESOLUTION SUCCESS RATES PER AGENT(RESOLUTION STATUS).**

```
CREATE VIEW Succes AS
SELECT
    AgentID,
    COUNT(*) AS TotalInteractions,
    SUM(CASE WHEN ResolutionStatus = 'Resolved' THEN 1 ELSE 0 END) AS ResolutionSuccess,
    SUM(CASE WHEN ResolutionStatus = 'Resolved' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS ResolutionRate
FROM ncpl.project3
GROUP BY AgentID;
SELECT * FROM Succes
```

AgentID	TotalInteractions	ResolutionSuccess	ResolutionRate
21	2	2	100.000000000000
5	1	0	0.000000000000
32	1	0	0.000000000000
95	1	0	0.000000000000

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2. **FOR SEGMENT CUSTOMERS BASED ON TOTAL SPEND ,PURCHASE FREQUENCY AND LOYALTY TIER(LOYALTY ACCOUNTS.TIER LEVEL.)**

```sql
CREATE OR ALTER VIEW CustomerSegmentation AS
SELECT
    L.CustomerID,
    SUM(CAST(O.Amount AS float)) AS TotalSpend,
    COUNT(O.OrderID) AS PurchaseFrequency,
    L.TierLevel,
    CASE
        WHEN SUM(CAST(O.Amount AS float)) > 5000
            THEN 'High-Value Customer'
        WHEN COUNT(O.OrderID) = 1
            THEN 'One-Time Buyer'
        WHEN COUNT(O.OrderID) = 2
            THEN 'second-Time Buyer'
        WHEN L.TierLevel IN ('Gold','Platinum')
            THEN 'Loyalty Champion'
        ELSE 'Regular Customer'
    END AS Segment
FROM [project].[ONLINETRANSACTIONS] O
JOIN [project].[LOYALTY] L
```

```sql
FROM [project].[ONLINETRANSACTIONS] O
JOIN [project].[LOYALTY] L
    ON O.CustomerID = L.CustomerID
GROUP BY L.CustomerID, L.TierLevel;
select * from CustomerSegmentation
```

Results Messages

View Table Chart Export results

Search

CustomerID	TotalSpend	PurchaseFrequency	TierLevel	Segment
5	147.49	1	Gold	One-Time Buyer
6	94.31	1	Gold	One-Time Buyer
18	136.61	1	Silver	One-Time Buyer

3. **FOR ANALYZE DATETIME TO FIND PEAK DAYS AND TIMES IN-STORE VS ONLINE.**

```sql
CREATE  VIEW PeakDayONLINESALES AS
SELECT
   'Online' AS Channel,
    DATENAME(WEEKDAY, TRY_CAST (DateTime AS DATETIME)) AS DayOfWeek,    -------TRY_CAST-converts valid strings, returns NULL for invalid ones.
    DATEPART(HOUR, TRY_CAST (DateTime AS DATETIME)) AS HourOfDay,
    COUNT(OrderID) AS TotalOrders,
    SUM(CAST(Amount AS FLOAT)) AS TotalSales
FROM [project].[ONLINETRANSACTIONS]
GROUP BY DATENAME(WEEKDAY, TRY_CAST(DateTime AS DATETIME)), DATEPART(HOUR,TRY_CAST(DateTime AS DATETIME));
```

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```sql
CREATE  VIEW PeakDaySTORESALES AS
SELECT
    'STORE' AS Channel,
    DATENAME(WEEKDAY, TRY_CAST (DateTime AS DATETIME)) AS DayOfWeek,    -------TRY_CAST-converts valid strings, returns NULL for invalid ones.
    DATEPART(HOUR, TRY_CAST (DateTime AS DATETIME)) AS HourOfDay,
    COUNT(OrderID) AS TotalOrders,
    SUM(CAST(Amount AS FLOAT)) AS TotalSales
FROM [project].[ONLINETRANSACTIONS]
GROUP BY DATENAME(WEEKDAY, TRY_CAST(DateTime AS DATETIME)), DATEPART(HOUR,TRY_CAST(DateTime AS DATETIME));
```

```sql
CREATE OR ALTER VIEW CombinedSales AS
SELECT * FROM PeakDayONLINESALES
UNION ALL
SELECT * FROM PeakDaySTORESALES;
SELECT * FROM CombinedSales
```

Results Messages

View Table Chart Export results

Search

Channel	DayOfWeek	HourOfDay	TotalOrders	TotalSales
Online	Wednesday	1	1	187.64
STORE	Wednesday	1	1	187.64
Online	Wednesday	12	1	57.61

```sql
CREATE OR ALTER VIEW PeakDay_MAXSales AS
SELECT
    Channel, DayOfWeek,TotalSales
FROM CombinedSales
```

Results Messages

View Table Chart Export results

Search

Channel	DayOfWeek	TotalSales
Online	Tuesday	74.48
Online	Thursday	47.99
Online	Wednesday	164.04

4. **AVERAGE ORDER VALUE BY PRODUCTID,CATEGORY AND LOCATION.**

```sql
CREATE VIEW View_AOV3 AS
SELECT
    product.ProductID,
    product.Category,
    store.Location,
    AVG(CAST(onlinetransaction.Amount AS FLOAT)) AS AverageOrderValue
FROM [project].[ONLINETRANSACTIONS] onlinetransaction
JOIN [project].[products2] product ON onlinetransaction.ProductID = product.ProductID
JOIN [project].[STORES1] store ON onlinetransaction.OrderID = store.StoreID
GROUP BY product.ProductID, product.Category,store.Location;

select * from View_AOV3
```

Search

ProductID	Category	Location	AverageOrderValue
18	Electronics	Lake Jameschester	153.63
6	Books	Lake Phillip	143.57
6	Books	North Mariaburgh	16.58
100	Books	Laurenberg	186.14
100	Books	Wellsport	164.38
32	Electronics	East Alexandra	74.48

IN POWER BI

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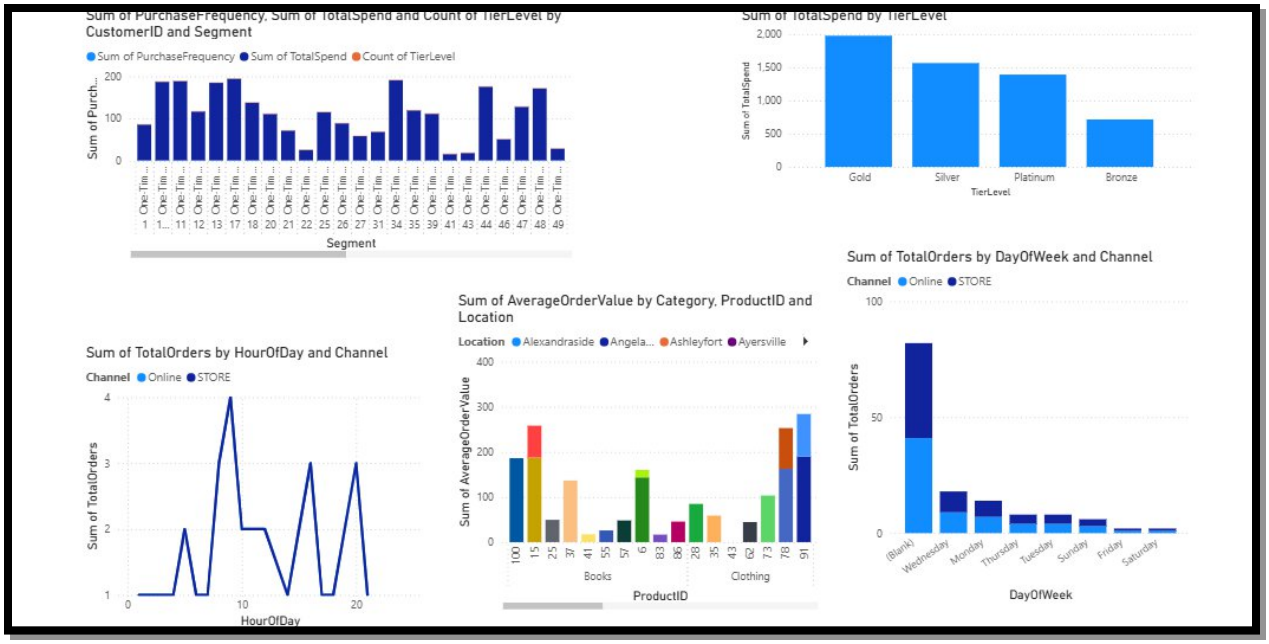

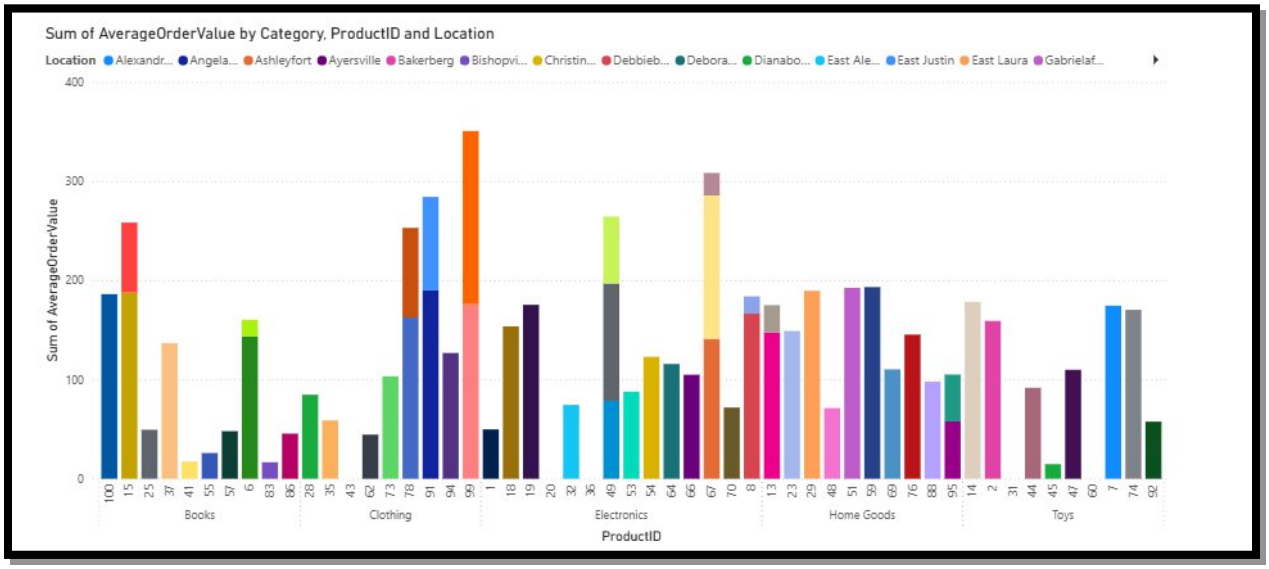

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