

# Advanced Functions

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## Overview

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Advanced Functions are used to transform results by applying post processing calculations to the initial query results. These functions are database independent as they are performed by Java code, rather than being part of the SQL query.

## Available Functions

Yellowfin comes with a set of pre-defined functions. However, your administrator may add in additional functions specifically for your organisation or reporting needs. Expand the following to see the lists of functions available:

|                                            |                                                                                                                                                                              |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accumulative Percentage</b>             | Will print a running percentage for the values returned. A maximum of 100% will be displayed.                                                                                |
| <b>Accumulative Total</b>                  | Will print out a running total for the data returned.                                                                                                                        |
| <b>Ascending Rank</b>                      | The highest value returned will be displayed as a 1. Used where the preferable result is a higher value. Eg. Profit.                                                         |
| <b>Bottom 10 Rank</b>                      | The bottom 10 values (lowest) are returned.                                                                                                                                  |
| <b>Bottom N Rank</b>                       | The bottom N values (lowest) are returned— user is prompted to define number to return.                                                                                      |
| <b>Delta from Last</b>                     | Calculate change between consecutive rows                                                                                                                                    |
| <b>Delta from Last N</b>                   | Calculate change between the current row and row - N                                                                                                                         |
| <b>Descending Rank</b>                     | The lowest value returned will be displayed as a 1. Used where the preferable result is a lower value. Eg. Expenses.                                                         |
| <b>Difference of Columns</b>               | Returns difference of two selected columns                                                                                                                                   |
| <b>Multiplication of Columns</b>           | Returns multiplication of two selected columns                                                                                                                               |
| <b>Natural Logarithm</b>                   | Gives the base e logarithm of the values of a given field.                                                                                                                   |
| <b>Natural Logarithm</b>                   | Gives the base e logarithm of the values in the field.                                                                                                                       |
| <b>Percentage Against Absolute Maximum</b> | Returns percentage of selected field according to an absolute maximum value.                                                                                                 |
| <b>Percentage Against Column</b>           | Creates a percentage ration of values in the selected column compared to another column.                                                                                     |
| <b>Percentage Against Maximum</b>          | Returns the % of the attribute when compared to the maximum value of the attribute within the dataset.                                                                       |
| <b>Percentage of Total</b>                 | Returns the % of the attribute when compared to the total summed value of the attribute for the entire dataset.                                                              |
| <b>Sum of Columns</b>                      | Returns the sum of two selected columns.                                                                                                                                     |
| <b>Top 10 Rank</b>                         | The top 10 values (highest) are returned.                                                                                                                                    |
| <b>Top N Rank</b>                          | The top N values (highest) are returned – user is prompted to define number to return.                                                                                       |
| <b>Top N With Ties</b>                     | Returns top values for the selected field with provision for tied values. This means that if there are multiple records per ranking it will restrict it to N total rankings. |

|                            |                                                                             |
|----------------------------|-----------------------------------------------------------------------------|
| <b>Days Between Date</b>   | The days between the date selected and another date column on the report.   |
| <b>Days to Now</b>         | The days between the date selected and the current date. (age in days)      |
| <b>Months Between Date</b> | The months between the date selected and another date column on the report. |
| <b>Months to Now</b>       | The months between the date selected and the current date. (age in months)  |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Weeks Days Between</b>      | The week days between the date selected and another date column on the report.                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Years Between Date</b>      | The years between the date selected and another date column on the report.                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Years to Now</b>            | The years between the date selected and the current date. (age in years)                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Decile</b>                  | Decile divides the rows returned into 10 equal parts, and assigns a value of 1 to 10, based upon its rank to the highest value. Deciles are used as a measure of dispersion.                                                                                                                                                                                                                                                                                                                                            |  |
| <b>Deviation</b>               | The number of deviations from the mean.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>Linear Regression</b>       | A linear trendline is a best-fit straight line that is used with simple linear data sets. Your data is linear if the pattern in its data points resembles a line. A linear trendline usually shows that something is increasing or decreasing at a steady rate.                                                                                                                                                                                                                                                         |  |
| <b>Mean</b>                    | The arithmetic mean (or simply the mean) of a list of numbers is the sum of all the members of the list divided by the number of items in the list.                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>Median</b>                  | The median is described as the number separating the higher half of a sample, a population, or a probability distribution, from the lower half.                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Mode</b>                    | The mode is the value that occurs the most frequently in a data set                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>Moving Average</b>          | A moving average trendline smoothes out fluctuations in data to show a pattern or trend more clearly.<br>A moving average uses a specific number of data points (set by the Period option), averages them, and uses the average value as a point in the line.<br>If Period is set to 2, for example, then the average of the first two data points is used as the first point in the moving average trendline. The average of the second and third data points is used as the second point in the trendline, and so on. |  |
| <b>Moving Total</b>            | The total over the last N periods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Naïve Forecasting</b>       | A naïve forecasting model is a special case of the moving average forecasting model where the number of periods used for smoothing is 1. Therefore, the forecast for a period, t, is simply the observed value for the previous period, t-1.<br>Due to the simplistic nature of the naïve forecasting model, it can only be used to forecast up to one period in the future. It is not at all useful as a medium-long range forecasting tool.                                                                           |  |
| <b>Polynomial Regression</b>   | A polynomial trendline is a curved line that is used when data fluctuates. It is useful, for example, for analysing gains and losses over a large data set. The order of the polynomial can be determined by the number of fluctuations in the data or by how many bends (hills and valleys) appear in the curve. An Order 2 polynomial trendline generally has only one hill or valley. Order 3 generally has one or two hills or valleys. Order 4 generally has up to three.                                          |  |
| <b>Quartile</b>                | Quartile divides the rows returned into 4 equal parts, and assigns a value of 1 to 4, based upon its rank to the highest value. Quartiles are used as a measure of dispersion.                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Standard Deviation</b>      | The standard deviation is a measure of the dispersion of a set of values. It can apply to a probability distribution, a random variable, a population or a multiset.                                                                                                                                                                                                                                                                                                                                                    |  |
| <b>Standard Score</b>          | The standard score indicates how many standard deviations an observation is above or below the mean. It allows comparison of observations from different normal distributions, which is done frequently in research.                                                                                                                                                                                                                                                                                                    |  |
| <b>Variance</b>                | Returns the difference between the data sets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>Weighted Moving Average</b> | Returns a moving average that is weighted so that the more recent the value, the more weight is applied to it.                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Concatenate</b>             | Joins two columns into one text string.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |

Data Conversion allows you to adjust results once they've returned from the database. For example you may wish to convert a currency value which is stored in the database from a full currency value to a ('000) where the value is divided by 1000. This transformation can be achieved using the data conversion.

## Applying a Function

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## Report Builder - Data Step

To apply an advanced function first you will need to ensure the field you wish to apply it to has been added to your table. Often, when applying functions, you may find you need two copies of the field in your table; one to display the original values (such as sales figures) and the second to have a function applied to it (for example, displaying the top 10 rank of sales figures).

To apply a function to a field in your table from the Data step of the report builder, complete the following:

1. Open the field's drop down menu, in either of these locations:
  - a. Through the Columns/Rows list

|         |      |                 |
|---------|------|-----------------|
| Columns | Year | Invoiced Amo... |
| Rows    |      |                 |

- b. Through the Table Preview

| Year | Invoiced Amount |
|------|-----------------|
| 2007 | \$3,349         |
| 2007 | \$3,525         |
| 2007 | \$5,122         |
| 2007 | \$5,360         |
| 2007 | \$5,392         |
| 2007 | \$5,580         |
| 2007 | \$6,628         |

2. Now select the **Advanced Function** option from the list, opening the Advanced Function display.
3. You will now need to complete the function options:

- a. Apply the appropriate aggregation to the field. This ensures the function is applied on top of any aggregations necessary.
  - b. Select which function type you wish to use, from **Analysis**, **Statistical**, and **Text**
  - c. Select the name of the function you wish to use from the list. Once selected, you will see a description of the function displayed next to it. Some functions require extra parameters, which will need to be defined once the function has been selected.
  - d. You also have the option to set the function to only display on the Charts page. This allows you to create additional copies of a field to apply functions to for graphical purposes, without cluttering your table with extra fields.
4. When defined, click **Save** to apply the function.

## Report Builder - Charts Step

To apply a function to a field in your table from the Charts step of the report builder, complete the following:

1. Click on the + button at the bottom left of the page

|                       |                     |
|-----------------------|---------------------|
|                       | Year                |
| Advanced Function for | Sum Invoiced Amount |
| +                     |                     |

2. Select **Advanced Function** for and choose the field you wish to use from the list, opening the Advanced Function display.
3. You will now need to complete the function options:

- a. Apply the appropriate aggregation to the field. This ensures the function is applied on top of any aggregations necessary.
  - b. Select which function type you wish to use, from **Analysis**, **Statistical**, and **Text**
  - c. Select the name of the function you wish to use from the list. Once selected, you will see a description of the function displayed next to it. Some functions require extra parameters, which will need to be defined once the function has been selected.
  - d. You also have the option to set the function to only display on the Charts page. This allows you to create additional copies of a field to apply functions to for graphical purposes, without cluttering your table with extra fields.
4. When defined, click **Save** to apply the function.

## Report Builder - Output Step

To apply a function to a field in your table from the Output step of the report builder, complete the following:

1. Open the field's drop down menu

| Year | Invoiced Amount |
|------|-----------------|
| 2007 | \$3,349         |
| 2007 | \$3,525         |
| 2007 | \$5,122         |
| 2007 | \$5,360         |
| 2007 | \$5,392         |
| 2007 | \$5,580         |
| 2007 | \$6,628         |

2. Now select the **Advanced Function** option from the list, opening the Advanced Function display.

3. You will now need to complete the function options:

The screenshot shows the 'Advanced Metrics' interface with the 'Data Conversion' tab selected. The main area displays a field 'Revised Amount (Numeric)' with various aggregation buttons. Below this, a 'Select Function' dropdown is set to 'Analysis', and a search box shows a list of functions: 'Top N Rank', 'Top Accumulative Percentage', 'Top N Rank', 'Top N Value', and 'Truncate Database'. A 'Display only in charts' checkbox is checked. At the bottom, there are tabs for 'Overview', 'Setting', and 'User Prompt', and a 'How Many to Display' input set to '10'.

- Apply the appropriate aggregation to the field. This ensures the function is applied on top of any aggregations necessary.
  - Select which function type you wish to use, from **Analysis**, **Statistical**, and **Text**
  - Select the name of the function you wish to use from the list. Once selected, you will see a description of the function displayed next to it. Some functions require extra parameters, which will need to be defined once the function has been selected.
  - You also have the option to set the function to only display on the Charts page. This allows you to create additional copies of a field to apply functions to for graphical purposes, without cluttering your table with extra fields.
4. When defined, click **Save** to apply the function.

## Applying Data Conversion

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Data in a field can be converted by completing the following:

- Open the Advanced Function display, as outlined in the sections above.
- Choose the 'Data Conversion' tab. This will provide you with the interface to use to select the conversion you wish to apply.
- Choose the aggregation appropriate for you conversion.
- Click **Add** button to select and apply a conversion – this will present you with a list of possible conversions for the data type you have selected. By default there is a java date converter and a Numeric divide converter (This lets you divide a value by 1000's etc).
- Follow the on screen instructions for the converter and click **Save**.
- Note that you can add multiple converters to a data type if required by clicking the add link and creating a new type.

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