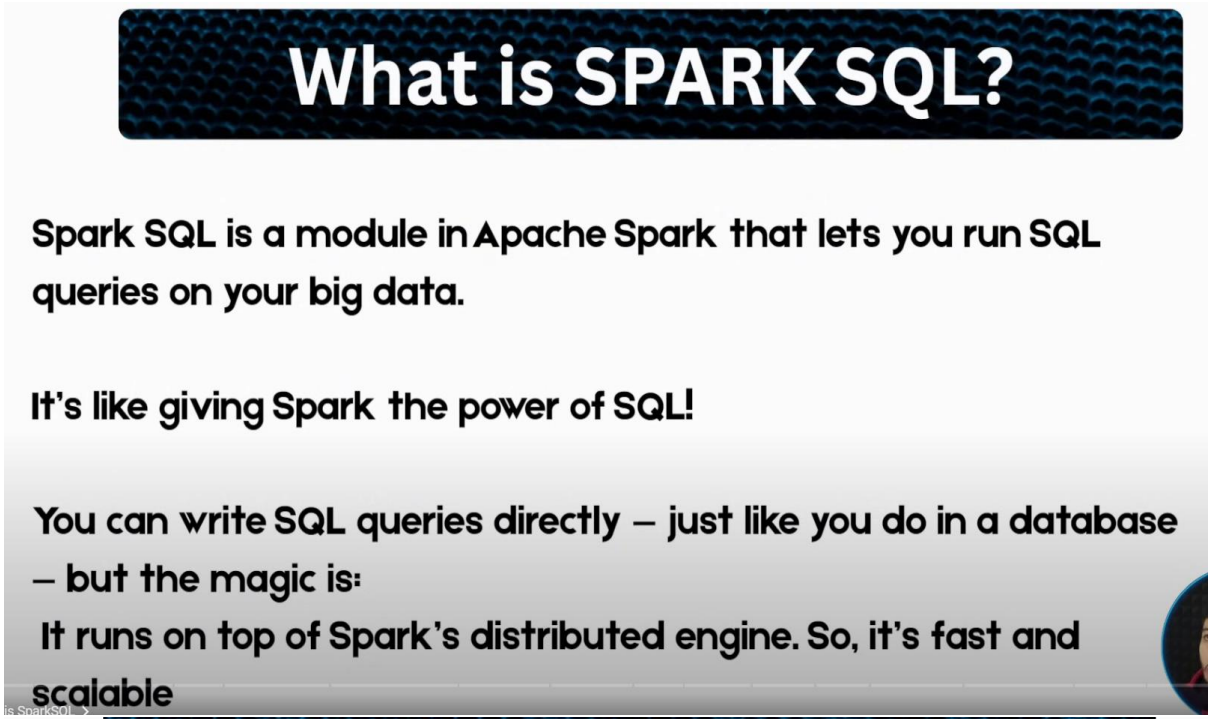
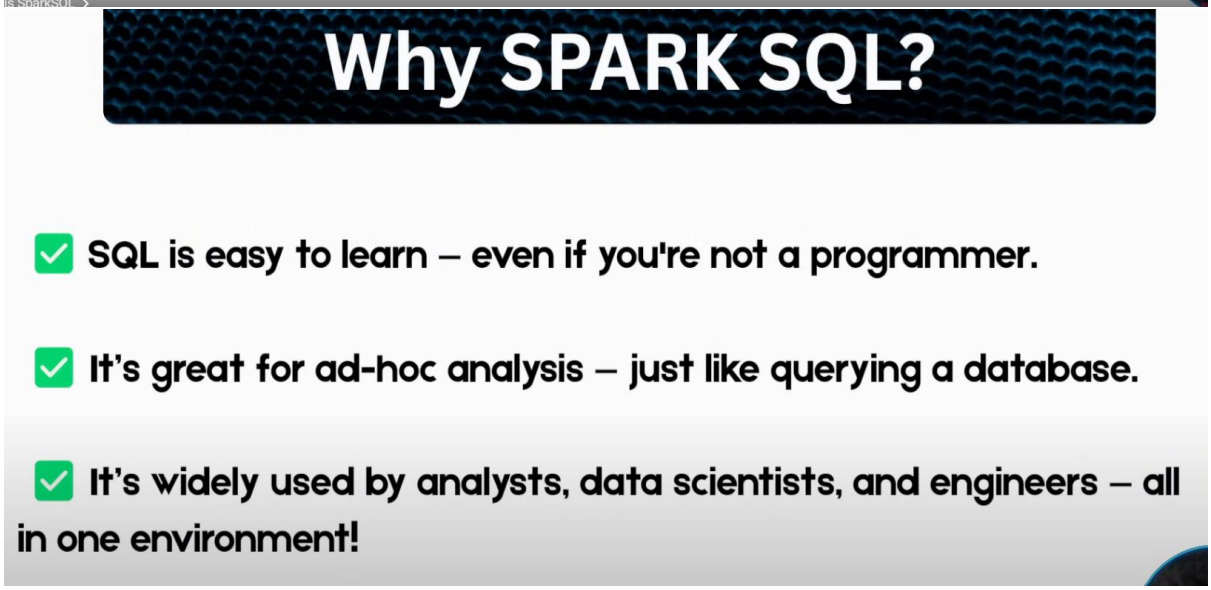
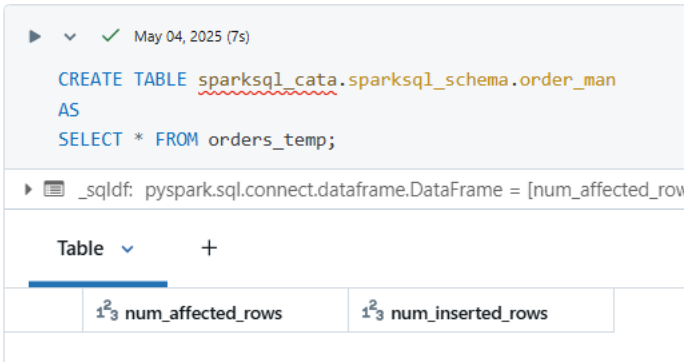




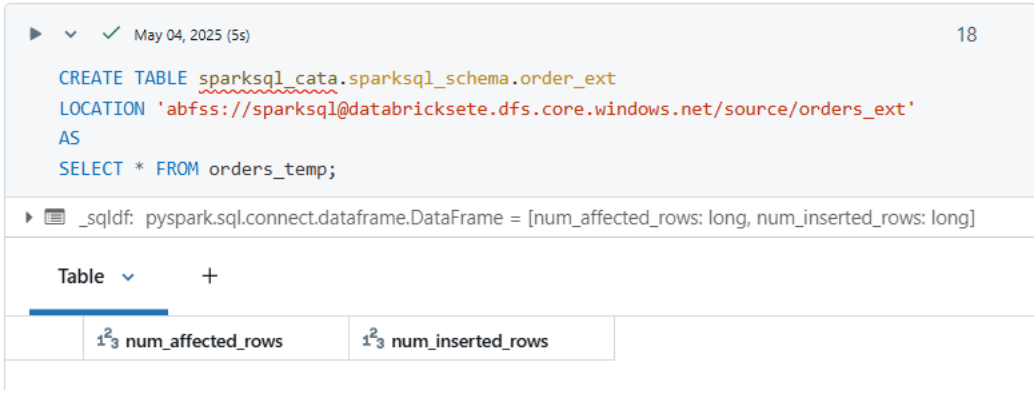
Temp views are only available for the Notebook session, Global views remain till the cluster is not killed, available in all the sessions of the same cluster.

Managed Tables

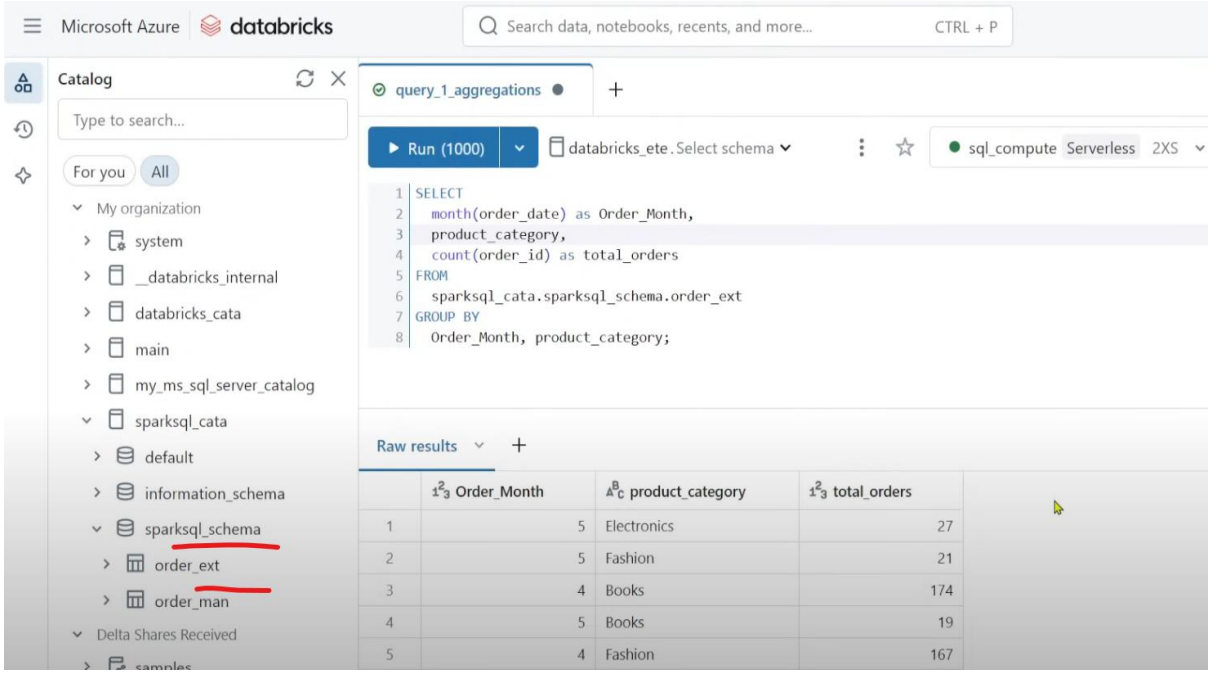


UNDROP is a unique functionality in Managed Tables, even after deletion data gets retained for some time

External Table



SQL Warehouse → compute built for SQL workloads



Sequence of execution : from → where → groupby → select

```
SELECT
  month(order_date) as Order_Month,
  product_category,
  count(order_id) as total_orders
FROM
  sparksql_cata.sparksql_schema.order_ext
GROUP BY
  Order_Month, product_category
ORDER BY Order_Month asc, total_orders desc;
```

Raw results

	Order_Month	product_category	total_orders
1	4	Electronics	196
2	4	Kitchen	177
3	4	Books	174
4	4	Home Decor	172
5	4	Fashion	167
6	5	Electronics	27
7	5	Kitchen	26
8	5	Fashion	21
9	5	Home Decor	21
10	5	Books	19

Subquery

```sql
SELECT * FROM
(
SELECT
  month(order_date) as Order_Month,
  product_category,
  count(order_id) as total_orders
FROM
  sparksql_cata.sparksql_schema.order_ext
GROUP BY
  Order_Month, product_category
ORDER BY Order_Month asc, total_orders desc
) tbl1
WHERE
product_category = 'Home Decor'
```

Conditional statements

```sql
SELECT
      *,
      CASE
      WHEN (payment_method LIKE '%Card%') AND (order_status IN ('Cancelled','Returned')) THEN 'CARD'
      WHEN (payment_method IN ('Paypal','UPI')) AND (order_status IN ('Cancelled','Returned')) THEN 'CASH'
      ELSE 'No Value' END Payment_Flag
FROM
  sparksql_cata.sparksql_schema.order_ext
```

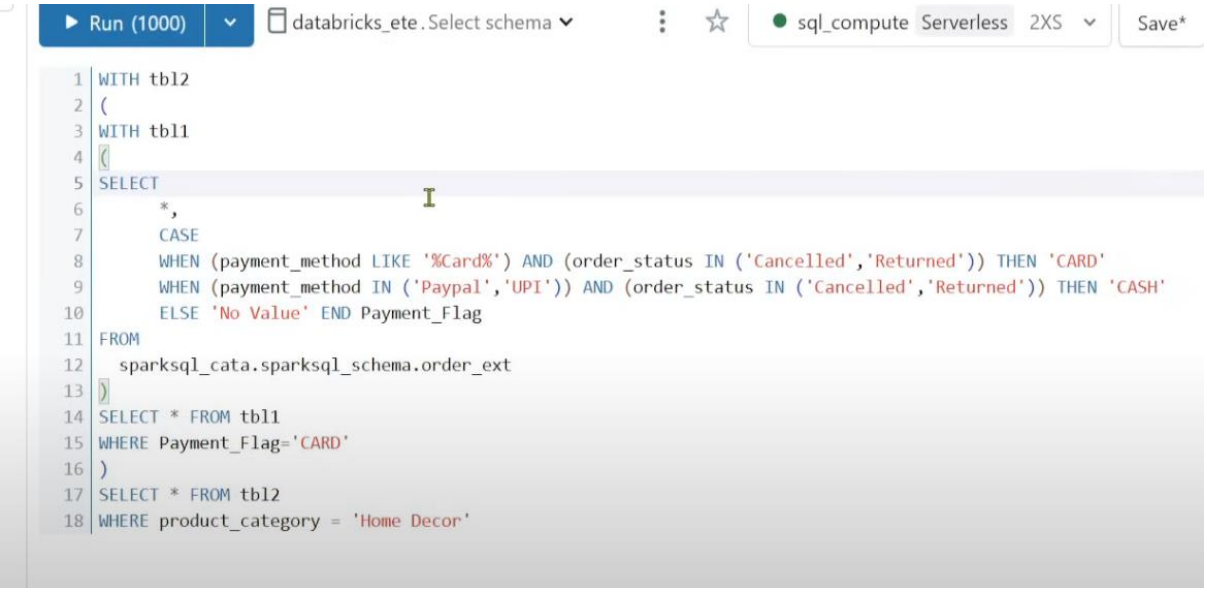
Raw results

	product_name	quantity	price_per_unit	payment_method	order_status	Payment_Flag
1	Sneakers	2	58.53	PayPal	Cancelled	No Value
2	T-Shirt	3	83.76	UPI	Returned	CASH
3	Sunglasses	2	78.85	PayPal	Processing	No
4	Sunglasses	5	46.49	PayPal	Delivered	N
5	Photo Frame	2	78.61	PayPal	Returned	

Subqueries are alternatives to CTE

```sql
WITH tbl1
(
SELECT
      *,
      CASE
      WHEN (payment_method LIKE '%Card%') AND (order_status IN ('Cancelled','Returned')) THEN 'CARD'
      WHEN (payment_method IN ('Paypal','UPI')) AND (order_status IN ('Cancelled','Returned')) THEN 'CASH'
      ELSE 'No Value' END Payment_Flag
FROM
  sparksql_cata.sparksql_schema.order_ext
)
SELECT * FROM tbl1
WHERE Payment_Flag='CARD'
```

Hierarchial CTEs

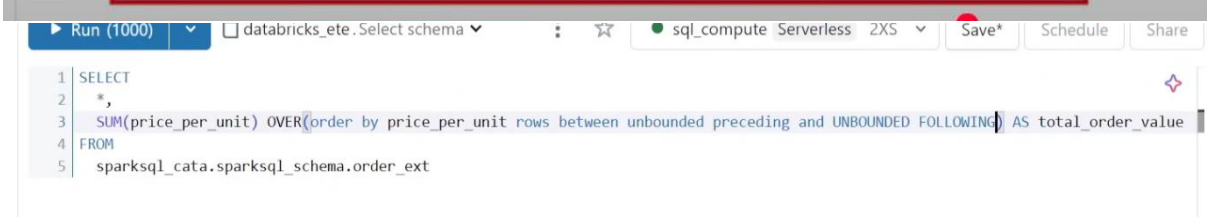



```
WITH tbl2
(
WITH tbl1
(
SELECT
      *,
      CASE
      WHEN (payment_method LIKE '%Card%') AND (order_status IN ('Cancelled','Returned')) THEN 'CARD'
      WHEN (payment_method IN ('Paypal','UPI')) AND (order_status IN ('Cancelled','Returned')) THEN 'CASH'
      ELSE 'No Value' END Payment_Flag
FROM
  sparksql_cata.sparksql_schema.order_ext
)
SELECT * FROM tbl1
WHERE Payment_Flag='CARD'
)
SELECT * FROM tbl2
WHERE product_category = 'Home Decor'
```

Window Functions

```
SELECT
  price_per_unit,
  Rank() over(order by price_per_unit desc) as rank,
  Dense_Rank() over(order by price_per_unit desc) as dense_rank,
  Row_Number() over(order by price_per_unit desc) as row_number
FROM
  sparksql_cata.sparksql_schema.order_ext
```

30	97.17	30	30	30
31	97.14	31	31	31
32	96.98	32	32	32
33	96.98	32	32	33
34	96.77	34	33	34
35	96.74	35	34	35
36	96.59	36	35	36
37	96.57	37	36	37
38	96.5	38	37	38
39	96.48	39	38	39
40	96.47	40	39	40




```
SELECT
  *,
  SUM(price_per_unit) OVER(order by price_per_unit rows between unbounded preceding and UNBOUNDED FOLLOWING) AS total_order_value
FROM
  sparksql_cata.sparksql_schema.order_ext
```

```
SELECT
  *,
  SUM(price_per_unit) OVER(order by price_per_unit rows between unbounded preceding and UNBOUNDED FOLLOWING) AS total_order_value,
  SUM(price_per_unit) OVER(order by price_per_unit rows between unbounded preceding and CURRENT ROW) AS running_total

FROM
  sparksql_cata.sparksql_schema.order_ext
```

Raw results

	quantity	1.2 price_per_unit	payment_method	order_status	1.2 total_order_value	1.2 running_total
1	4	10.03	Credit Card	Cancelled	55205.36000000007	10.03
2	2	10.16	PayPal	Cancelled	55205.36000000007	20.189999999999998
3	5	10.46	Credit Card	Returned	55205.36000000007	30.65
4	4	10.51	Debit Card	Processing	55205.36000000007	41.16
5	3	10.59	Credit Card	Returned	55205.36000000007	51.75
6	2	10.59	Debit Card	Processing	55205.36000000007	62.34
7	3	10.6	UPI	Processing	55205.36000000007	72.94

UPSERT - MERGE

May 05, 2025 (12s) 2

```
%python
df = spark.read.table("sparksql_cata.sparksql_schema.order_man")
```

df: pyspark.sql.connect.dataframe.DataFrame = [order_id: integer, user_id: string ... 8 more fields]

May 05, 2025 (2s) 3

```
%python
df.createOrReplaceTempView("order_source")
```

May 05, 2025 (2s) 4

```
%python
spark.sql('''SELECT * FROM {orders_temp}''',orders_temp = df).display()
```

The last 2 commands are equivalent

May 05, 2025 (10s) 5

```
MERGE INTO sparksql_cata.sparksql_schema.order_ext trg
USING order_source src
ON trg.order_id = src.order_id
WHEN MATCHED THEN
UPDATE SET *
WHEN NOT MATCHED THEN
INSERT *
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [num_affected_rows: long, num_updated_rows: long ... 2 more fields]

Table +

	num_affected_rows	num_updated_rows	num_deleted_rows	num_inserted_rows
1	1000	1000	0	0

FUNCTIONS

2 types → 1) User Defined Scalar Function 2)User Defined Table Function

Register Functions in UC

FUNCTIONS

SCALAR FUNCTION

May 05, 2025 (9s) 3

```
CREATE OR REPLACE FUNCTION sparksql_cata.sparksql_schema.discount_price(p_price DECIMAL(10,2))
RETURNS DECIMAL(10,2)
LANGUAGE SQL
RETURN p_price * 0.90
```

May 05, 2025 (5s) 4

```
SELECT price_per_unit, sparksql_cata.sparksql_schema.discount_price(price_per_unit) FROM sparksql_cata.sparksql_schema.order_ext
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [price_per_unit: double, sparksql_cata.sparksql_schema.discount_price(price_per_unit): decimal(10,2)]

Table +

	price_per_unit	sparksql_cata.sparksql_schema.discount_price(price_per_unit)
1	58.53	52.68
2	83.76	75.38
3	78.85	70.97
4	46.49	41.84
5	78.61	70.75
6	53.51	48.16
7	12.71	11.44
8	46.6	41.94
9	35.87	32.28
10	30.95	27.86
11	18.79	16.91
12	69.14	62.23
13	90.64	81.58
14	93.91	84.52
15	61	54.90

TABLE FUNCTIONS - UDTF

May 05, 2025 (4s) 6 SQL

```
CREATE OR REPLACE FUNCTION sparksql_cata.sparksql_schema.discount_price(p_category STRING)
RETURNS TABLE
LANGUAGE SQL
RETURN
(SELECT * FROM sparksql_cata.sparksql_schema.order_ext WHERE product_category = p_category)
```

May 05, 2025 (6s) 7

```
SELECT * FROM sparksql_cata.sparksql_schema.discount_price('Home Decor')
```

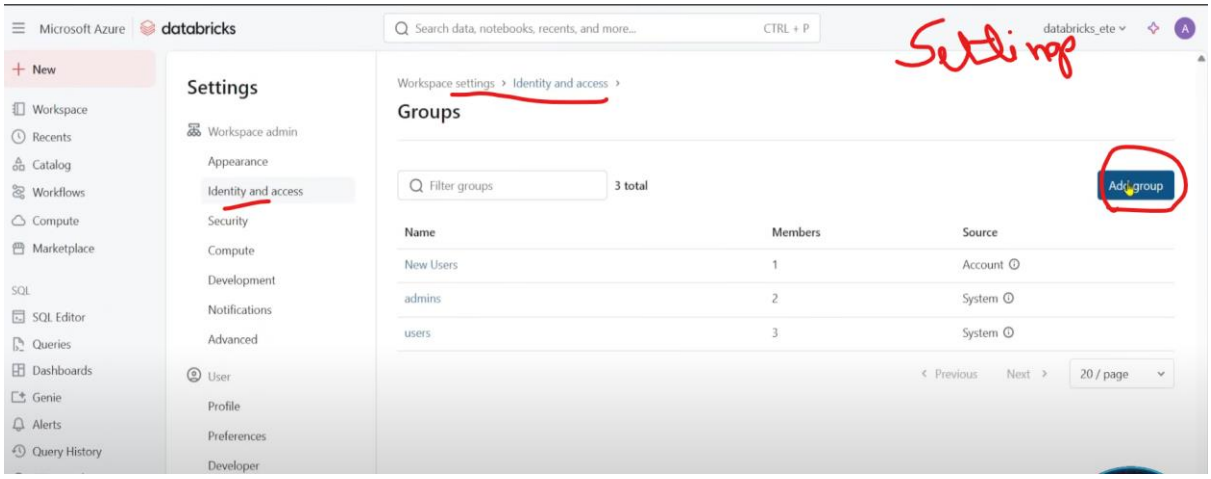
_sqldf: pyspark.sql.connect.dataframe.DataFrame = [order_id: integer, user_id: string ... 8 more fields]

Table +

	order_id	user_id	order_date	product_id	product_category	product_name	quantity	price_per_unit	payment_method
1	1005	U003	2025-04-19	P988	Home Decor	Photo Frame	2	78.61	PayPal
2	1007	U129	2025-04-23	P786	Home Decor	Wall Clock	5	12.71	Credit Card
3	1008	U102	2025-04-15	P101	Home Decor	Photo Frame	1	46.6	Debit Card
4	1034	U016	2025-04-23	P948	Home Decor	Wall Clock	3	54.5	UPI
5	1035	U150	2025-04-10	P242	Home Decor	Cushion Cover	2	34.04	Credit Card
6	1036	U171	2025-05-02	P585	Home Decor	Cushion Cover	2	17.22	Credit Card
7	1040	U172	2025-04-08	P644	Home Decor	Wall Art	2	97.17	Debit Card
8	1051	U049	2025-04-25	P219	Home Decor	Wall Art	3	78.9	UPI
9	1058	U090	2025-04-16	P250	Home Decor	Wall Clock	5	72.65	UPI
10	1061	U069	2025-04-06	P463	Home Decor	Wall Clock	1	96.35	PayPal
11	1063	U187	2025-05-03	P772	Home Decor	Wall Art	2	46.91	Debit Card
12	1064	U152	2025-04-28	P133	Home Decor	Wall Clock	3	56.43	UPI
13	1066	U128	2025-04-15	P639	Home Decor	Cushion Cover	4	20.13	Credit Card
14	1076	U141	2025-04-13	P898	Home Decor	Lamp	3	41.6	UPI

Dynamic Data Masking

Prerequisite: need amin rights



Add yourself as an admin

+ Code + Text

DYNAMIC DATA MASKING

MASK FUNCTION

May 05, 2025 (3s) 3

```
CREATE OR REPLACE FUNCTION sparksql_cata.sparksql_schema.dynamic_mask(p_user_id STRING)
RETURN
CASE WHEN is_account_group_member('admin') THEN p_user_id ELSE '*****' END;
```

Masking PII (Personal identifiable information) → used_id
is_account_group_member() is an inbuilt function

APPLYING MASK FUNCTION TO THE COLUMN - user_id

May 05, 2025 (2s) 5

```
ALTER TABLE sparksql_cata.sparksql_schema.order_ext
ALTER COLUMN user_id SET MASK sparksql_cata.sparksql_schema.dynamic_mask;
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [order_id: integer, user_id: string ... 8 more fields]

Table +

	order_id	user_id	order_date	product_id	product_category	product_name	quantity	price
1	1001	*****	2025-04-20	P940	Fashion	Sneakers	2	
2	1002	*****	2025-04-16	P794	Fashion	T-Shirt	3	
3	1003	*****	2025-04-18	P326	Fashion	Sunglasses	2	
4	1004	*****	2025-04-10	P574	Fashion	Sunglasses	5	
5	1005	*****	2025-04-19	P988	Home Decor	Photo Frame	2	
6	1006	*****	2025-04-15	P328	Kitchen	Knife Set	4	
7	1007	*****	2025-04-23	P786	Home Decor	Wall Clock	5	

Row Level Security → restricting access to the users/what users should have access to what data (Normally applied in PowerBI but can be used in ADB)

ROW LEVEL SECURITY

Markdown

Mapping Table

May 05, 2025 (14s) 3

```
CREATE TABLE sparksql_cata.sparksql_schema.map_table
(
  payment_category STRING,
  email STRING
)
```

May 05, 2025 (22s) 4

```
SELECT * FROM sparksql_cata.sparksql_schema.order_ext
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [order_id: integer, user_id: string ... 8 more fields]

Table +

	order_id	user_id	order_date	product_id	product_category	product_name	quantity	price_per_unit	payment_meth
1	1001	*****	2025-04-20	P940	Fashion	Sneakers	2	58.53	PayPal
2	1002	*****	2025-04-16	P794	Fashion	T-Shirt	3	83.76	UPI
3	1003	*****	2025-04-18	P326	Fashion	Sunglasses	2	78.85	PayPal
4	1004	*****	2025-04-10	P574	Fashion	Sunglasses	5	46.49	PayPal
5	1005	*****	2025-04-19	P988	Home Decor	Photo Frame	2	78.61	PavPal

May 05, 2025 (4s)

```
INSERT INTO sparksql_cata.sparksql_schema.map_table
VALUES
('Credit Card','anshlambaaz@gmail.com'),
('Debit Card','anshlambaaz@gmail.com'),
('PayPal','newuser@anshlambaazgmail.onmicrosoft.com'),
('UPI','newuser@anshlambaazgmail.onmicrosoft.com')
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [num_affected_rows: long, num_inserted_rows: lor

Table +

	num_affected_...	num_inserted_rows
1	4	4

Just now (4s) 6

```
SELECT * FROM sparksql_cata.sparksql_schema.map_table
WHERE email = current_user()
```

Table +

	payment_category	email
1	Credit Card	anshlambaaz@gmail.com
2	Debit Card	anshlambaaz@gmail.com

Mapping Table Testing

May 05, 2025 (3s) 7

```
SELECT * FROM sparksql_cata.sparksql_schema.map_table
WHERE email = current_user()
AND payment_category = 'Credit Card'
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [payment_category: string, email: string]

Table +

	payment_category	email
1	Credit Card	anshlambaaz@gmail.com

Just now (4s) 6

```
SELECT * FROM sparksql_cata.sparksql_schema.map_table
WHERE email = current_user()
AND payment_category = 'UPI'
```

See performance (1)

Table +

	payment_category	email

No data cause UPI data should be visible to the other user

Converting Mapping Table into a Boolean

May 05, 2025 (3s) 9

```
SELECT EXISTS
(
SELECT * FROM sparksql_cata.sparksql_schema.map_table
WHERE email = current_user()
AND payment_category = 'UPI'
)
```

_sqldf: pyspark.sql.connect.dataframe.DataFrame = [EXISTS(SELECT*FROMsparksql_cata.sparksql_schema.map_tableWHEREemail=current_user()AND

Table +

	EXISTS(SELECT*FROMsparksql_cata.sparksql_schema.map_tableWHEREemail=current_user()ANDpayment_category='UPI')
1	false

CONVERT INTO A BOOLEAN FUNCTION

May 05, 2025 (3s) 11

```
CREATE OR REPLACE FUNCTION sparksql_cata.sparksql_schema.rowlevel_security(p_payment_method STRING)
RETURNS BOOLEAN
LANGUAGE SQL
RETURN
(
  EXISTS
  (
  SELECT * FROM sparksql_cata.sparksql_schema.map_table
  WHERE email = current_user()
  AND payment_category = p_payment_method
  )
)
```

APPLYING RLS FUNCTION TO THE COLUMN

+ Code + Te

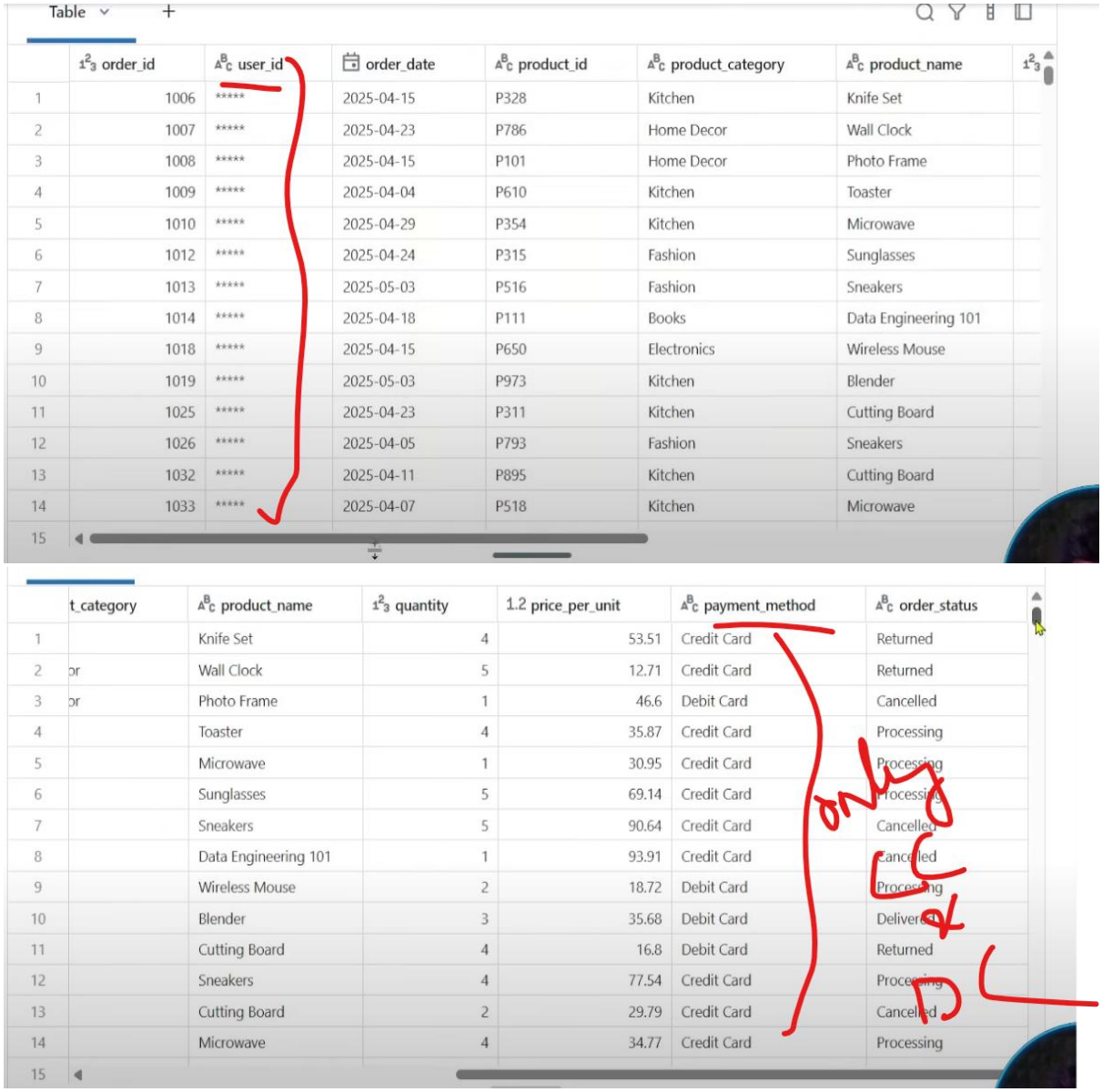
May 05, 2025 (3s) 13

```
ALTER TABLE sparksql_cata.sparksql_schema.order_ext
SET ROW FILTER sparksql_cata.sparksql_schema.rowlevel_security ON (payment_method)
```

TESTING

Just now (5s) 15

```
SELECT * FROM sparksql_cata.sparksql_schema.order_ext
```



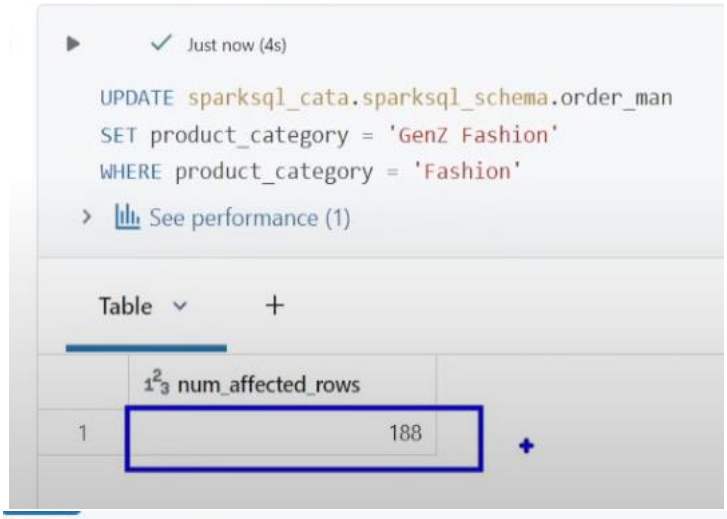
	order_id	user_id	order_date	product_id	product_category	product_name
1	1006	*****	2025-04-15	P328	Kitchen	Knife Set
2	1007	*****	2025-04-23	P786	Home Decor	Wall Clock
3	1008	*****	2025-04-15	P101	Home Decor	Photo Frame
4	1009	*****	2025-04-04	P610	Kitchen	Toaster
5	1010	*****	2025-04-29	P354	Kitchen	Microwave
6	1012	*****	2025-04-24	P315	Fashion	Sunglasses
7	1013	*****	2025-05-03	P516	Fashion	Sneakers
8	1014	*****	2025-04-18	P111	Books	Data Engineering 101
9	1018	*****	2025-04-15	P650	Electronics	Wireless Mouse
10	1019	*****	2025-05-03	P973	Kitchen	Blender
11	1025	*****	2025-04-23	P311	Kitchen	Cutting Board
12	1026	*****	2025-04-05	P793	Fashion	Sneakers
13	1032	*****	2025-04-11	P895	Kitchen	Cutting Board
14	1033	*****	2025-04-07	P518	Kitchen	Microwave
15						

	t_category	product_name	quantity	price_per_unit	payment_method	order_status
1		Knife Set	4	53.51	Credit Card	Returned
2	or	Wall Clock	5	12.71	Credit Card	Returned
3	or	Photo Frame	1	46.6	Debit Card	Cancelled
4		Toaster	4	35.87	Credit Card	Processing
5		Microwave	1	30.95	Credit Card	Processing
6		Sunglasses	5	69.14	Credit Card	Processing
7		Sneakers	5	90.64	Credit Card	Cancelled
8		Data Engineering 101	1	93.91	Credit Card	Cancelled
9		Wireless Mouse	2	18.72	Debit Card	Processing
10		Blender	3	35.68	Debit Card	Delivered
11		Cutting Board	4	16.8	Debit Card	Returned
12		Sneakers	4	77.54	Credit Card	Processing
13		Cutting Board	2	29.79	Credit Card	Cancelled
14		Microwave	4	34.77	Credit Card	Processing
15						

So whats happening bts : when we are querying the table, we have applied row filter on payment_method column, simply pass all the values to the rowlevel_security function, this function will take all the values of payment_method & check the current user and privilege of that user.

DML/DDL on Delta Tables

DML OPERATIONS




```
DESCRIBE sparksql_cata.sparksql_schema.order_man
```

See performance (1)

Table

	col_name	data_type	comment
1	order_id	int	null
2	user_id	string	null
3	order_date	date	null
4	product_id	string	null
5	product_category	string	null
6	product_name	string	null
7	quantity	int	null
8	price_per_unit	double	null
9	payment_method	string	null
10	order_status	string	null

Just now (2s)

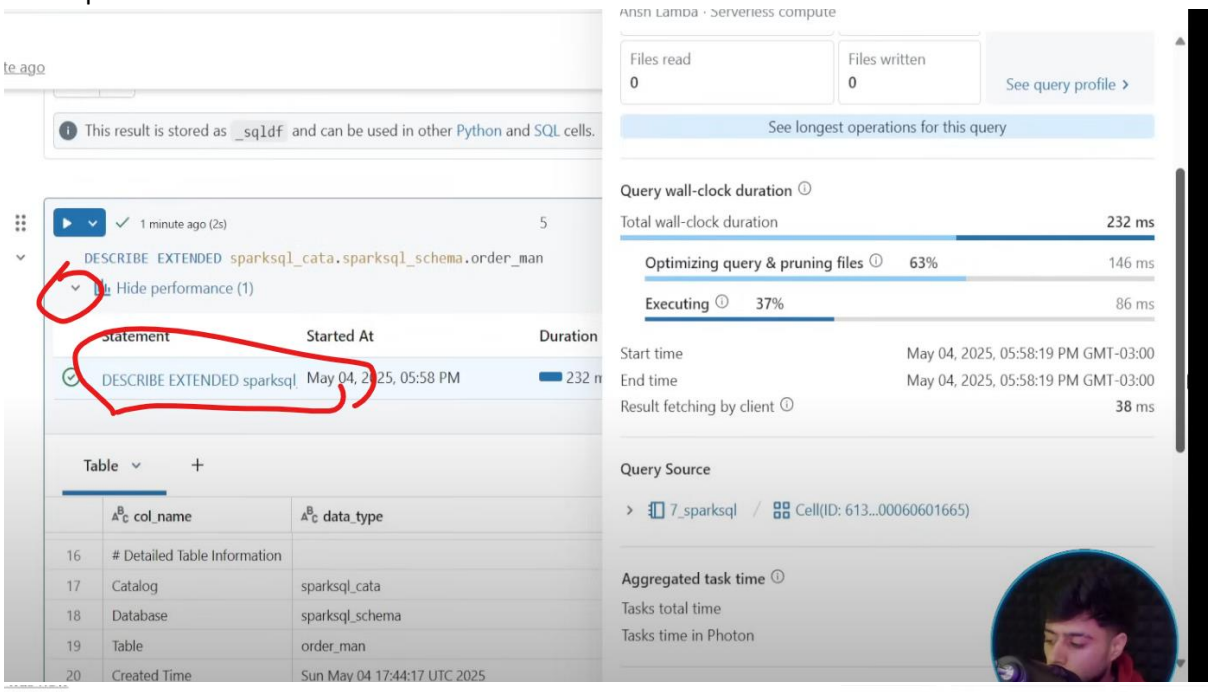
```
DESCRIBE EXTENDED sparksql_cata.sparksql_schema.order_man
```

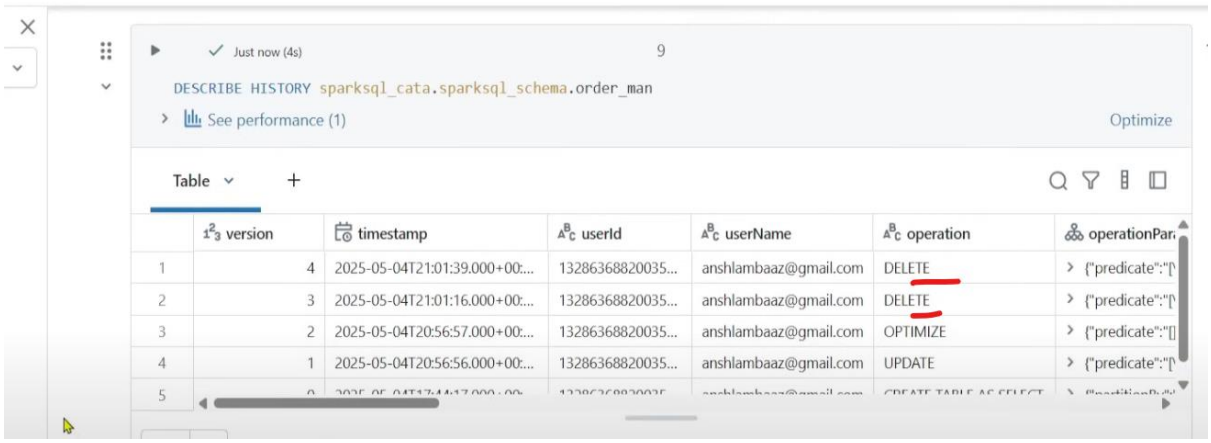
See performance (1)

9	payment_method	string
10	order_status	string
11		
12	# Delta Statistics Columns	
13	Column Names	quantity, order_id, price_per_unit, user_id, payment_method, order_status, product_name, order_date, product_id, product_
14	Column Selection Method	first-32
15		
16	# Detailed Table Information	
17	Catalog	sparksql_cata
18	Database	sparksql_schema
19	Table	order_man
20	Created Time	Sun May 04 17:44:17 UTC 2025

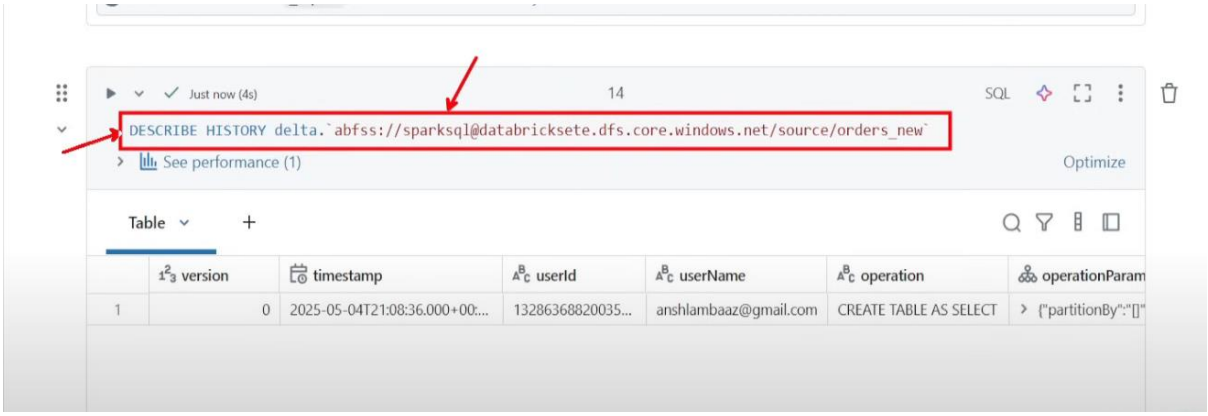
Delta Tables calculate the statistics of first 32 columns

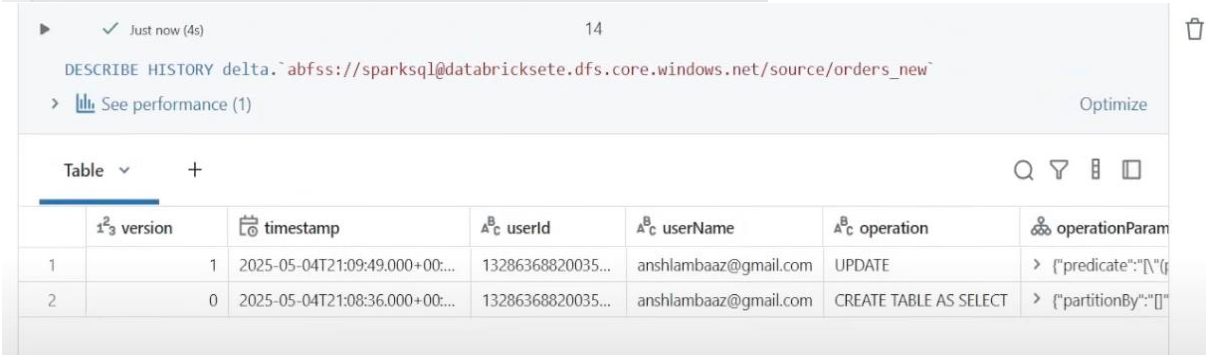
To see performance

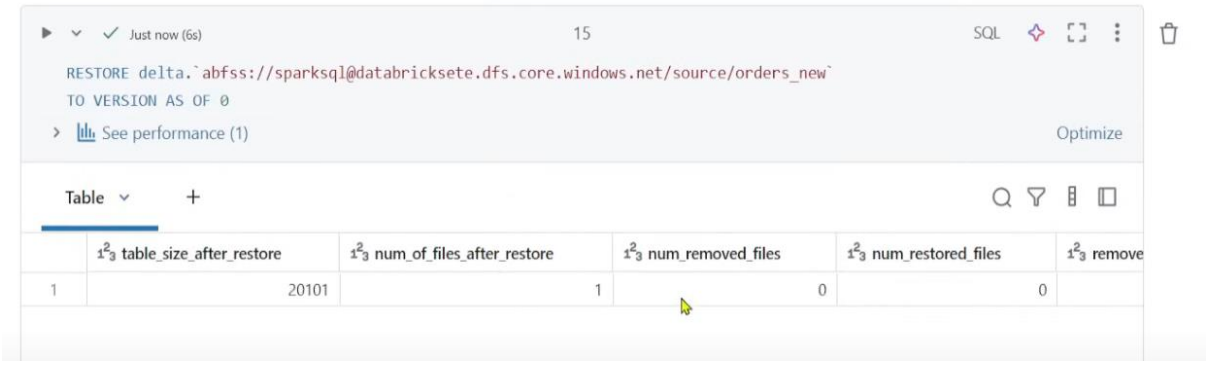




Different approach






Just now (6s)
15
SQL
RESTORE delta.`abfss://sparksql@databricksete.dfs.core.windows.net/source/orders_new`
TO VERSION AS OF 0
See performance (1)
Optimize
Table
table_size_after_restore
num_of_files_after_restore
num_removed_files
num_restored_files
remove
1
20101
1
0
0