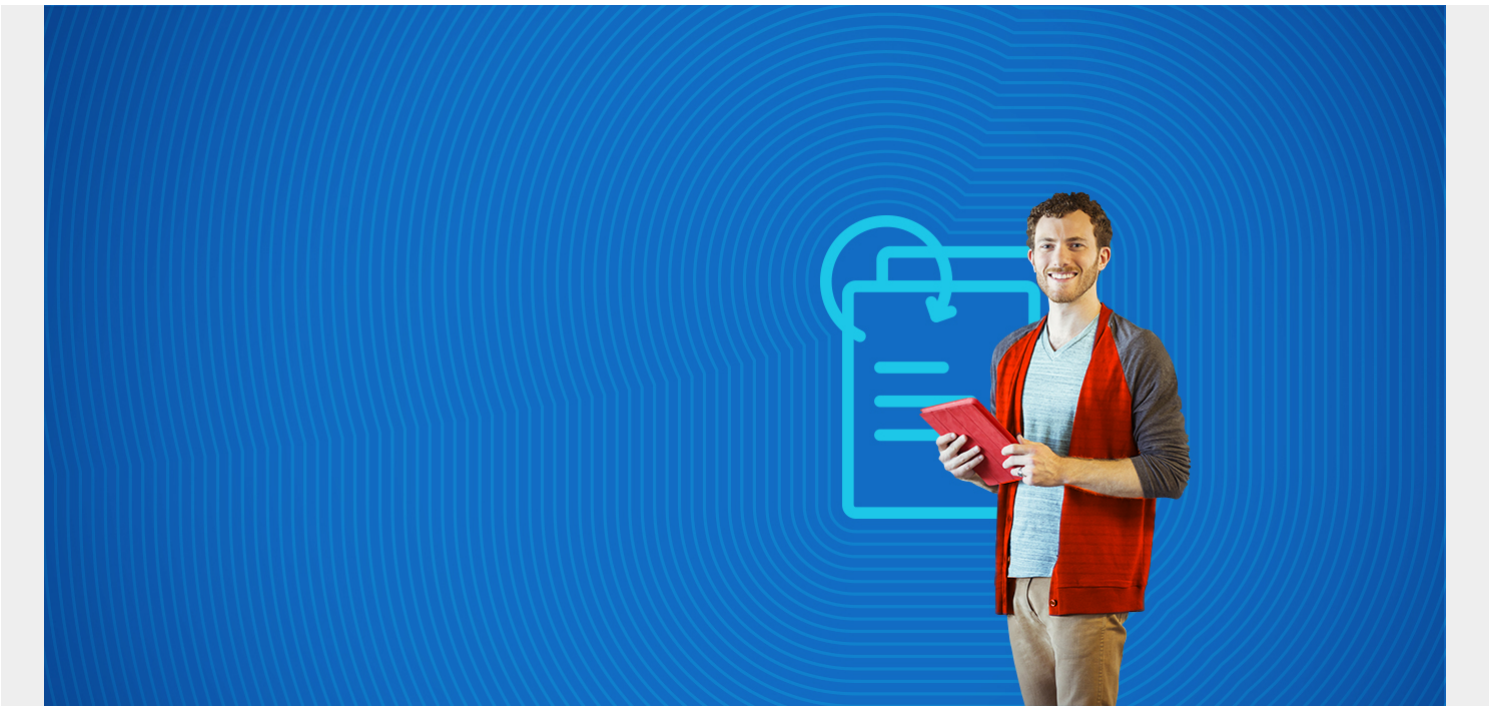
SNOWFLAKE WINDOW FUNCTIONS: PARTITION BY AND ORDER BY



Snowflake supports **windows functions**. Think of windows functions as running over a subset of rows, except the results return every row. That's different from the traditional SQL **group by** where there is one result for each group.

A windows function could be useful in examples such as:

- A running sum
- The average values over some number of previous rows
- A percentile ranking of each row among all rows.

The topic of window functions in Snowflake is large and complex. This tutorial serves as a brief overview and we will continue to develop additional tutorials.

Snowflake definitions

Snowflake defines **windows** as a group of related rows. It is defined by the **over()** statement. The over() statement signals to Snowflake that you wish to use a windows function instead of the traditional SQL function, as some functions work in both contexts.

A **windows frame** is a windows subgroup. Windows frames require an **order by** statement since the rows must be in known order.

Windows frames can be cumulative or sliding, which are extensions of the **order by** statement. **Cumulative** means across the whole windows frame. **Sliding** means to add some offset, such as +- n

rows.

A window can also have a **partition** statement. A partition is a group of rows, like the traditional group by statement.

Windows vs regular SQL

For example, if you grouped sales by product and you have 4 rows in a table you might have two rows in the result:

Regular SQL group by

```
select count(*) from sales group by product:

10 product A
20 product B
```

Windows function

With the windows function, you still have the count across two groups but each of the 4 rows in the database is listed yet the sum is for the whole group, when you use the partition statement.

```
count 10 product A
count 10 product A
count 20 product B
count 20 product B
```

Create some sample data

To study this, first create these two tables.

```
CREATE TABLE customers
  (
     customernumber     varchar(100) PRIMARY KEY,
    customername varchar(50),
    phonenumber varchar(50),
    postalcode varchar(50),
    locale varchar(10),
    datecreated date,
    email varchar(50)
  );


CREATE TABLE orders
  (
     customernumber     varchar(100) PRIMARY KEY,
    ordernumber varchar(100),
    comments varchar(200),
```

```
    orderdate date,
    ordertype varchar(10),
    shipdate date,
discount number,
quantity int,
    productnumber varchar(50)
)
```

Then paste in this SQL data. The top of the data looks like this:

```
insert into customers
(customernumber,customername,phonenumber,postalcode,locale,datecreated,email)
values
('440','tiqthogsjwsedifisiir','3077854','vdew','','2020-09-27','twtp@entt.com
');

insert into orders
(customernumber,ordernumber,comments,orderdate,ordertype,shipdate,discount,qu
antity,productnumber) values
('440','402','swgstdhmju','2020-09-27','sale','2020-10-01','0.700595024035891
9','61','BB111');

insert into customers
(customernumber,customername,phonenumber,postalcode,locale,datecreated,email)
values
('802','hrdngzutwelfhgwcyznt','1606845','rnmk','','2020-09-27','ympv@zfze.com
');

insert into orders
(customernumber,ordernumber,comments,orderdate,ordertype,shipdate,discount,qu
antity,productnumber) values
('802','829','jybwzvoyzb','2020-09-27','sale','2020-10-06','0.370224892284185
3','75','FF4444');

insert into customers
(customernumber,customername,phonenumber,postalcode,locale,datecreated,email)
values
('199','ogvaevvhhqtjcqggafnv','8452159','hyxm','','2020-09-27','znqo@rftp.com
');
```

Partition by

A partition creates subsets within a window. Here, we have the sum of quantity by product.

```
select customernumber, ordernumber, productnumber,quantity,
        sum(quantity) over (partition by productnumber) as prodqty
               from orders
               order by ordernumber
```

CUSTOMERNUMBER	ORDERNUMBE	PRODUCTNUM	QUANTITY	PRODQTY
143	106	FF4444	41	1336
913	113	FF4444	82	1336
694	113	CC222	19	778
601	114	CC222	9	778
457	126	EE333	60	1190
462	135	CC222	62	778
684	157	EE333	100	1190
601	171	CC222	85	778
988	172	FF4444	81	1336
963	177	BB111	9	1132
802	178	CC222	20	778
641	205	EE333	49	1190
993	205	AA111	67	1286
103	209	CC222	20	778

This produces the same results as this SQL statement in which the orders table is joined with itself:

```
select customernumber,
        ordernumber,
        productnumber,quantity,
        (select sum(quantity) from orders as o2 where o1.productnumber =
o2.productnumber) as prodqty
               from orders as o1
         order by ordernumber
```

Order by

The **sum()** function does not make sense for a windows function because it's is for a group, not an ordered set. Yet Snowflake lets you use sum with a windows frame—i.e., a statement with an order() statement—thus yielding results that are difficult to interpret.

Let's look at the rank function, one that is relevant to ordering. Here, we use a windows function to rank our most valued customers. These are the ones who have made the largest purchases.

The **rank()** function takes no arguments. The window is ordered by quantity in descending order. We limit the output to 10 so it fits on the page below.

```
select customernumber, quantity, rank() over (order by quantity desc) from
orders  limit 10
```

Here is the output. The customer who has purchases the most is listed first.

CUSTOMERNUMBER	QUANTITY	RANK
684	100	1
641	99	2
543	98	3
457	91	4
834	91	4
679	91	4
537	90	7
456	89	8
129	89	8
841	88	10

Additional resources

For more tutorials like this, explore these resources:

- BMC Machine Learning & Big Data Blog
- How To Import Amazon S3 Data to Snowflake
- Snowflake SQL Aggregate Functions & Table Joins
- AWS Guide, with 15 articles and tutorials
- Amazon Braket Quantum Computing: How To Get Started