

# Percentile Rank Formula



$$R = \frac{P}{100 (N + 1)}$$



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## How to Calculate Percentile in PostgreSQL

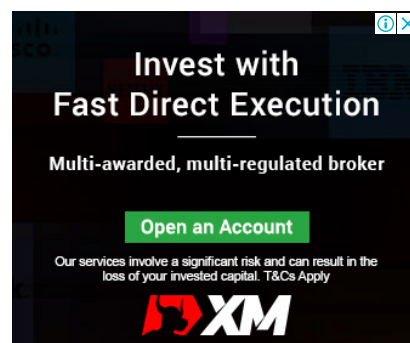
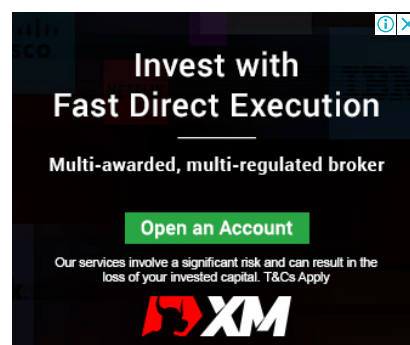


Calculating Percentile helps you rank data for analysis as well as calculate median for a set of values. Here's how to calculate percentile in PostgreSQL using `percentile_cont` window function. We will also look at how to calculate 50th percentile, 90th percentile, 95th percentile and nth percentile in PostgreSQL, since they are commonly used in data analysis.

## How to Calculate Percentile in PostgreSQL

We will calculate percentile in PostgreSQL using `percentile_cont` window function

Let's say you have the following table `sales(order_date,amount)` and you want to calculate 50th percentile.



```
postgres=# create table sales(order_date date,sale int);

postgres=# insert into sales values('2020-04-01',210),
      ('2020-04-02',125),('2020-04-03',150),('2020-04-04',
      ('2020-04-05',200),('2020-04-10',220),('2020-04-06',
      ('2020-04-07',215),('2020-04-08',300),('2020-04-09',

postgres=# select * from sales;
 order_date | sale
-----+-----
 2020-04-01 |   210
 2020-04-02 |   125
 2020-04-03 |   150
 2020-04-04 |   230
 2020-04-05 |   200
 2020-04-10 |   220
 2020-04-06 |    25
 2020-04-07 |   215
 2020-04-08 |   300
 2020-04-09 |   250
```



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([http://ubiq.co/database-blog/fill-missing-dates-using-postgresql-generate\\_series/](http://ubiq.co/database-blog/fill-missing-dates-using-postgresql-generate_series/))

Here's the query to calculate 50th percentile in PostgreSQL. You can use the same query to calculate median in PostgreSQL (<http://ubiq.co/database-blog/calculate-median-postgresql/>).

```
postgres=# SELECT PERCENTILE_CONT(0.5) WITHIN GROUP(ORDER BY sa
percentile_cont
-----
          212.5
```

In the above query, we use *percentile\_cont*

(<https://www.postgresql.org/docs/9.4/functions-aggregate.html>) window function that allows you to define what percentile (e.g **0.5** that is 50th percentile) you want to calculate. Then we also use WITHIN GROUP clause to calculate percentile within the group of *sale* values. We also use ORDER BY clause to sort the *sale* values before we calculate percentile in PostgreSQL.

When you use *percentile\_cont* window function, PostgreSQL will interpolate the median value as the average of 2 middle values (210, 215), in case there are 2 middle values. That is why it returns 212.5

Bonus Read : How to Calculate Moving Average in PostgreSQL

(<http://ubiq.co/database-blog/calculate-moving-average-postgresql/>)

When you can calculate percentile in PostgreSQL, if you don't want PostgreSQL to interpolate but only return the closest value, use *percentile\_disc* window function instead. Here's an example

```
postgres=# SELECT PERCENTILE_DISC(0.5) WITHIN GROUP(ORDER BY sa
percentile_disc
-----
210
```

In this case, it will return the one of the middle values, in case there are 2 middle values.

Bonus Read : How to Import CSV File into PostgreSQL  
(<http://ubiq.co/database-blog/import-csv-file-postgresql/>)

## How to Calculate 90th Percentile in PostgreSQL

Similarly, you can calculate 90th percentile in PostgreSQL using *percentile\_cont*. We change **0.5 to 0.9** in *percentile\_cont* function

```
postgres=# SELECT PERCENTILE_CONT(0.9) WITHIN GROUP(ORDER BY sa
percentile_cont
-----
255
```

You can also calculate 90th percentile in PostgreSQL using *percentile\_disc*

```
postgres=# SELECT PERCENTILE_DISC(0.9) WITHIN GROUP(ORDER BY sa
percentile_disc
-----
250
```

## How to Calculate 95th Percentile in PostgreSQL

Similarly, you can calculate 95th percentile in PostgreSQL, using *percentile\_cont*

```
postgres=# SELECT PERCENTILE_CONT(0.95) WITHIN GROUP(ORDER BY s
percentile_cont
-----
277.5
```

You can also calculate 95th percentile in PostgreSQL using *percentile\_disc*

```
postgres=# SELECT PERCENTILE_DISC(0.95) WITHIN GROUP(ORDER BY s
percentile_disc
-----
300
```

## How to Calculate nth Percentile in PostgreSQL

Similarly, you can calculate nth percentile in PostgreSQL using *percentile\_cont*. We basically supply  $n/100$  in *percentile\_cont* function

```
postgres=# SELECT PERCENTILE_CONT(n/100) WITHIN GROUP(ORDER BY
```

You can also calculate 90th percentile in PostgreSQL using *percentile\_disc*

```
postgres=# SELECT PERCENTILE_DISC(n/100) WITHIN GROUP(ORDER BY
```

After you calculate percentile in PostgreSQL, you can use a PostgreSQL Reporting Tool (<http://ubiq.co/postgresql-reporting-tools>) to plot the percentile values along with sale values on a line chart to analyze the difference and also do goal setting. For that we will join the calculated 50th percentile value with original *sales* table as shown below

```
postgres=# select * from sales,
(SELECT PERCENTILE_CONT(0.5) WITHIN GROUP(ORDER BY sale) FROM s
order by order_date;
 order_date | sale | percentile_cont
-----+-----+-----
2020-04-01 | 210 |          212.5
2020-04-02 | 125 |          212.5
2020-04-03 | 150 |          212.5
2020-04-04 | 230 |          212.5
2020-04-05 | 200 |          212.5
2020-04-06 |  25 |          212.5
2020-04-07 | 215 |          212.5
2020-04-08 | 300 |          212.5
2020-04-09 | 250 |          212.5
2020-04-10 | 220 |          212.5
```

Here's a line chart that shows daily sales along with percentile, plotted using Ubiq (<https://ubiq.co>)

daily sales with percentile

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◀ [How to Import CSV to MySQL Workbench \(https://ubiq.co/database-blog/import-csv-mysql-workbench/\)](https://ubiq.co/database-blog/import-csv-mysql-workbench/)

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