# FastCube .NET User Manual

Version 2024.1

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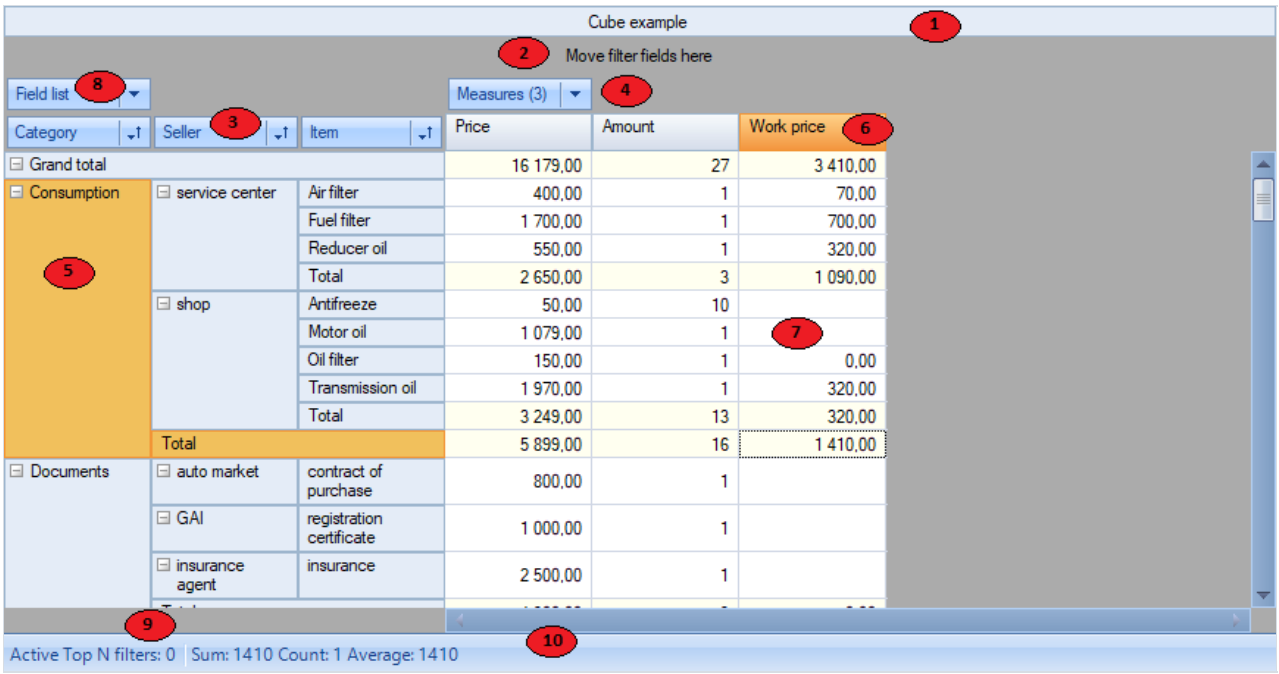
# Description of the FastCube Library

## The Grid

The Grid is an interactive tool for the presentation and analysis of data. There are multi-level headers in the left and top parts of the grid. The 'headers' are filled with the dimension values; there are both horizontal and vertical 'headers'. The central part of the grid displays the values of the measures.




The grid consists of several regions, identified by numbers above:

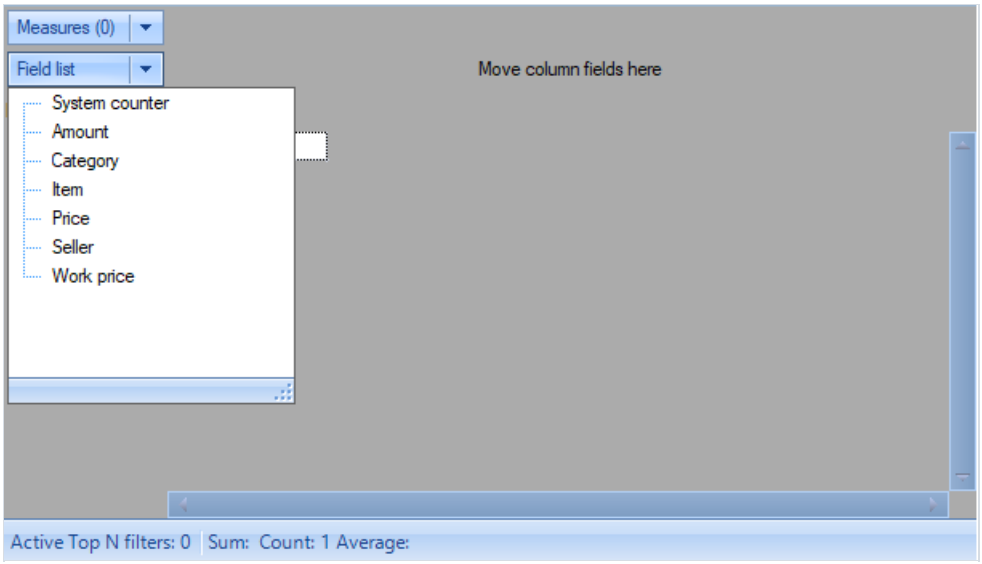
1. the grid title
2. the filter region : dimensions included in this region can be used for filtering the grid data
3. the vertical dimension headers : dimensions included in this region form the grid's vertical header
4. the horizontal dimension headers : dimensions included in this region form the grid's horizontal header
5. the vertical header of the grid
6. the horizontal header of the grid
7. data region
8. the list of fields : the fields required for processing are dragged from the drop-down list : fields not required are dragged back to this list
9. list of Top-N filters : filters can be modified through the context menu for this field
10. the region showing aggregates for the selected cells : can be modified through the context menu

# Setting up the Grid Structure

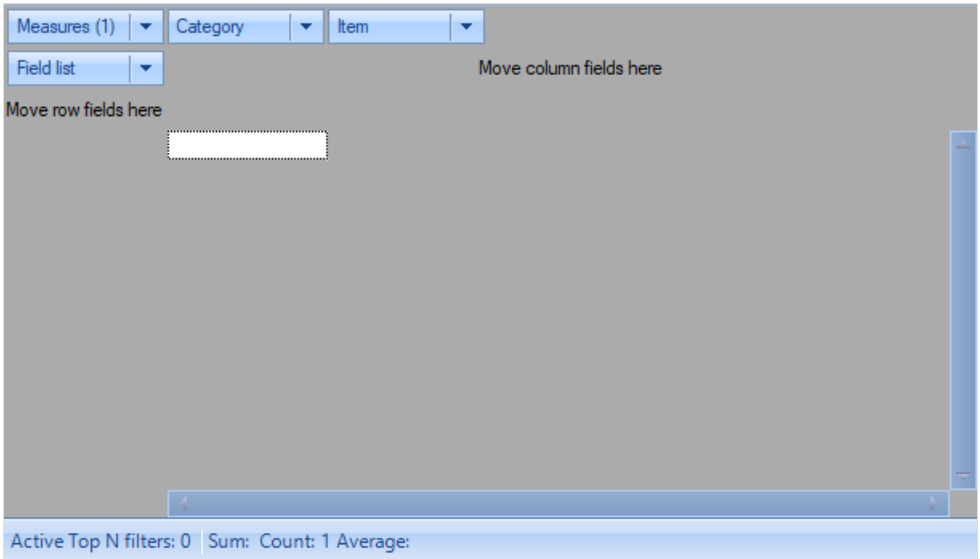
The grid structure many be defined in several different ways: by code, by loading from a cube or scheme file or by manual setup by the user. This paragraph deals only with manual setup of the grid structure.

Dimensions and measures are added to the grid by dragging from the drop-down list (shown below) or by using the Field List dialog. They are added to one of the following regions:

- the filters region
- the row fields region
- the column fields region
- or the measure fields region (the data region)




Let's add the fields "Category" and "Item" to the filters region, and drag the "Price" field to the data region. The grid now looks like this:




The number in brackets in the "Measures" dimension indicates the number of measures defined for this grid. Here the number of measures is 1, since we dragged the "Price" field to the data region. The "Measures" dimension is in fact not a simple dimension. Unlike all the others, "Measures" contains measures, and not elements of the database row as its values. This implementation of the measure list as a pseudo-dimensions allows a consistent approach in the user interface - dragging to any dimension region and value filter.

No data is yet displayed in the grid above as the grid only displays data when it contains at least one measure and the "Measures" dimension is located either in the row fields region or in the column fields region.

For example, if the "Category" and "Item" dimensions are dragged into the row fields region and the "Measures" dimension into the column fields region, then the grid will look like this:

# Totals

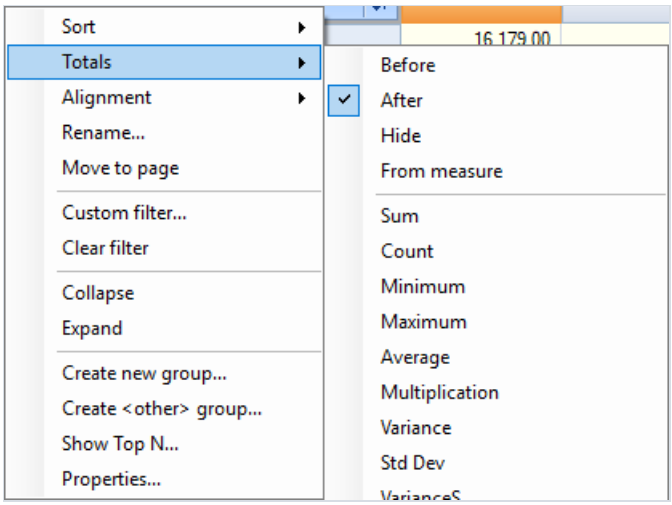
As well as dimension values the grid can also show Total values. Total value is an aggregated measure value over a group of dimension values. A Total value is calculated using the default aggregate function for the measure.

The various levels of Total are shown in this partial grid:

| | | | | | |
|---|---|---|---|---|---|
| Grand total | | | 16 179,00 | 27 | 3 410,00 |
| Consumption | service center | Air filter | 400,00 | 1 | 70,00 |
| | | Fuel filter | 1 700,00 | 1 | 700,00 |
| | | Reducer oil | 550,00 | 1 | 320,00 |
| | | Total | 2 650,00 | 3 | 1 090,00 |
| | | Antifreeze | 50,00 | 10 | |
| | | Motor oil | 1 079,00 | 1 | |
| | | Oil filter | 150,00 | 1 | 0,00 |
| | | Transmission oil | 1 970,00 | 1 | 320,00 |
| | | Total | 3 249,00 | 13 | 320,00 |
| | Total | | 5 899,00 | 16 | 1 410,00 |

Totals

Use the dimension context menu to change the position of Totals (before or after), to hide Totals and to manage the aggregate functions.

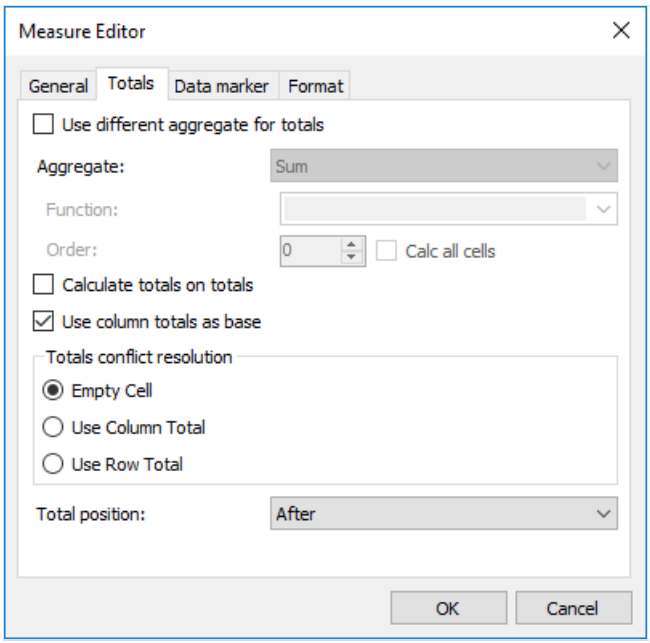



If in the example above we turn off the Total for the "Seller" dimension and also the Grand Total, set the Total position for "Category" dimension to "Before" and add an aggregate "Count" to it, we achieve this final grid:

| Category | Seller | Item | Price | Amount | Work price |
|---|---|---|---|---|---|
| Consumption | Total | | 5 899,00 | 16 | 1 410,00 |
| | Total Count | | 7,00 | 7 | 7,00 |
| | service center | Air filter | 400,00 | 1 | 70,00 |
| | | Fuel filter | 1 700,00 | 1 | 700,00 |
| | | Reducer oil | 550,00 | 1 | 320,00 |
| | shop | Antifreeze | 50,00 | 10 | |
| | | Motor oil | 1 079,00 | 1 | |
| | | Oil filter | 150,00 | 1 | 0,00 |
| | | Transmission oil | 1 970,00 | 1 | 320,00 |

The context menu item "From measure" sets Totals to show a value defined on the "Total position" parameter for the measure. This item only has a value for the axis which contains the "Measures" field and is ignored for other axes.

A measure's Total parameters can be modified in the measure editor:




A Total value is calculated using the default aggregate function for the measure. The aggregate function to be used can be changed or can even be implemented using a script, if required.

The Total calculation can be made either on the source dataset values or on total values of a child level. This can be set using the "Calc totals on to totals" checkbox. If this option is checked then the axis from which to take the Total value (either columns or rows) must be set. This can be set using "Use column totals as base".

Sometimes a situation can arise where, according to the dimensions parameters, each axis requires a different aggregate function with a different values for particular cells. So there is a conflict of which aggregate function to use. The "Totals conflict resolution" group-box has options for solving the conflict. A conflicting cell will not be calculated by default.

The "Total position" parameter defines how to show the Total for the axis with the "Measures" field for those dimensions which have the Totals position set to "From measure".

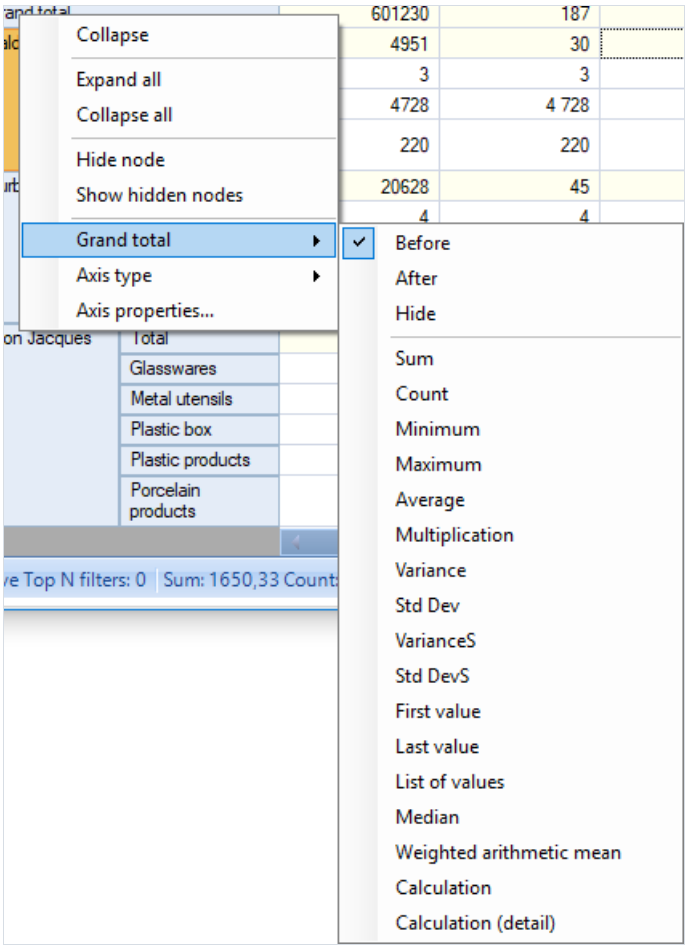
The example below shows the dimension "Manager" Totals set to "From measure", the "Amount" measure Totals set to "Before", the "Cost" measure Totals set to "Hide" and the other measures Totals set to "After". It can be seen that the "Cost" Total is not shown for the "Manager" dimension:

| Customer | | | |
|---|---|---|---|
| Field list | | | |
| Manager | Product | Measures (4) | |
| Amount | | | 601230 |
| Cost | | | 11 706 187,56 |
| Paid | | | 5 219 178,52 |
| Balance | | | 6 487 009,04 |
| Baldwin Janet | Amount | | 4951 |
| | Metal utensils | Amount | 3 |
| | | Cost | 643,00 |
| | | Paid | 643,00 |
| | | Balance | 0,00 |
| | Plastic products | Amount | 4728 |
| | | Cost | 240 260,35 |
| | | Paid | 6 453,60 |
| | | Balance | 233 806,75 |
| | Porcelain products | Amount | 220 |
| | | Cost | 6 416,30 |
| | | Paid | 1 257,60 |
| | | Balance | 5 158,70 |
| | Paid | | 8 354,20 |
| | Balance | | 238 965,45 |
| Burbank Kevin | Amount | | 20628 |
| | Glasswares | Amount | 4 |
| | | Cost | 483,25 |

The next example shows the outcome when Total aggregate functions are changed and Total values are calculated on child totals. All three measures are built using the main aggregate function "Sum" by field "Amount". The Total for measure "Amount" is not customized. For measures "Amount1" and "Amount2" the Totals aggregate function is changed to "Average" and the measure "Amount2" uses the "Calculate totals on totals" option:

| Field list | | Measures (3) | | |
|---|---|---|---|---|
| Manager | Product | Amount | Amount 1 | Amount 2 |
| Grand total | | 601230 | 187 | 54 657 |
| Baldwin Janet | Total | 4951 | 30 | 1 650 |
| | Metal utensils | 3 | 3 | 3 |
| | Plastic products | 4728 | 4 728 | 4 728 |
| | Porcelain products | 220 | 220 | 220 |
| Burbank Kevin | Total | 20628 | 45 | 5 157 |
| | Glasswares | 4 | 4 | 4 |
| | Metal utensils | 737 | 737 | 737 |
| | Plastic products | 19302 | 19 302 | 19 302 |
| | Silver utensils | 585 | 585 | 585 |
| Glon Jacques | Total | 322977 | 1 846 | 53 830 |
| | Glasswares | 3087 | 3 087 | 3 087 |
| | Metal utensils | 119 | 119 | 119 |
| | Plastic box | 289740 | 289 740 | 289 740 |
| | Plastic products | 1316 | 1 316 | 1 316 |
| | Porcelain products | 28711 | 28 711 | 28 711 |

Grand totals can only be managed through the context menu:

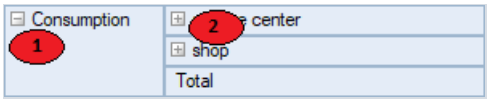

Collapse
Expand all
Collapse all
Hide node
Show hidden nodes
Grand total
Axis type
Axis properties...
Before
After
Hide
Sum
Count
Minimum
Maximum
Average
Multiplication
Variance
Std Dev
VarianceS
Std DevS
First value
Last value
List of values
Median
Weighted arithmetic mean
Calculation
Calculation (detail)
601230
187
4951
30
3
3
4728
4 728
220
220
20628
45
4
4
Total
Glasswares
Metal utensils
Plastic box
Plastic products
Porcelain products
Top N filters: 0
Sum: 1650,33

# Drill Up/Down

Grid data can be collapsed (drilled up) to exclude the values of the dimensions located below from processing or can be expanded (drilled down). These operations are performed using the "-" and "+" buttons located on both headers of the grid.

To group the data by the value of a certain dimension, you need to click the "-" button of the corresponding dimension. And conversely, to refine the data click the "+" button. These buttons are identified as '1' and '2' below:

1. drill up button
2. drill down button




Drilling up or drilling down changes the structure of the grid header and the data region. The two illustrations below show how the grid looks after drilling down on "service center" and then after drilling up on "Consumption":

| | | | | | |
|---|---|---|---|---|---|
| ⊟ Consumption | ⊟ service center | Air filter | 400,00 | 1 | 70,00 |
| | | Fuel filter | 1 700,00 | 1 | 700,00 |
| | | Reducer oil | 550,00 | 1 | 320,00 |
| | | Total | 2 650,00 | 3 | 1 090,00 |
| | ⊞ shop | | 3 249,00 | 13 | 320,00 |
| | Total | | 5 899,00 | 16 | 1 410,00 |

| | | | |
|---|---|---|---|
| ⊞ Consumption | 5 899,00 | 16 | 1 410,00 |

Only the main Total shows when a dimension item is collapsed.

It is possible to collapse the grand totals. The result depends on whether or not the "Measures" field is placed in the collapsed axis. An axis without measures collapses with the hiding of all the cells except the grand total cell. An axis with measures can collapse grand totals for each measure independently. The collapse of measure grand totals hides all the cells of that measure. Collapsing the grand totals of all the measures hides all the cells except the grand total cells for each measure.

In this example the grand totals for measure "Amount" and "Cost" are collapsed:

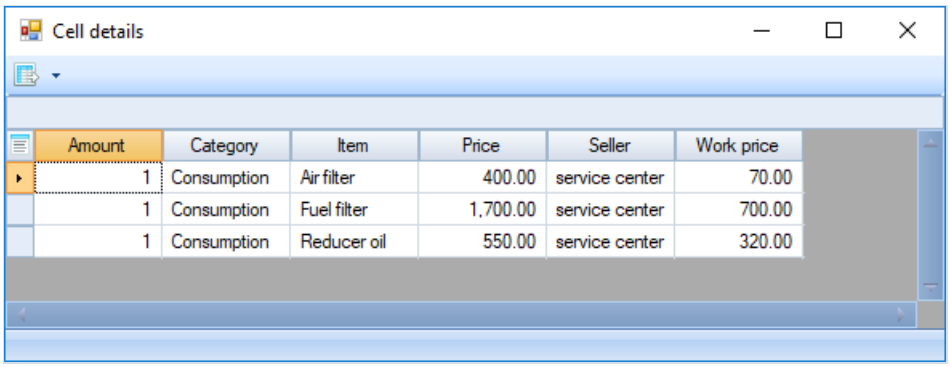
| Manager | Product | Measures (4) | |
|---|---|---|---|
| ⊞ Amount | | | 601230 |
| ⊞ Cost | | | 11 706 187,56 |
| ⊟ Paid | | | 5 219 178,52 |
| ⊟ Balance | | | 6 487 009,04 |
| ⊟ Baldwin Janet | Paid | | 8 354,20 |
| | Balance | | 238 965,45 |
| | Metal utensils | Paid | 643,00 |
| | | Balance | 0,00 |
| | Plastic products | Paid | 6 453,60 |
| | | Balance | 233 806,75 |
| | Porcelain products | Paid | 1 257,60 |
| | | Balance | 5 158,70 |
| ⊟ Burbank Kevin | Paid | | 536 548,98 |
| | Balance | | 885 426,09 |
| | Glasswares | Paid | 483,25 |
| | | Balance | 0,00 |

And here the grand totals for all the measures are collapsed:

| Manager | Product | |
|---|---|---|
| Amount | | 601230 |
| Cost | | 11 706 187,56 |
| Paid | | 5 219 178,52 |
| Balance | | 6 487 009,04 |

# Drill Through

Double-clicking on a data cell opens a window showing a Detail Table which contains the source data rows used for calculation of the selected cell:




| Amount | Category | Item | Price | Seller | Work price |
|---|---|---|---|---|---|
| 1 | Consumption | Air filter | 400.00 | service center | 70.00 |
| 1 | Consumption | Fuel filter | 1,700.00 | service center | 700.00 |
| 1 | Consumption | Reducer oil | 550.00 | service center | 320.00 |

This Detail Table can be manipulated by:

- changing the visibility and size of the columns
- selecting data cells for copying to the clipboard
- exporting data to the same format as the main grid

The status bar shows the current row and total row count.

# Rotation

The grid layout can easily be changed by moving the dimensions between the three regions: filter region, row dimensions region and column dimensions region. In OLAP terms, this operation is called rotation, because it corresponds to rotating a multi-dimensional data array. Data rotation enables the same information to be analysed from different perspectives.

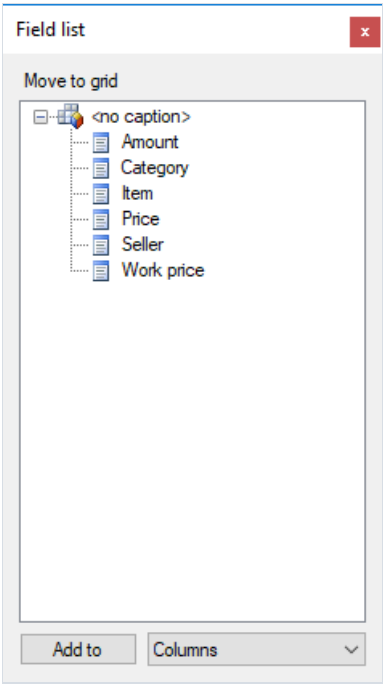
To rotate data in the grid the various dimensions must be dragged with the mouse from one region to another. As the mouse is dragged over the grid a special pointer shows where the dimension will go if the button mouse is released at that moment (see grid below):

| Move filter fields here | | | | | |
|---|---|---|---|---|---|
| Field list | | | Measures (3) | | |
| Category | Seller | Item | Price | Amount | Work price |
| Grand total | | | 16 179,00 | 27 | 3 410,00 |
| Consumption | service center | Air filter | 400,00 | 1 | 70,00 |
| | | Fuel filter | 1 700,00 | 1 | 700,00 |
| | | Reducer oil | 550,00 | 1 | 320,00 |
| | | Total | 2 650,00 | 3 | 1 090,00 |
| | shop | Antifreeze | 50,00 | 10 | |
| | | Motor oil | 1 079,00 | 1 | |
| | | Oil filter | 150,00 | 1 | 0,00 |
| | | Transmission oil | 1 970,00 | 1 | 320,00 |
| | | Total | 3 249,00 | 13 | 320,00 |
| | Total | | 5 899,00 | 16 | 1 410,00 |
| Documents | auto market | contract of purchase | 800,00 | 1 | |
| | GAI | registration certificate | 1 000,00 | 1 | |
| | insurance agent | insurance | 2 500,00 | 1 | |
| | Total | | 4 300,00 | 3 | 0,00 |

This is the resultant grid after the "Item" dimension has been moved from the row dimensions region to the column dimensions region:

| Move filter fields here | | | | | | |
|---|---|---|---|---|---|---|
| Field list | | Item | Measures (3) | | | |
| Category | Seller | Price | Amount | Work price | Air filter | |
| | | | | | Price | Amo |
| Grand total | | 16 179,00 | 27 | 3 410,00 | 400,00 | |
| Consumption | service center | 2 650,00 | 3 | 1 090,00 | 400,00 | |
| | shop | 3 249,00 | 13 | 320,00 | | |
| | Total | 5 899,00 | 16 | 1 410,00 | 400,00 | |
| Documents | auto market | 800,00 | 1 | | | |
| | GAI | 1 000,00 | 1 | | | |
| | insurance agent | 2 500,00 | 1 | | | |
| | Total | 4 300,00 | 3 | 0,00 | | |
| Goods | prev owner | 1 100,00 | 4 | 500,00 | | |
| | shop | 4 880,00 | 4 | 1 500,00 | | |
| | Total | 5 980,00 | 8 | 2 000,00 | | |

The move can also be made using the field list dialog of the grid:




As well as partial rotation it is also possible to perform total rotation (grid transposition). This operation moves all the row dimensions to the column region and all the column dimensions to the row region. Unlike partial rotation, grid transposition does not require the recalculation of data cells and as a result is instantaneous. Transpose a grid using the 'Transpose' button on the toolbar. Our transposed grid looks like this:

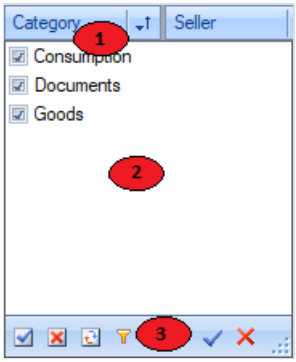
Move filter fields here

| Field list / Measures (3) | Category: Grand total | Seller: Consumption / service center: Air filter | Item: Fuel filter | Reducer oil | Total | sh Antif |
|---|---|---|---|---|---|---|
| Price | 16 179,00 | 400,00 | 1 700,00 | 550,00 | 2 650,00 | |
| Amount | 27 | 1 | 1 | 1 | 3 | |
| Work price | 3 410,00 | 70,00 | 700,00 | 320,00 | 1 090,00 | |

# Filtering

Data filtering is performed by excluding certain dimension values from the analysis. Please note that it does not matter in which region of the grid this dimension is located (filter region, row dimensions region or column dimensions region). Filtered values are not only hidden in the grid header but are also excluded from measures and Totals calculations.

Values of dimensions can be filtered using the drop-down list which is opened with a mouse-click on the dimension filtering button ('1' below):




Key to the grid above:

1. dimension filtering button
2. list of dimension values
3. drop-down list toolbar

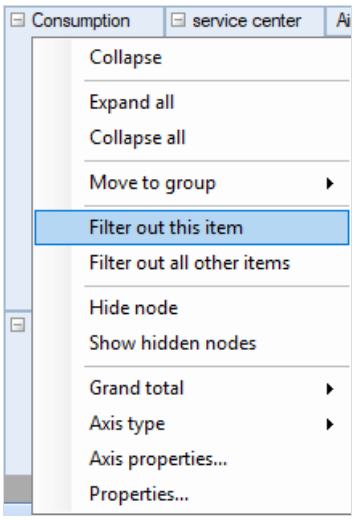
Checked values in the drop-down list are visible in the grid. If un-checked, all the corresponding rows of the source data are excluded from grid calculations. Values are toggled either by clicking on its checkbox or by selecting the value and pressing the spacebar on the keyboard. Holding the Ctrl button down while clicking a checkbox turns off all the values except the clicked one.

Depending on the grid settings, changes may be applied automatically or by the Apply button.

The toolbar may contain the following commands:

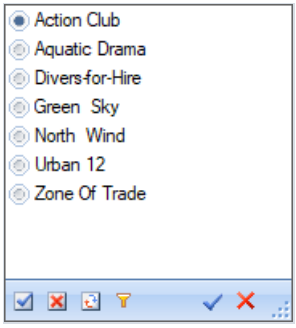
| Icon | Action |
|---|---|
| | Mark all values as visible |
| | Mark all values as hidden |
| | Toggle value visibility |
| | Show only the values that are not filtered by other dimensions |
| | Apply changes and close list |
| | Cancel changes and close list |

Filters can also be applied through the grid context menu:

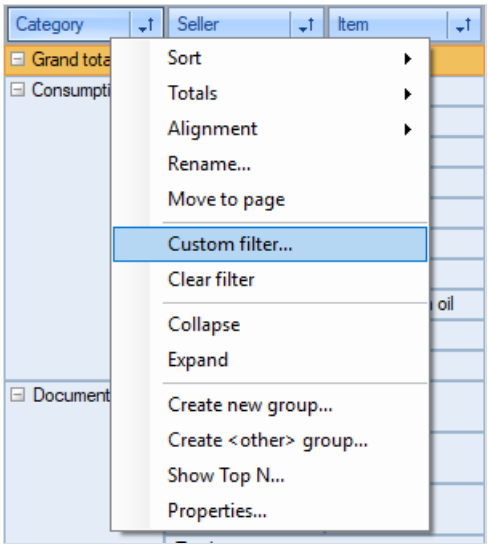



The Filter drop-down list can also be configured as radio buttons instead of checkboxes.

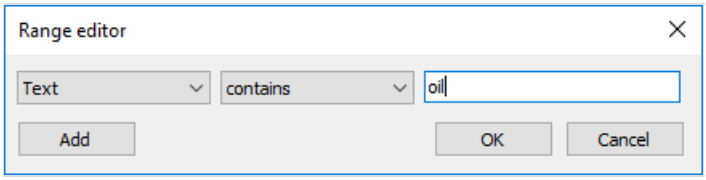
Radio buttons allow the selection of only one value at a time as visible:



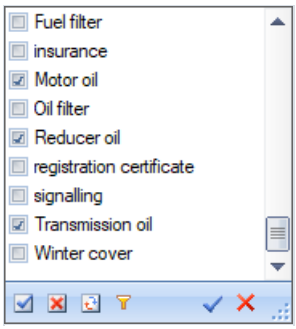

The Dimension values Range Editor offers conditional filtering of values. It is opened from the dimension context menu item "Custom filter...":



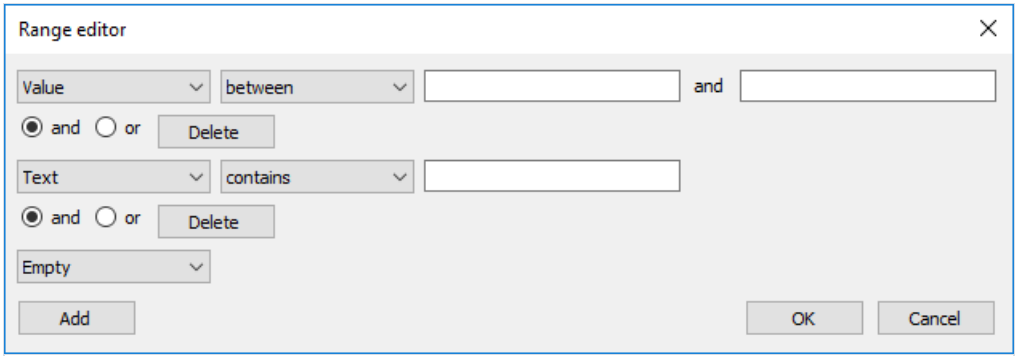

For example, the "Product" dimension can be set to filter out all values except where "Text contains 'utensils' substring":




This is equivalent to:




The Range Editor can create multiple, simultaneous conditions of varying type:




Filtering affects measures and the calculation of Totals, but the grid can also be set to simply hide particular nodes in the headers. In this case the hidden nodes do not affect measures and the calculation of Totals. Node hiding can only be set using the context menu.

# Sorting

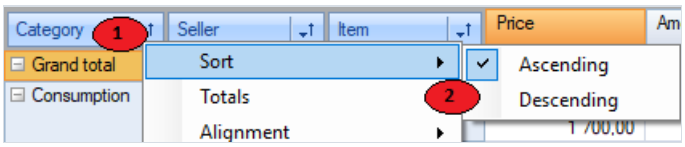
All the data in the grid is displayed in sorted order, irrespective of the original order in the source table. The sort order is either ascending or descending. Numeric values and date/times are sorted in their natural order, ascending or descending/. Strings are sorted alphabetically, ascending or descending.

Every dimension in the grid can have its own sort order/. For example, rows for the "Category" dimension can have ascending order and those for the "Seller" dimension descending order. The default sort order is ascending for all dimensions.

The sort order for a selected dimension is changed either by:

1. double-clicking on the dimension title
2. or selecting the required order from the dimension context menu (numbered '2' in diagram below)

The current dimension sort order is marked with a special symbol (numbered '1' in diagram below):




Apart from the sort order, it is also possible to set the sort type separately for lines and columns. There are three types of sorting:

1. by axes values - the default sort type
2. by measure Totals - data is sorted by the Total values for a measure - if there are several measures then only the values of the measure associated with the selected cell are included in the sort
3. by active row/column - sorting is similar to the previous type, but instead of the Total values of the row/column the values of the current row/column (selected in the grid) are used

The sort type is selected through the toolbar for both row dimensions and column dimensions.

# Grouping

FastCube can collect several dimension values into a group. Grouping is a two stage process - group creation followed by population with values.

Grouping features:

- unlimited number of dimension groups
- empty groups allowed
- empty groups not shown on axes
- groups must have unique names inside a dimension
- a dimension value cannot belong to more than one group
- inclusion of a dimension value in one group automatically excludes it from all other groups
- a dimension value can be excluded from grouping
- a system group "Others" can be created, which includes all values not belonging to any other group
- group deletion automatically excludes all the values it contains
- group creation, deletion, renaming, value inclusion and exclusion can be performed while the cube is active
- a filter window shows all groups and their members : group filtering state depends on member states
- moving a dimension from one region to another does not reset groups
- dimension groups are saved in cube files together with the dimension members

The axis shows dimensions having groups at two levels: group level and member level. The group level contains dimension group names and also dimension values that do not belong to any group. The member level contains the values which belong to the groups. A group can be in a collapsed state, in which case the group members are not shown. If all groups are collapsed then the member level is not shown.

Beware! any operation involving a group, including collapse/expansion, causes measure recalculation because of the change to the axis.

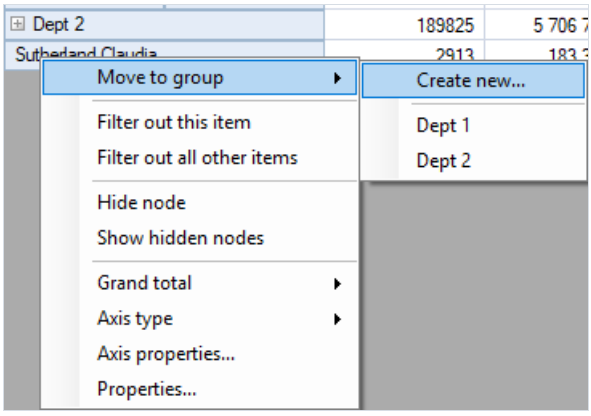
An example of a grid where the "Manager" dimension has no grouping:

| Product | Customer | | | |
|---|---|---|---|---|
| Field list | Measures (4) | | | |
| Manager | Amount | Cost | Paid | Balance |
| Grand total | 601230 | 11 706 187,56 | 5 219 178,52 | 6 487 009,04 |
| Baldwin Janet | 4951 | 247 319,65 | 8 354,20 | 238 965,45 |
| Burbank Kevin | 20628 | 1 421 975,07 | 536 548,98 | 885 426,09 |
| Glon Jacques | 322977 | 3 422 430,60 | 71 131,63 | 3 351 298,97 |
| Guckenheimer Scott Jr | 59936 | 724 337,69 | 21 410,20 | 702 927,49 |
| Montgomery Jennifer | 6957 | 364 227,36 | 1 592,20 | 362 635,16 |
| Nordstrom Carol | 314 | 15 550,20 | 15 503,20 | 47,00 |
| Parker Robert | 10490 | 218 139,22 | 188 610,63 | 29 528,59 |
| Phong Leslie | 68100 | 1 816 894,39 | 1 574 939,34 | 241 955,05 |
| Reeves Roger | 26879 | 998 331,20 | 843 409,90 | 154 921,30 |
| Steadman Walter | 77085 | 2 293 621,88 | 1 903 866,24 | 389 755,64 |
| Sutherland Claudia | 2913 | 183 360,30 | 53 812,00 | 129 548,30 |

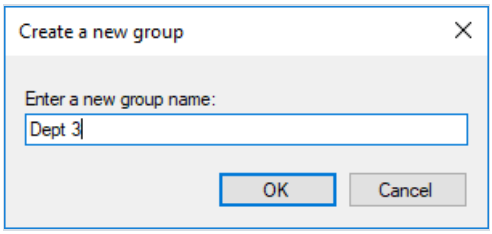
The same grid with the dimension "Manager" having two groups, "Dept 1" and "Dept 2", each manager having been moved to the correct Department group:

| Product | Customer | | | | |
|---|---|---|---|---|---|
| Field list | | Measures (4) | | | |
| Manager | Manager(...) | Amount | Cost | Paid | Balance |
| Grand total | | 601230 | 11 706 187,56 | 5 219 178,52 | 6 487 009,04 |
| Dept 1 | Total | 408492 | 5 816 063,01 | 637 445,01 | 5 178 618,00 |
| | Baldwin Janet | 4951 | 247 319,65 | 8 354,20 | 238 965,45 |
| | Burbank Kevin | 20628 | 1 421 975,07 | 536 548,98 | 885 426,09 |
| | Glon Jacques | 322977 | 3 422 430,60 | 71 131,63 | 3 351 298,97 |
| | Guckenheimer Scott Jr | 59936 | 724 337,69 | 21 410,20 | 702 927,49 |
| Dept 2 | | 189825 | 5 706 764,25 | 4 527 921,51 | 1 178 842,74 |
| Sutherland Claudia | | 2913 | 183 360,30 | 53 812,00 | 129 548,30 |

Note that group "Dept 1" is expanded and group "Dept 2" is collapsed. Also, manager "Sutherland Claudia" does not belong to any group since she works in "Dept 3". Let's create a group for her. First open the context menu by right-clicking on value "Sutherland Claudia". The "Move to group" options are : add to a previously created group, or start a new group. Let's choose "Create new...":



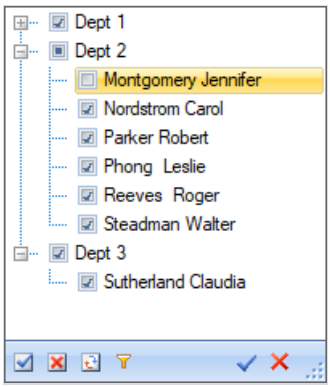

And enter the department name:



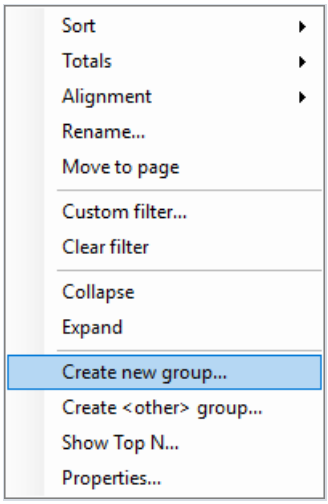

The new group is created and "Sutherland Claudia" is moved to it:

| Manager | Amount | Cost | Paid | Balance |
|---|---|---|---|---|
| Grand total | 601230 | 11 706 187,56 | 5 219 178,52 | 6 487 009,04 |
| Dept 1 | 408492 | 5 816 063,01 | 637 445,01 | 5 178 618,00 |
| Dept 2 | 189825 | 5 706 764,25 | 4 527 921,51 | 1 178 842,74 |
| Dept 3 | 2913 | 183 360,30 | 53 812,00 | 129 548,30 |

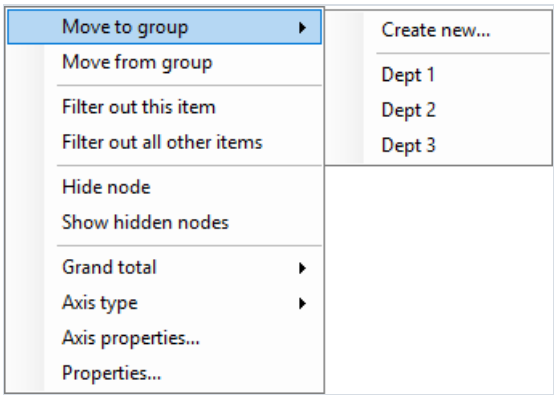
The filter drop/-down list for the "Manager" dimension now looks like this:



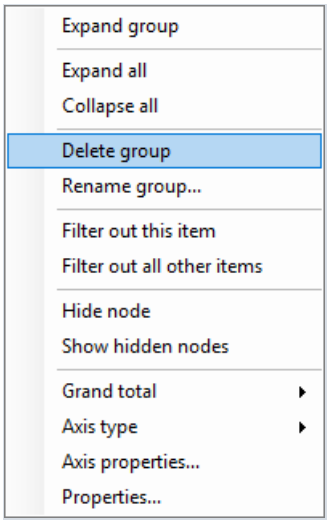

And the context menu for the dimension is:




While the context menu for a dimension member is:




And the context menu for the dimension group is:

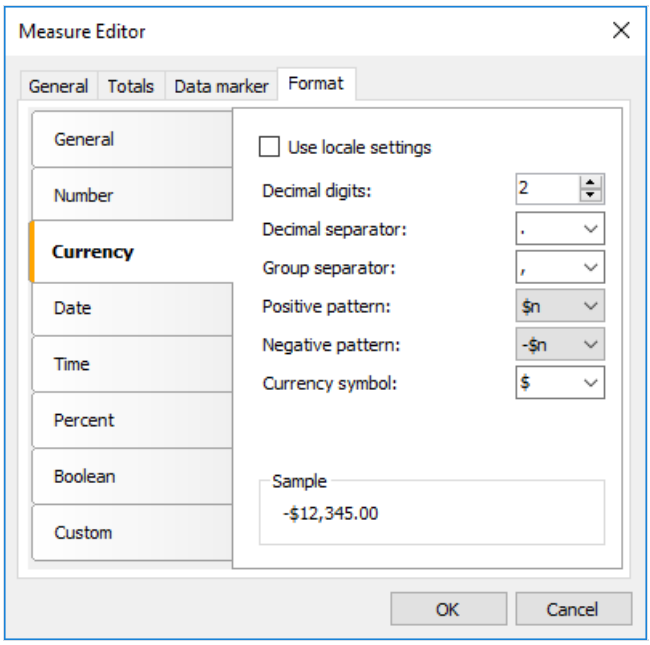


# Data Formatting

By default a grid formats data according to the field type and the precision. For numeric measures the grid uses a number format having the same precision as the database field. But sometimes one or more measures need to be presented differently. For example, let's change the format of the "Price" measure to currency:

| Category | Seller | Item | Price | Amount | Work price |
|---|---|---|---|---|---|
| Grand total | | | 16 179,00 | 27 | 3 410,00 |
| Consumption | service center | Air filter | 400,00 | 1 | 70,00 |
| | | Fuel filter | 1 700,00 | 1 | 700,00 |
| | | Reducer oil | 550,00 | 1 | 320,00 |
| | | Total | 2 650,00 | 3 | 1 090,00 |

The Format Editor is opened either from the cell's context menu or through the toolbar:



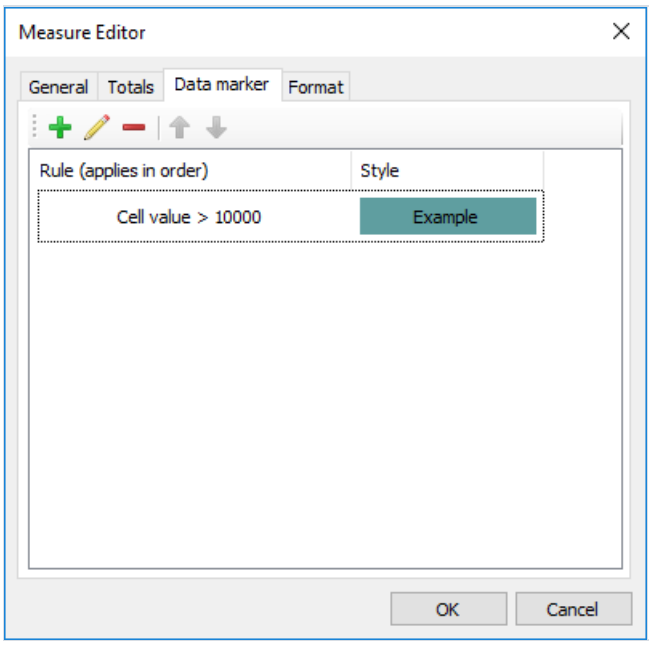

This editor lists the format categories on the left with the corresponding formats on the right. The format string, group and decimal separators can be altered if necessary.

| Category | Seller | Item | Price | Amount | Work price |
|---|---|---|---|---|---|
| Grand total | | | $16,179.00 | 27 | 3 410,00 |
| Consumption | service center | Air filter | $400.00 | 1 | 70,00 |
| | | Fuel filter | $1,700.00 | 1 | 700,00 |
| | | Reducer oil | $550.00 | 1 | 320,00 |
| | | Total | $2,650.00 | 3 | 1 090,00 |

# Data highlight

FastCube.Net cross-table allows to set a special display style for the particular measure values.

It is necessary to create a highlight rule (or several rules) in the measure properties dialog to highlight measure data.




All highlight rules can be divided into 2 types which will be given below:

- highlight all measure cells depending on their values,
- highlight only those cells which match the specified condition.

Rules apply to cells consistently. Therefore, if one cell matches 2 rules which both change cell background then the last rule wins. On the other hand, if one rule only changes the background and another changes the font style then cell will get background from the first rule and the font style from the second.

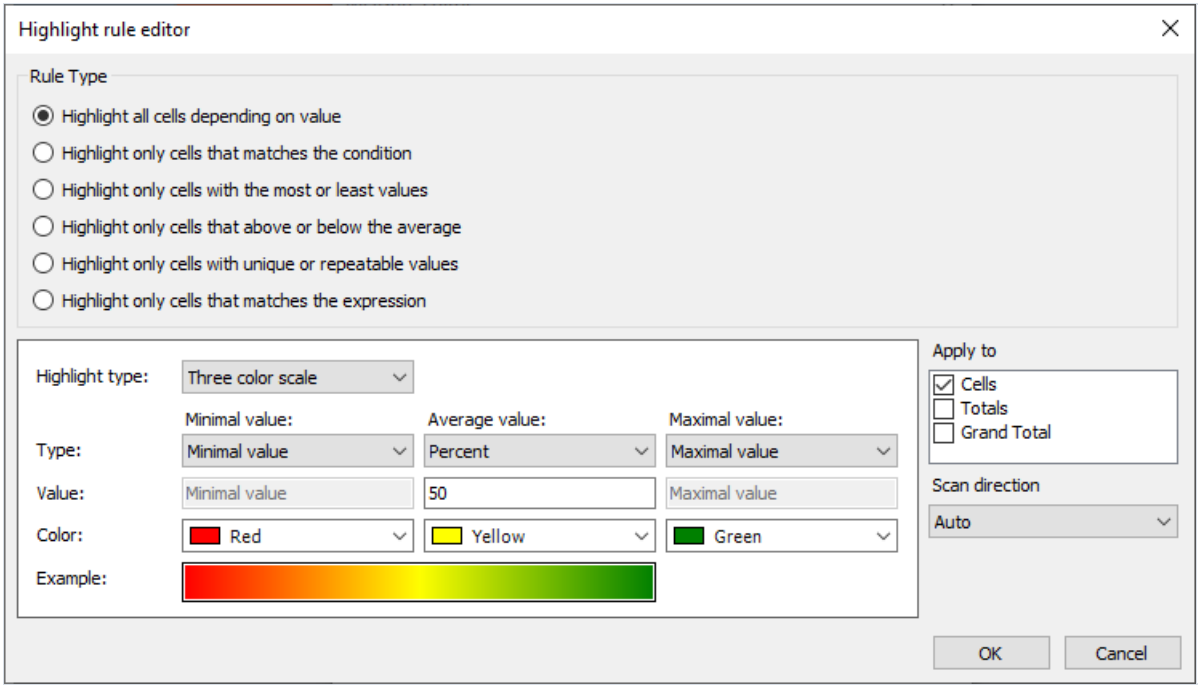
Rules apply to generic cells by default but if needed can also be applied to `totals` and the `grand total`. This can be set in the highlight rule setup dialog.

Some rules require to perform additional calculations in the pivot table (like minimum, average, rank, etc). And we know that measures can be placed both in rows and in columns. To perform these calculations FastCube needs to know the `Scan direction` (the direction to traverse measure cells). "Auto" mode correctly works in the majority of cases but it may be needed to define the direction by hands. In this case the `Scan direction` option needs to be set to the Rows or Columns mode.

# Highlight all cells depending on value

FastCube.Net can apply four different types of highlighting known as continuous highlighting, which applies highlighting to all cells dependent on their values. Each type of continuous highlighting is described below.

## Two color scale and Three color scale



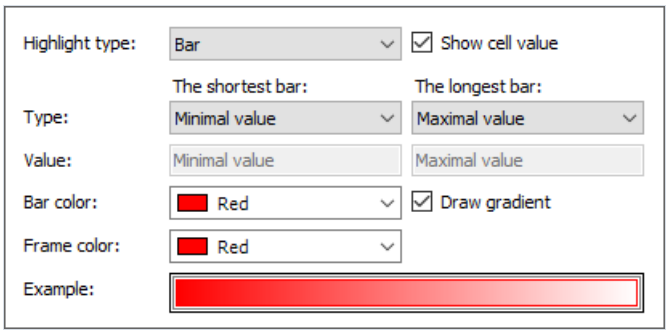

Color scale highlighting fills each cell's background with a color calculated from the given color gradient scale. The editor dialog sets the values for the extreme points and their corresponding colors, and also for one intermediate point for the three color scale. The values for the points can be set either as absolute numbers ("Number" option) or as one of the following relative options:

- Minimal value / Maximal value - minimal or maximal measure value
- Percent - value field sets the percent relative to minimal and maximal measure values
- Percentile - value field sets the percentile relative to measure values

An example of two color and three color scale highlighting:

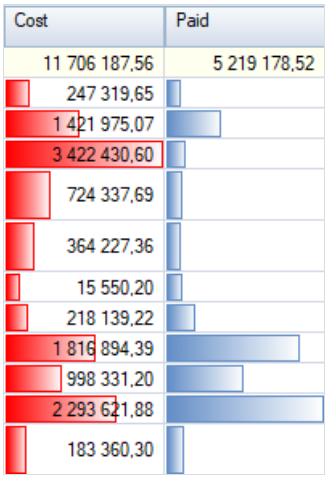
| Amount | Paid |
|---|---|
| 601230 | 5 219 178,52 |
| 4951 | 8 354,20 |
| 20628 | 536 548,98 |
| 322977 | 71 131,63 |
| 59936 | 21 410,20 |
| 6957 | 1 592,20 |
| 314 | 15 503,20 |
| 10490 | 188 610,63 |
| 68100 | 1 574 939,34 |
| 26879 | 843 409,90 |
| 77085 | 1 903 866,24 |
| 2913 | 53 812,00 |

## Bar

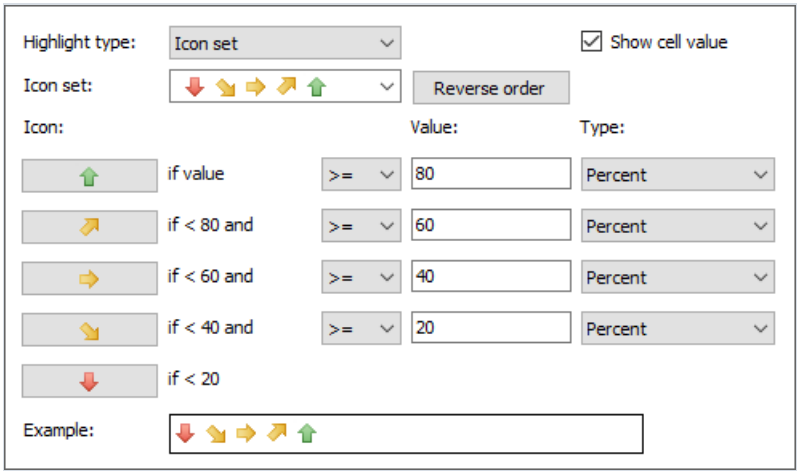



This type of highlighting draws a colored bar within the measure cell. The length of the bar depends on the values set under the Shortest bar and the Longest bar properties. The property values, as previously, can be set with either the absolute or the relative option. The bar can be drawn either in a solid color or with a gradient color to white. The frame color for the bar is set independently. The cell value can also be hidden for this type of highlighting, leaving only the bar visible.

An example of bar highlighting with and without visible cell values:




## Icon set




In Icon set highlighting an icon related to the value inside the measure cell is drawn to the left of the cell's value. The editor dialog has options for sets of 3, 4 or 5 icons. Each icon used requires a value range to be set. The cell value can also be hidden for this type of highlighting, leaving only the icon visible.

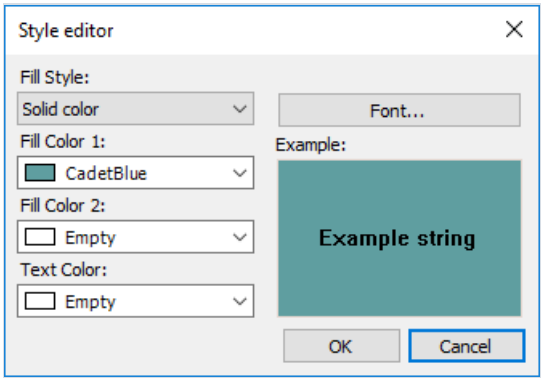
An example of icon set highlighting with and without visible cell values:

| Balance | Paid |
|---|---|
| 6 487 009,04 | 5 219 178,52 |
| 238 965,45 | |
| 885 426,09 | |
| 3 351 298,97 | |
| 702 927,49 | |
| 362 635,16 | |
| 47,00 | |
| 29 528,59 | |
| 241 955,05 | |
| 154 921,30 | |
| 389 755,64 | |
| 129 548,30 | |

# Highlighting only the matching cells

The rules of this group differ only by the cell selection mechanics. The rule style applies to all the cells which passes the selection.

The "Style..." button opens the drawing style editor:



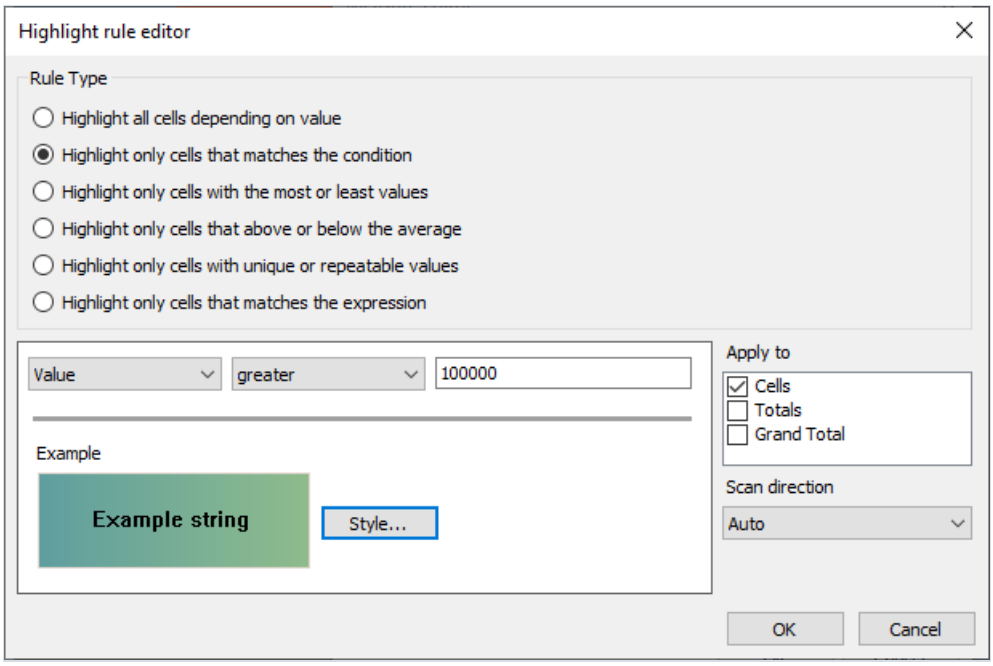

The style editor allows you to choose background fill, color and style of the text. Solid fill style only requires a "Fill Color 1" value, but gradient fill also requires a "Fill Color 2" value.

Here is an example after applying different conditional styles to some measure cells:

| Amount | Cost | Paid | Balance |
|---|---|---|---|
| 601230 | 11 706 187,56 | 5 219 178,52 | 6 487 009,04 |
| 4951 | 247 319,65 | 8 354,20 | 238 965,45 |
| 20628 | 1 421 975,07 | **536 548,98** | 885 426,09 |
| 322977 | 3 422 430,60 | 71 131,63 | 3 351 298,97 |
| 59936 | 724 337,69 | 21 410,20 | 702 927,49 |
| 6957 | 364 227,36 | 1 592,20 | 362 635,16 |
| 314 | 15 550,20 | 15 503,20 | ~~47,00~~ |
| 10490 | 218 139,22 | 188 610,63 | ~~29 528,59~~ |
| 68100 | 1 816 894,39 | **1 574 939,34** | 241 955,05 |
| 26879 | 998 331,20 | **843 409,90** | 154 921,30 |
| 77085 | 2 293 621,88 | **1 903 866,24** | 389 755,64 |
| 2913 | 183 360,30 | 53 812,00 | 129 548,30 |

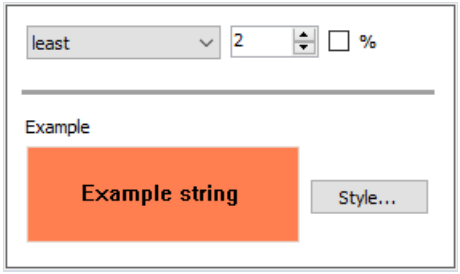
## Cells that match the condition

Highlight rules can process measure data as number, text, date or check for NULL value. Depending on the type of processing, different conditions can be used. So, for example, number processing allows "greater" and "lower" conditions while text processing allows "contains" and "not contains" conditions, which look for a substring within a text string:



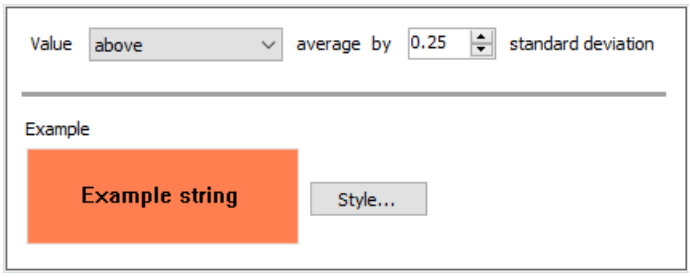

## Most or Least cells

The rule allows to select most or least cells or percent from amount of most/least cells in group. Most cells are cells with the minimal rank (and maximal value). On the other hand, Least cells are cells with the maximal rank (and minimal value).



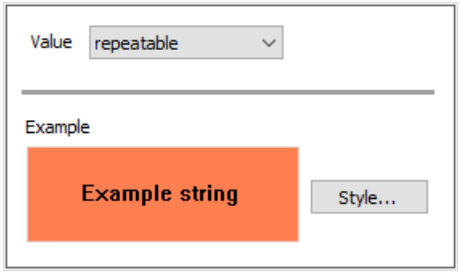

## Cells above or below average

The rule allows to select cells comparing with average in group. In addition it is possible to offset from average by the chosen amount of `standard deviations`.



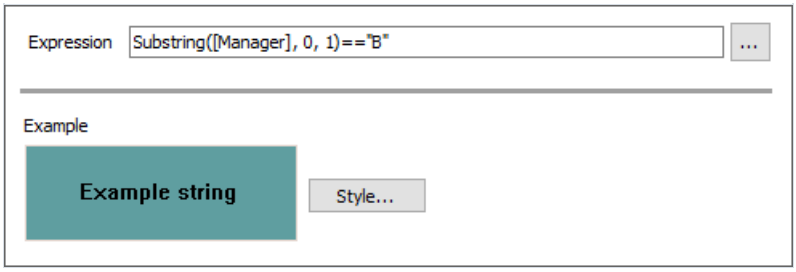

## Cells with unique or repeatable values

The rule allows to select cells which values are repeated or not in the group.




## Cells that matches the expression

The rule allows to set any user expression to select cells. One, for example, can check dimension values or values of another measure. So, in the below example, we check the first letter of the `Manager` dimension.



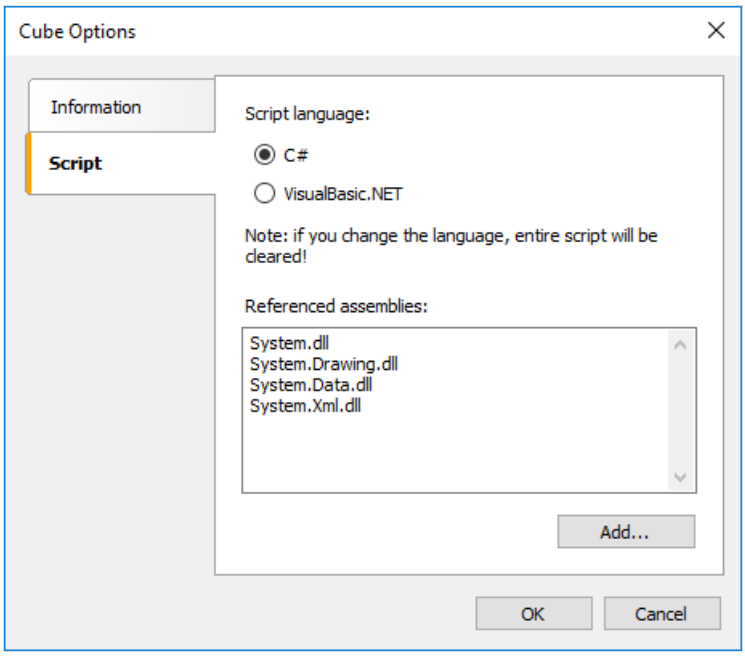
# Expressions

FastCube allows to use expressions for Measures, Totals calculation and for Measure filtering.

An expression is a code in C# or VB.Net language, which returns any value. For example:

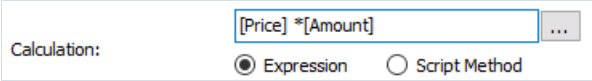
```
2 + 2
```

An expression should be written in a language chosen as a script in a cube. By default, it is C#. You can change the language by the button "Cube options" and by choosing the "Script" element in a window.

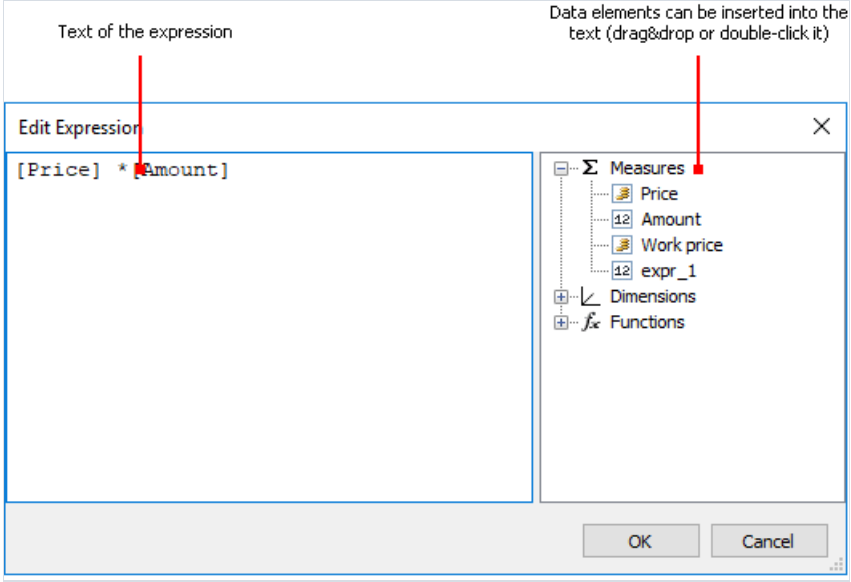


# Expression editor

To write an expression quickly, use the expression editor. It can be invoked in such places of FastCube UI, where you can type an expression:




The expression editor presents a window where you can write an expression and insert some elements into it:



# Using .Net functions

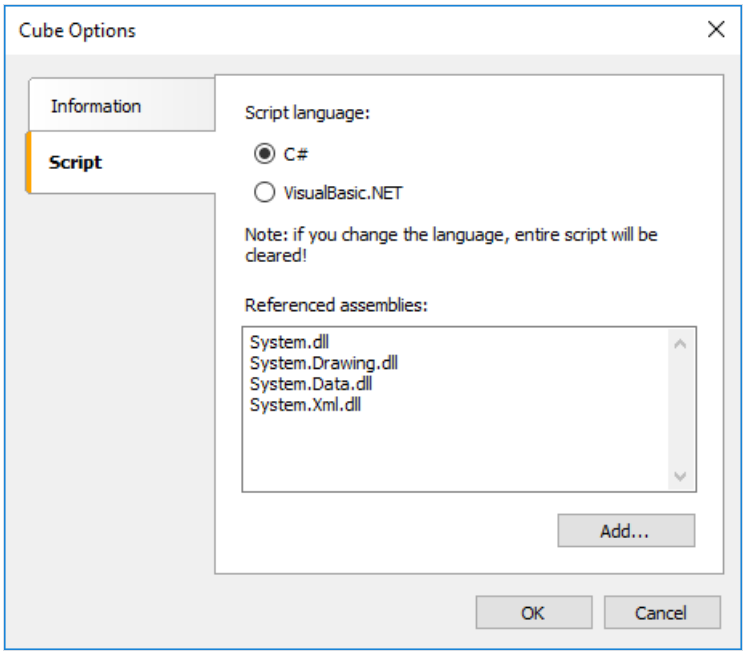
You can use any.Net objects in expressions. The following example demonstrates Max function use:

```
Math.Max(5, 10)
```

By default a report uses the following .Net assemblies:

```
System.dll
System.Drawing.dll
System.Windows.Forms.dll
System.Data.dll
System.Xml.dll
```

You have access to all .Net objects declared in these assemblies. If you need to have access to another assembly, add its name in report assemblies list. You can do it in the "Report|Options..." menu, by choosing the "Script" element in a window:




For example, if you want to use a function in your report which was declared in your application, add application assembly (.exe or .dll) in a report assemblies list. After that you can call the function by using namespace of your application. For example, if the following function is defined in application:

```
namespace Demo
{
  public static class MyFunctions
  {
    public static string Func1()
    {
      return "Hello!";
    }
  }
}
```

You can use it in your report in the following way:

```
Demo.MyFunctions.Func1()
```

If you add the "using Demo" line at the top of the report's script, it will allows you to shorten the syntax:

```
MyFunctions.Func1()
```

To refer to the function or variable that was defined in a script, just use its name:

```
myPrivateVariableThatIHaveDeclaredInScript
MyScriptFunction()
```

> You can use in an expression only those functions which return a value.

# Reference to slice data

Apart from standard language elements, you can use the following slice elements in expressions:

- measures;
- dimensions.

Any of these elements can be used in an expression, by including it in square brackets. For example:

```
[Price] + 1
```

A variable "Page", which returns Price measure value, is used in the expression. It is enclosed in square brackets.

# Reference to slice elements

For reference to measures and dimensions, the following format is used:

```
[MeasureName]
```

Let us look at the following example of using measures in an expression:

```
[Price] * [Amount]
```

Here it should be noted that: every measure and dimension has a definite data type. How element can be used in an expression depends on its type. For instance, in above mentioned example, Price is double and Amount is integer and that is why they can be used in such a way. In the following example, we will try to use "Item" dimension of string type, which will lead to an error:

```
[Amount] + " " + [Item]
```

The error occurs because, you never mix strings with numbers. For this, you need to convert the number into a string:

```
[Amount].ToString() + " " + [Item]
```

In this case, we refer to the "Amount" measure as if it is an integer variable. And it is so. We know that all expressions are compiled. All non-standard things (like referring measure) from a compiler's point of view are converted into another type, which is understandable to a compiler. So, the last expression will be turned into the following form:

```
((int)Slice.Measures.GetItemByName("Amount").CurrentValue).ToString() + " " +
((string)Slice.Dimensions.GetItemByName("Item").CurrentValue)
```

As seen, FastCube changes reference to measures and dimensions in the following way:

`[Amount]` --> `((int)Slice.Measures.GetItemByName("Amount").CurrentValue)`

`[Item]` --> `((string)Slice.Dimensions.GetItemByName("Item").CurrentValue)`

That is, we can use data column in an expressions as if it is a variable having a definite type. For example, the following expression will return the first symbol of an employee's name:

```
[Employees.FirstName].Substring(0, 1)
```

# Script

Script is a higher-level programming language, which works inside the FastCube library. Script can be written in one of the following .Net languages:

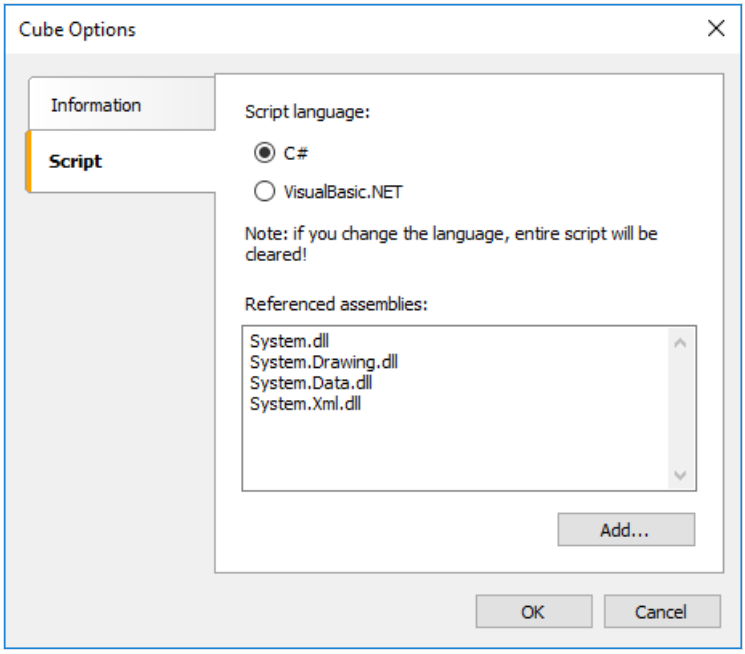
- C#
- VisualBasic.Net

Using the script, you can do the following:

- perform measure calculation and totals calculation, which cannot be done via regular means of the FastCube engine;
- perform dimension values calculation;

In order to see the cube's script, press the "Code" button.

Script language can be set in the "Cube options" window (click on appropriate button on the toolbar). This is supposed to be done before writing various handlers, because when changing the language, the existing script gets deleted.



# General information

In the script, you can:

- add your variables, methods and properties to the main script class;
- create slice/cube elements events handler;
- add new classes to the script, if needed. A class can be added either before the SliceScript main class or after it.

You cannot:

- delete, rename or change the visibility area of the SliceScript main class;
- rename a namespace in which the main class is located.

When cube/slice builds, the following occurs:

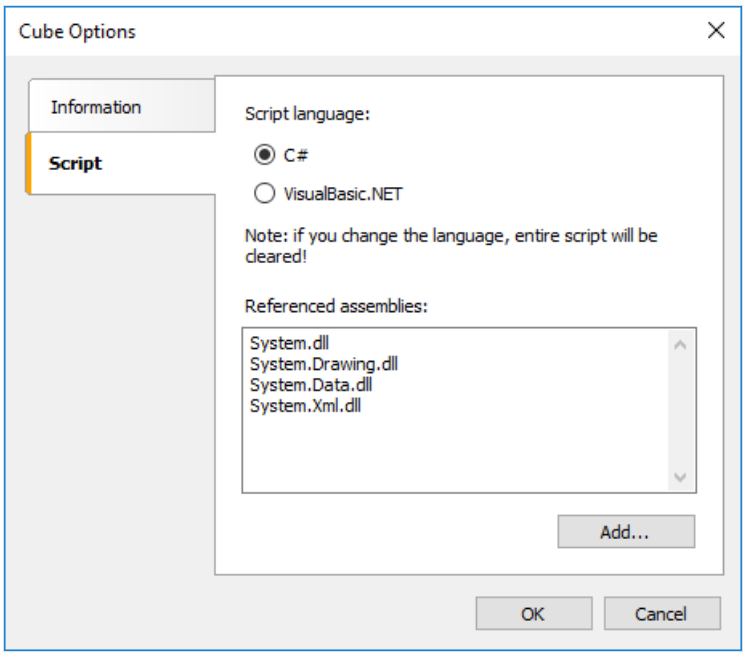
- FastCube adds Slice and Cube variables into the script. This is done before compiling the script and allows you to refer them;
- a script is compiled, if it is not empty;
- the script class is initialized;
- performs further cube/slice building.

# Using .NET objects

In a script, you can use any .Net objects, which are defined in the following assemblies:

```
System.dll
System.Drawing.dll
System.Windows.Forms.dll
System.Data.dll
System.Xml.dll
```

Apart from that, you can use any object, defined in the FastCube assembly. If you need access to another assembly, add it to the list of assemblies. This can be done by "Cube options" button, by choosing the "Script" tab:




For example, if you want to use a function in your cube which was declared in your application, add application assembly (.exe or .dll) in a cube assemblies list. After that you can call the function by using namespace of your application. For example, if the following function is defined in application:

```
namespace Demo
{
  publicstaticclass MyFunctions
  {
    publicstaticstring Func1()
    {
      return"Hello!";
    }
  }
}
```

Calling it in the script can be done in the following way:

```
string hello = Demo.MyFunctions.Func1();
```

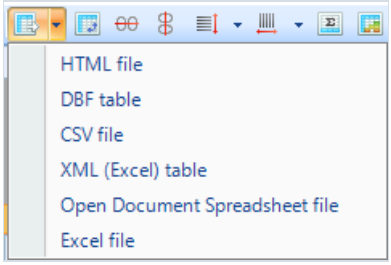
If you add the "using Demo" line at the top of the cube's script, it will allows you to shorten the syntax:

```
string hello = MyFunctions.Func1();
```

# Data export

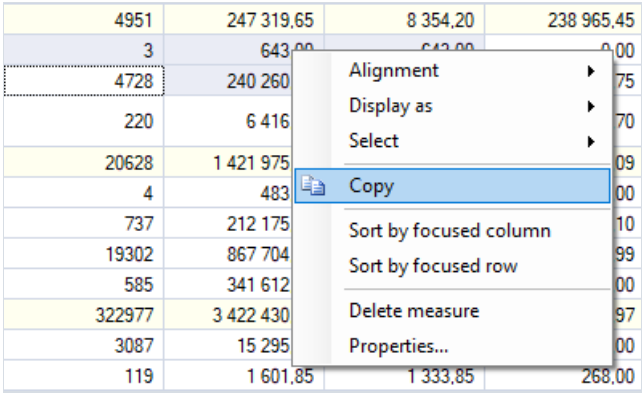
FastCube.Net can export grid data to a number of formats.

Presently export is supported in five formats: Excel, ODS, XML, HTML and DBF. Export in each format is initiated from buttons on the toolbar:




Exporting uses either the grid data or the source cube data, depending on the export format chosen. So, for example, Excel export uses the dimensions and measures in the grid, while DBF export is from the source cube data.

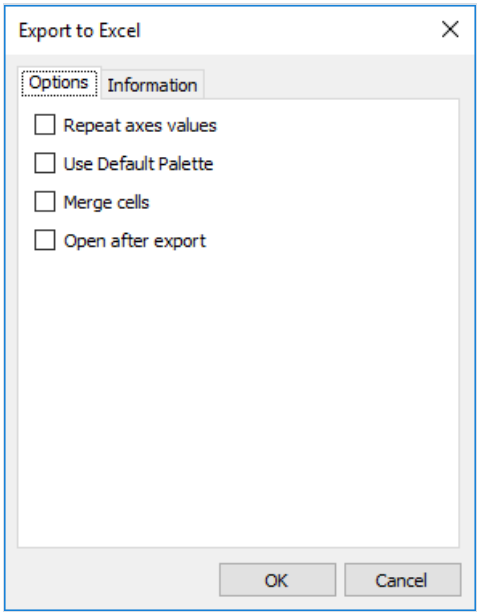
In addition to exporting data, FastCube can copy data from a selected region to the clipboard. A region in the grid can be selected either using the mouse or by pressing the Shift+arrow keys on the keyboard. Copying to the clipboard is done using the usual 'Ctrl+C' or 'Ctrl+Insert' combinations or using the context menu:



# Export to XLS

Excel is a Microsoft application for working with electronic spreadsheets. It is included in Microsoft Office. XLS files can also be opened with OpenOffice and LibreOffice.

When exporting to Excel format the output file settings are made in the export dialog:




Export settings:

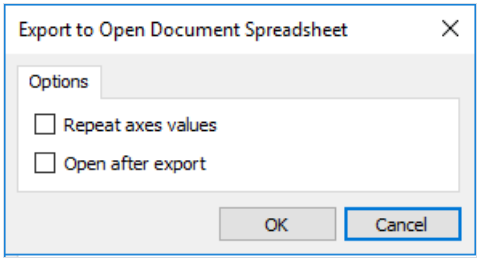
| Setting | Action |
|---|---|
| **Repeat axes values** | Grouped values in grid headers are repeated for each row/column |
| **Use default palette** | Use standard Excel colors |
| **Merge cells** | Merge cells for ranges |
| **Open after export** | Open file immediately after export (requires Excel, OpenOffice or LibreOffice) |

# Export to ODS

OpenDocument Format (ODF : OASIS Open Document Format for Office Application) was designed by OASIS and based on the XML format used in OpenOffice.

FastCube.Net supports export to the table type OpenDocument format (.ods). These files can be opened in OpenOffice or LibreOffice.

When exporting to ODF format the output file settings are made in the export dialog:



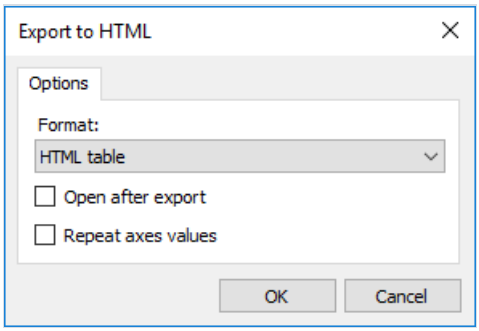

Export settings:

| Setting | Action |
|---|---|
| **Repeat axes values** | Grouped values in grid headers are repeated for each row/column |
| **Open after export** | Open file immediately after export |

# Export to HTML

HTML (Hypertext Markup Language) is regarded as the standard language for documents on the Internet. It is used for creating relatively simple but well designed documents. HTML supports hypertext linking as well as simple document layout.

When exporting to HTML format the output file settings are made in the export dialog:



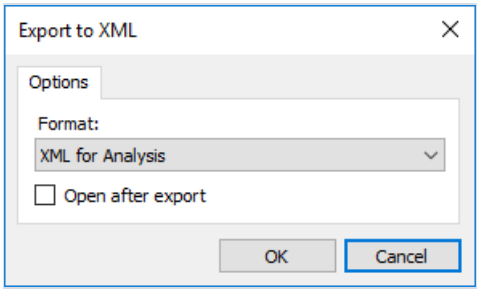

Export settings:

| Setting | Action |
|---|---|
| **HTML Format** | Possible values: *HTML table* - export to HTML table (table tag); *Excel Worksheet HTML* - export to HTML format with Excel extensions |
| **Repeat axes values** | Grouped values in grid headers are repeated for each row/column |
| **Open after export** | Open file immediately after export (requires Excel, OpenOffice or LibreOffice) |

# Export to XML

XML (Extensible Markup Language) is an extendable markup language. XML is intended for structured data storage and also for information exchange between different programs.

When exporting to XML format the output file settings are made in the export dialog:




Export parameters:

| Setting | Action |
|---|---|
| **XML format** | See bellow |
| **Open after export** | Open file immediately after export (requires Excel, OpenOffice or LibreOffice) |

XML formats:

| Format | Description |
|---|---|
| **Rowset** | export cube data in the format compatible with ADO Rowset |
| **Dataset** | export cube data in the format compatible with .Net Dataset |
| **DataPacket** | export cube data in the format compatible with ClientDataset of Embarcadero Delphy |
| **XML for Analysis** | export slice data in XML for Analysis format |

# Export to Dropbox

A prepared schema or cube can be saved to a Dropbox from the FastCube .NET. Schema or cube can be exported to one of the supported formats before being saved to the Dropbox.

Before saving a schema or cube to a Dropbox an application must be created in your Dropbox account. Do this by logging in to your Dropbox account and taking the following steps:

- click the “More” button: it is located at the bottom of the Dropbox homepage
- choose “Developers” in the drop-down list: you will be directed to the page for developers
- go to “App Console”: it directs you to the list of applications
- click the “Create App” button: the Dropbox will check your email: click Send Email. In your mail system inbox you will find an email having a “Confirm” button: click the button to confirm your email address.

Finally you will be directed to “Create a new Dropbox Platform app”.

Select "Dropbox API app" and answer the question "What type of data does your app need to store on Dropbox?" by selecting "Files and datastores".

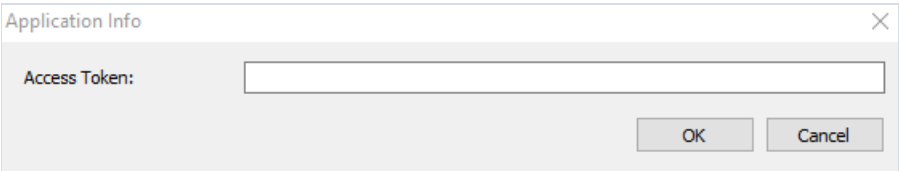
Answer the question "Can your app be limited to its own, private folder?" by choosing either of the two proposed answers.

This page also requires you to enter the name of the application.

After clicking the “Create app” button the system will create the application.

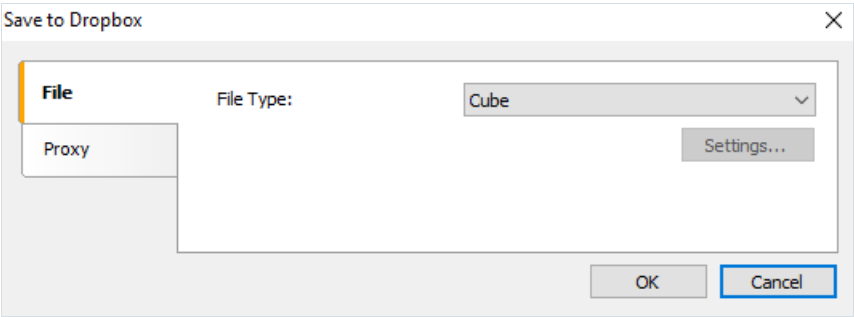
As a result the application settings page is opened. Here you can see the “Access Token”, which are required when exporting to a Dropbox.

You can now go to the FastCube .NET and export the file to the Dropbox by pressing the "Save" button and selecting “Dropbox”. When exporting to a Dropbox for the first time the "Application Info" window will be displayed:




Enter the “Access Token” obtained above. After clicking the “OK” button FastCube .NET saves these values and uses them again the next time.

The “Save to Dropbox” window has two tabs: File and Proxy:

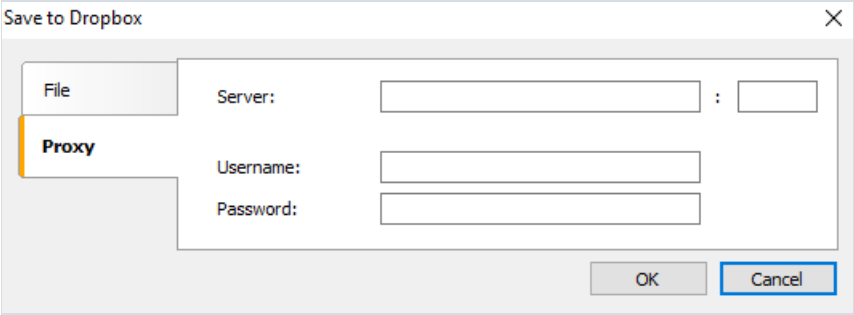


The File tab contains the following fields:

- File Type : select the file format (prepared schema or cube or one of the export formats) from the drop-down list.

If an export format is selected then the “Settings...” button becomes available, which opens the settings window for the chosen export format.

If a proxy server is used then the URL-address, port, username and password of the proxy server are set on the Proxy tab:

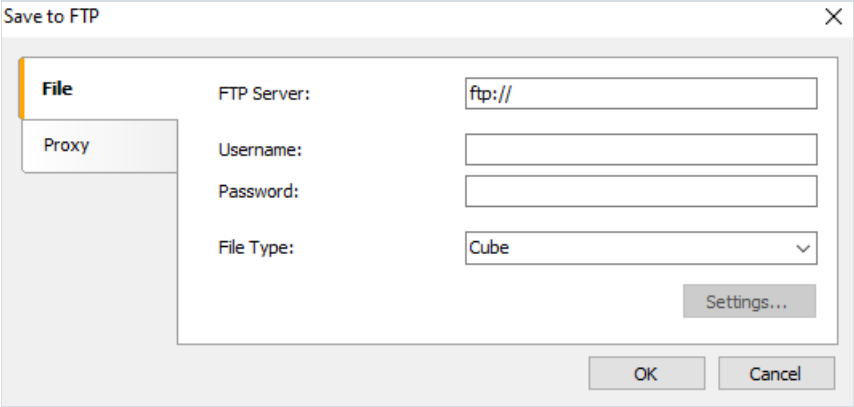



When all settings have been made click the “OK” button to save the file to the Dropbox.

# Export to FTP

A prepared schema or cube can be saved to an FTP server from the FastCube .NET. The schema or cube can be exported to one of the supported formats before being saved to FTP.

Press "Save"button and after that select "Cloud" and select "FTP". This opens the "Save to FTP" window.

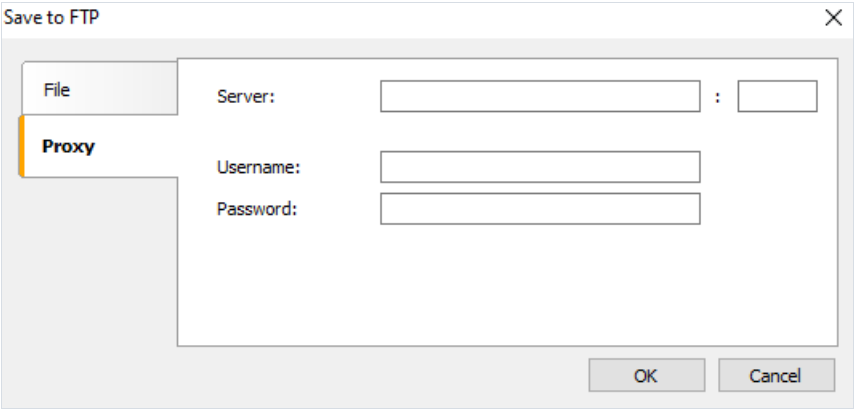



The File tab has the following fields:

- FTP Server: enter the URL-address of the FTP server
- Username and Password: enter your username and password
- File Type: select the file format (prepared schema or cube or one of the export formats) from the drop-down list.

If an export format is selected then the “Settings...” button becomes available, which opens the settings window for the chosen export format.

If a proxy server is used then the URL-address, port, username and password of the proxy server are set on the Proxy tab:




When all settings have been made click the OK button to save the file to the FTP server.

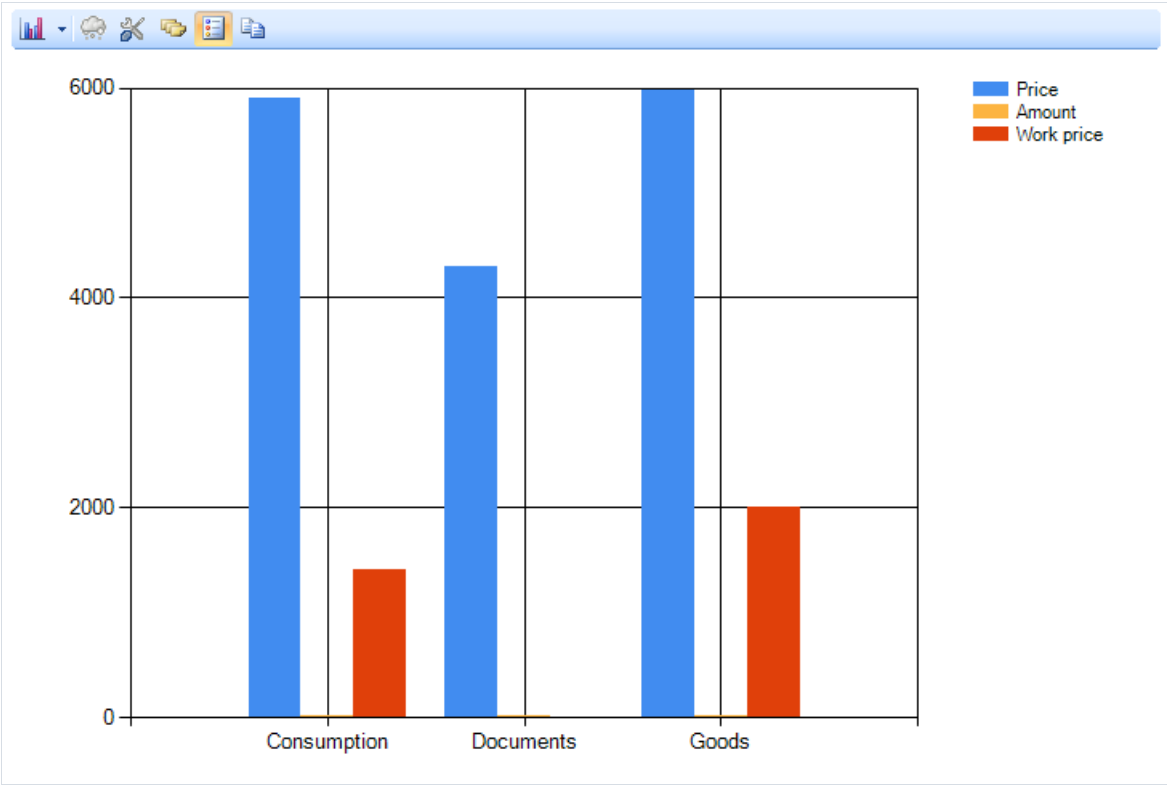
# Toolbar

The grid toolbar contains the following set of buttons:

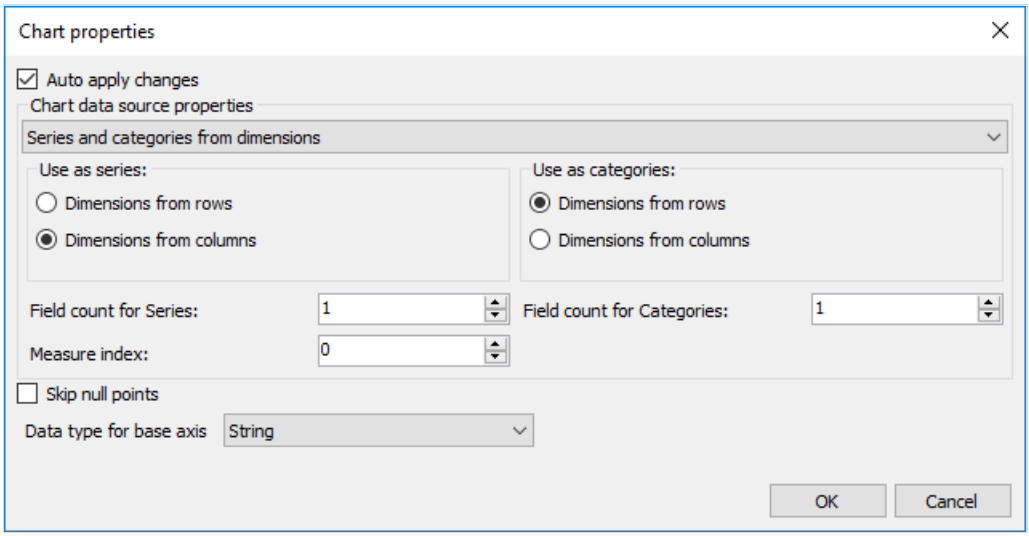
| Icon | Command |
|---|---|
| | Save cube or scheme to file. Cube files have an mdc extension - they contain source data array, filters and formatting settings. Scheme files have an mds extension - as well as formatting settings they can also contain filters |
| | Load cube or scheme file. Also allows loading of an additional data array to the current cube (e.g. data from another time period) |
| | Clear formatting scheme |
| | Export data to external formats drop-down menu shows list of available formats |
| | Transpose grid |
| | Hide dimension values having only zero or empty data in rows |
| | Hide dimension values having only zero or empty data in columns |
| | Select sort mode by rows |
| | Select sort mode by columns |
| | Open measure editor dialog |
| | Open measure highlight options |
| | Open measure format options |
| | Open field list window |
| | Show information about grid structure, data loading elapsed time, creation of headers and calculation of measures |

# The Chart

The data in a grid may be presented as a cumulative 2D chart. The MsChart component is used for display of the chart. Depending on the settings, one of the major dimensions of the rows/columns is used for the chart series and the opposing dimension (i.e. the major dimension in the columns/rows) is used to supply the values in each of the series.




If the source grid does not contain row or column dimensions, an internal representation of a grid with row and column dimensions will be built inside the chart. The chart properties dialog is opened from the toolbar:




The main property is the source of data for the series and categories. Possible sources are: the dimensions and the measures in the grid. The dimension region, number of dimensions for the names of categories/series and the measure index need to be selected appropriate to the selected source.

# The Chart Toolbar

The chart toolbar contains the following set of buttons:

| Icon | Action |
|---|---|
| | Select type of chart series |
| | "Freeze" chart. Chart will not update automatically |
| | Chart properties editor |
| | Display labels on values of series |
| | Display chart legend |
| | Copy to clipboard |

# Example of FastCube Use

This chapter describes examples of using FastCube.Net.

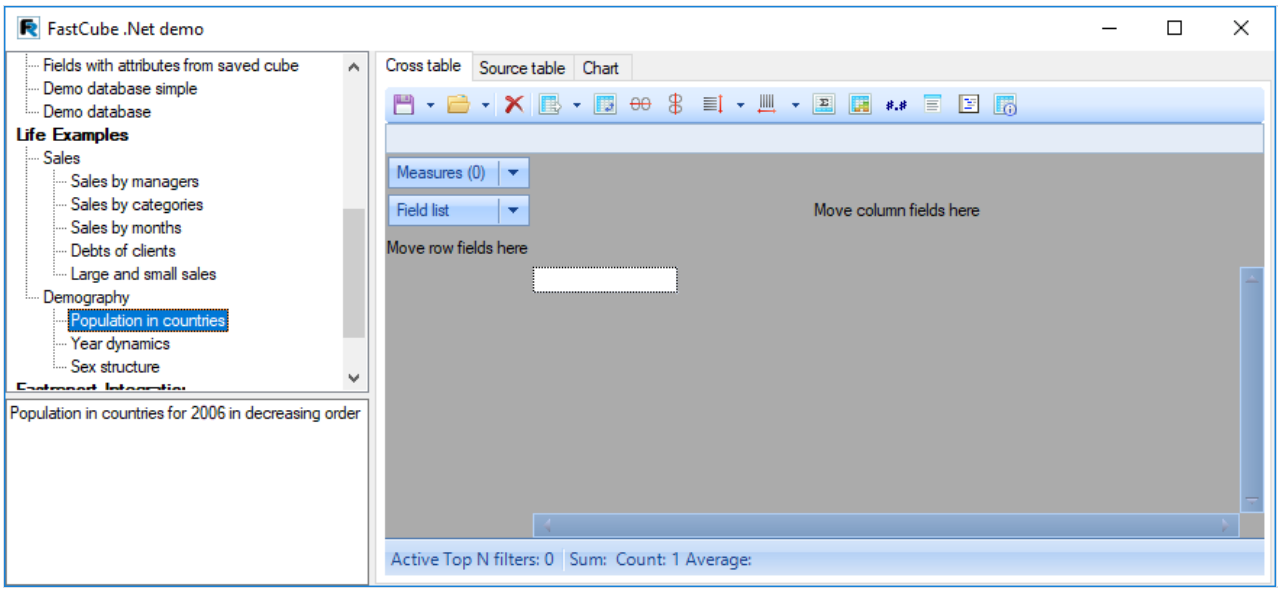
The examples can be seen in the demo program 'Advanced'.

# Example "Demography"

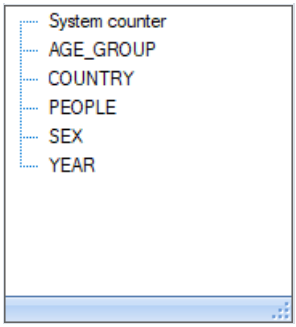
Let's show an example of using a multi-dimensional table holding demographic data for a number of countries. The source data was taken from the free service of the U.S. Census Bureau.

After some insignificant processing the data was loaded in the cube, so allowing the data to be displayed in a convenient way.

After loading the data into FastCube, start with the empty grid below (see 'Advanced' demo, 'Life Examples', 'Demography'):




Clicking on the "Field list" element, show this drop-down list:

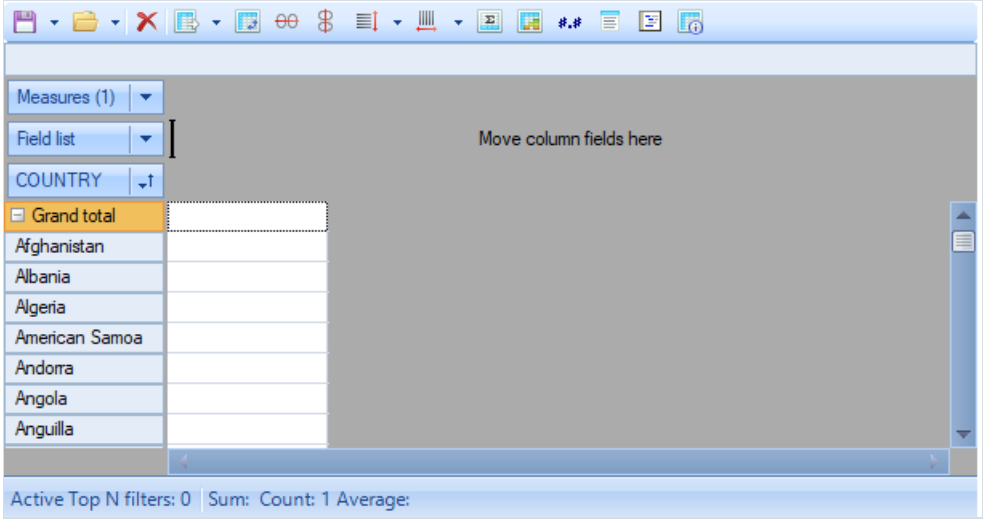



What can be done with this data? Let's create several examples.

If you have not been able to reproduce these examples, you can open the ready-made examples from the Advanced demo, "Life Examples", "Demography".

# Example 1: Population by country

Drag the "Country" field to the row region and the "People" field to the data region, then move the measures field that is already located in the filters region into the columns region:



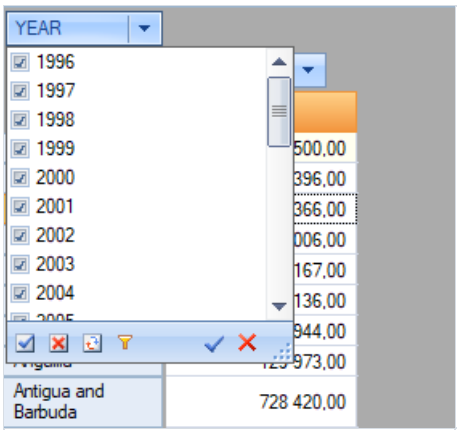

These steps give the grid below:

| Field list | Measures (1) |
|---|---|
| COUNTRY | PEOPLE |
| Grand total | 67 461 573 500,00 |
| Afghanistan | 279 485 396,00 |
| Albania | 38 430 366,00 |
| Algeria | 336 821 006,00 |
| American Samoa | 402 167,00 |
| Andorra | 732 136,00 |
| Angola | 117 584 944,00 |
| Anguilla | 129 973,00 |

It is easy to see that the data in the grid is incorrect. The reason for this is that here the "People" measure sums the values for all years. So we need to specify the required year. To do this, we must drag the "Year" field into the filters region.

When a field is added to the filters region of the grid, an element appears to enable data filtering through a drop-down list.

Let's click on the drop-down list of the "Year" field:

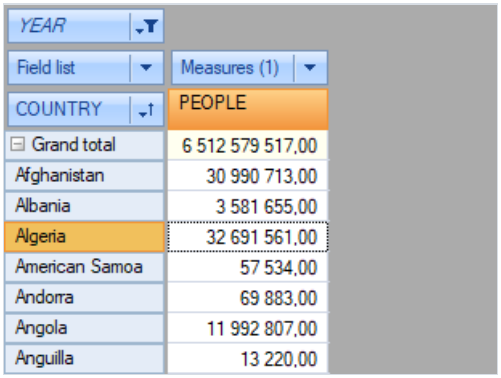



As shown, the grid contains data for 11 years. But we only need the data for 2006 - this can be achieved in several

ways:

1. by un-checking every year not needed, one by one (i.e. from 1996 to 2005)
2. by un-checking just 2006 and then clicking the "Inverse" button
3. by clicking the "Clear all" button and then clicking on 2006
4. by clicking on 2006 while holding down the 'Ctrl' key on the keyboard

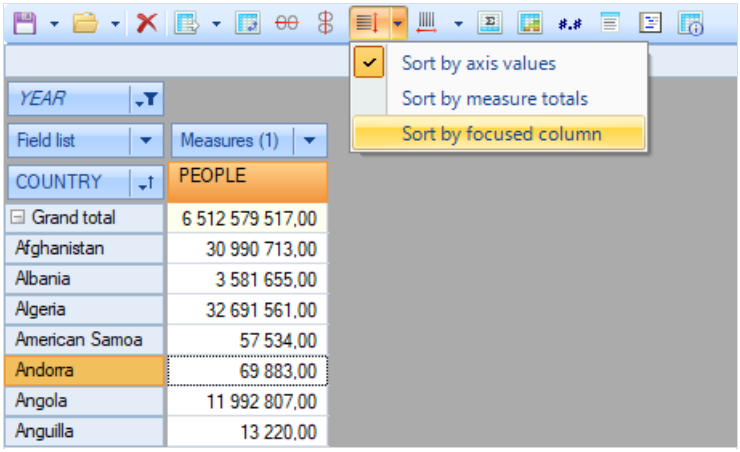
After these changes to the "Year" dimension the grid looks like this:




Note that the title 'Year' is displayed in italic and the drop-down icon shows a funnel, which means that a filter is applied to it.

Also note that the values of the "Country" dimension are listed in the alphabetical order/. For our analysis it would be more useful to list the countries in descending order of population. To do this, we need to sort the data by the value of the measure.

Click on any data cell in the grid, in the column which will be used for sorting the data, and select the option "Sort by focused column" in the toolbar:




This results in the grid displaying the data sorted by the value of the "People" measure (population), but in ascending order. Note that the column used for the sort is marked with a special symbol (diamond):

| YEAR | |
|---|---|
| Field list | Measures (1) |
| COUNTRY | PEOPLE |
| Grand total | 6 512 579 517,00 |
| Saint Pierre and Miquelon | 6 860,00 |
| Saint Helena | 7 338,00 |
| Montserrat | 9 153,00 |
| Tuvalu | 11 739,00 |
| Anguilla | 13 220,00 |
| Nauru | 13 274,00 |
| Palau | 20 394,00 |
| Turks and Caicos Islands | 21 016,00 |

To change the sort order to descending, double-click on the "Country" dimension (or do the same on the drop-down dimension menu).

Adding Percentage and Rank columns to the measure values, shows that China takes the first place by population (20% of the total population) and the United States only takes third place (4% of the total population).

| YEAR | | | |
|---|---|---|---|
| Field list | Measures (3) | | |
| COUNTRY | PEOPLE | PEOPLE % | PEOPLE range |
| Grand total | 6 512 579 517,00 | 100,00% | 1 |
| China | 1 313 973 713,00 | 20,18% | 1 |
| India | 1 111 713 910,00 | 17,07% | 2 |
| United States | 298 444 215,00 | 4,58% | 3 |
| Indonesia | 231 820 243,00 | 3,56% | 4 |
| Brazil | 186 141 676,00 | 2,86% | 5 |
| Pakistan | 164 870 515,00 | 2,53% | 6 |
| Bangladesh | 146 691 993,00 | 2,25% | 7 |
| Russia | 142 069 494,00 | 2,18% | 8 |
| Nigeria | 131 496 884,00 | 2,02% | 9 |

# Example 2: The dynamics of population growth

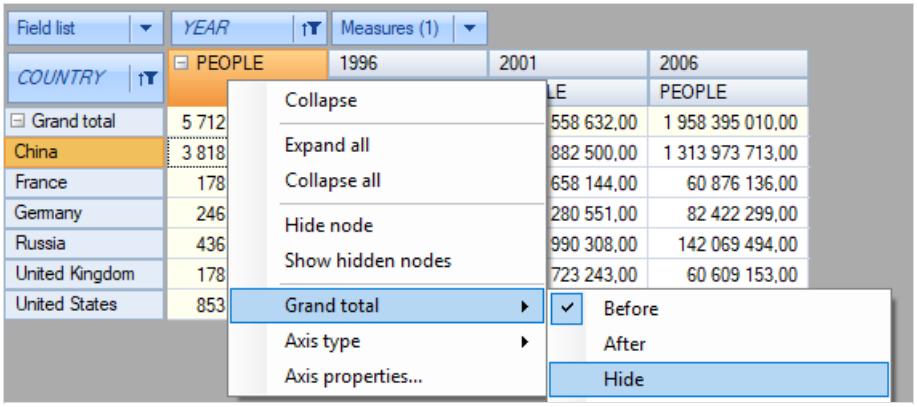
This example is based on the grid created above.

To achieve our objective we need to move the "Year" dimension from the filters region to the columns region, before the measures field, and add the values '1996' and '2001' to the years filter. As a result, the grid will show the population size in 5-year intervals between 1996 and 2006. Further, we can filter the country dimension to show just six countries: China, France, Germany, Russia, United Kingdom and the USA:

Move filter fields here

| Field list | YEAR | Measures (1) | | |
|---|---|---|---|---|
| COUNTRY | PEOPLE | 1996 | 2001 | 2006 |
| | | PEOPLE | PEOPLE | PEOPLE |
| Grand total | 5 712 597 917,00 | 1 844 644 275,00 | 1 909 558 632,00 | 1 958 395 010,00 |
| China | 3 818 623 660,00 | 1 227 767 447,00 | 1 276 882 500,00 | 1 313 973 713,00 |
| France | 178 922 688,00 | 58 388 408,00 | 59 658 144,00 | 60 876 136,00 |
| Germany | 246 593 517,00 | 81 890 667,00 | 82 280 551,00 | 82 422 299,00 |
| Russia | 436 371 501,00 | 148 311 699,00 | 145 990 308,00 | 142 069 494,00 |
| United Kingdom | 178 951 059,00 | 58 618 663,00 | 59 723 243,00 | 60 609 153,00 |
| United States | 853 135 492,00 | 269 667 391,00 | 285 023 886,00 | 298 444 215,00 |

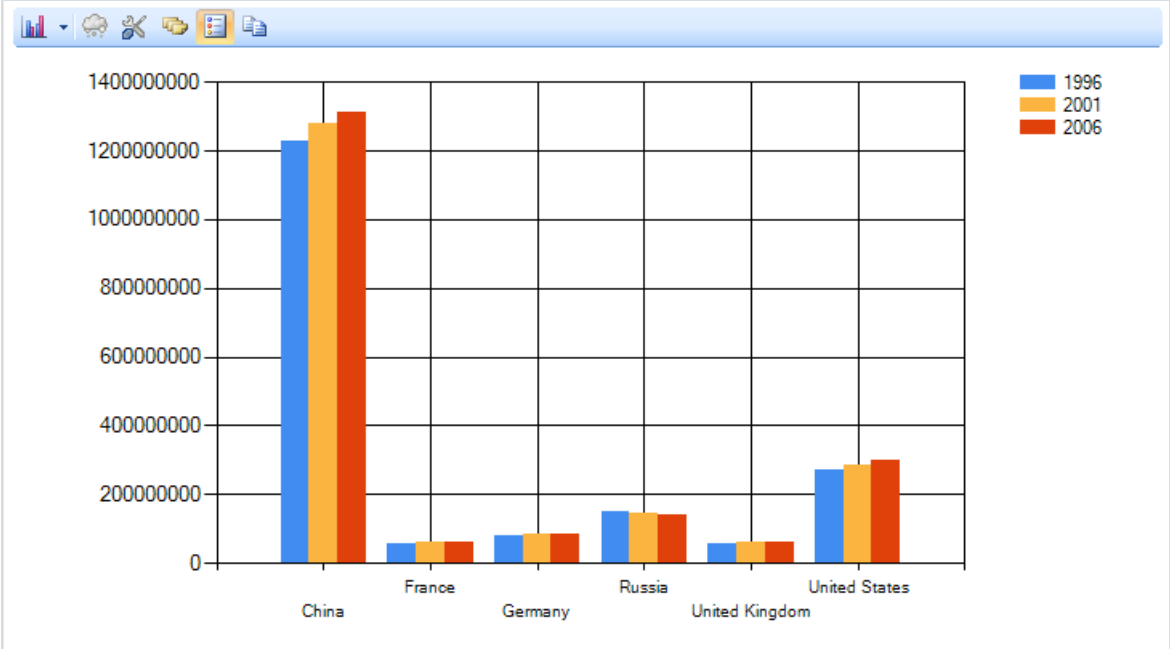
Now the first column shows the sum of the other columns and does not make any sense in this context, so we can hide the column. This is done through the context menu for the People item - 'Grand total - Hide':




The final grid looks like this:

| Field list | YEAR | Measures (1) | |
|---|---|---|---|
| COUNTRY | 1996 | 2001 | 2006 |
| | PEOPLE | PEOPLE | PEOPLE |
| Grand total | 1 844 644 275,00 | 1 909 558 632,00 | 1 958 395 010,00 |
| China | 1 227 767 447,00 | 1 276 882 500,00 | 1 313 973 713,00 |
| France | 58 388 408,00 | 59 658 144,00 | 60 876 136,00 |
| Germany | 81 890 667,00 | 82 280 551,00 | 82 422 299,00 |
| Russia | 148 311 699,00 | 145 990 308,00 | 142 069 494,00 |
| United Kingdom | 58 618 663,00 | 59 723 243,00 | 60 609 153,00 |
| United States | 269 667 391,00 | 285 023 886,00 | 298 444 215,00 |

This grid is useful for presenting the raw demographic data, but a far greater impact can be made when presented as a chart:




The chart clearly shows the relative sizes of the populations.

But to reveal which populations are increasing in size and which are falling, the grid data can be emphasized using the highlight tools:

| Field list | YEAR | Measures (1) | |
|---|---|---|---|
| COUNTRY | 1996 | 2001 | 2006 |
| | PEOPLE | PEOPLE | PEOPLE |
| Grand total | 1 844 644 275,00 | 1 909 558 632,00 | 1 958 395 010,00 |
| China | 1 227 767 447,00 | 1 276 882 500,00 | 1 313 973 713,00 |
| France | 58 388 408,00 | 59 658 144,00 | 60 876 136,00 |
| Germany | 81 890 667,00 | 82 280 551,00 | 82 422 299,00 |
| Russia | 148 311 699,00 | 145 990 308,00 | 142 069 494,00 |
| United Kingdom | 58 618 663,00 | 59 723 243,00 | 60 609 153,00 |
| United States | 269 667 391,00 | 285 023 886,00 | 298 444 215,00 |

# Example 3: Population by sex and age

In this example we will try to answer the following questions:

1. children of which gender are born more frequently?
2. does this gender ratio change with age?

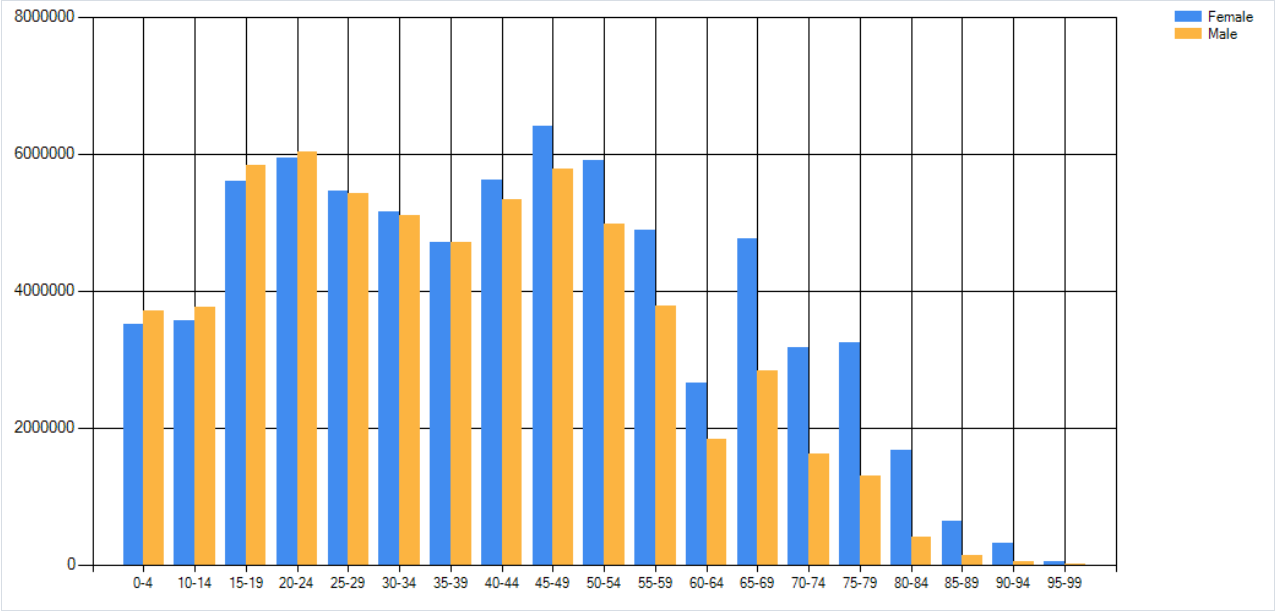
To answer these questions we will make the following changes to the grid:

1. drag the "Age_group" field from the Field list into the row region
2. drag the "Year" and "Country" fields into the filters region
3. drag the "Sex" field from the Field list and the measures field to the measure fields region
4. exclude the values of '100+' and '5-9' from the values of the "Age_group" dimension
5. leave only 2006 in the "Year" dimension
6. leave only Russia in the "Country" dimension

These steps produce the following grid:

| YEAR | COUNTRY | |
|---|---|---|
| Field list | Measures (1) | SEX |
| AGE_GRO... | PEOPLE | |
| | Female | Male |
| Grand total | 73 271 679,00 | 62 549 510,00 |
| 0-4 | 3 509 867,00 | 3 706 851,00 |
| 10-14 | 3 568 550,00 | 3 753 774,00 |
| 15-19 | 5 601 275,00 | 5 824 867,00 |
| 20-24 | 5 938 204,00 | 6 036 309,00 |
| 25-29 | 5 454 448,00 | 5 426 420,00 |
| 30-34 | 5 151 138,00 | 5 093 157,00 |
| 35-39 | 4 700 485,00 | 4 701 412,00 |
| 40-44 | 5 621 646,00 | 5 331 305,00 |
| 45-49 | 6 398 180,00 | 5 774 332,00 |
| 50-54 | 5 910 562,00 | 4 975 127,00 |
| 55-59 | 4 892 784,00 | 3 773 697,00 |
| 60-64 | 2 660 493,00 | 1 824 590,00 |
| 65-69 | 4 764 813,00 | 2 830 270,00 |
| 70-74 | 3 175 555,00 | 1 621 404,00 |
| 75-79 | 3 236 414,00 | 1 294 706,00 |
| 80-84 | 1 674 391,00 | 399 073,00 |
| 85-89 | 639 783,00 | 130 747,00 |
| 90-94 | 319 176,00 | 45 401,00 |
| 95-99 | 53 915,00 | 6 068,00 |

Just as previously, the raw data is less informative than a chart (though the figures may be important for printed reports), so let's switch to the chart page:




A chart makes it easy to answer our initial questions:

1. more boys are born than girls
2. however, from the age group 40-44 more women survive than men

# Minimum system requirements

Minimum system requirements for installing and using FastCube .NET:

- Operating system MS Windows 7-10, Windows Server 2012-2019;
- CPU: 1 GHz;
- RAM: 512 MB;
- You also need the installed .NET Framework version 4.7.2 or higher.

# Contacts and technical support

You can always ask questions about using the product by email, or by using the form on the website.

We also welcome your suggestions on how to improve our product.